TDOT Department of Transportation

TDOT SAFETY MANUAL

work 4 us

Revision 1: November 2023

The OHS Division's vision is to be the Safest DOT in the Nation. Our mission is to minimize risks of accidents and injuries for employees, contractors, and the public in all TDOT facilities and work zones by development and implementation of safety policy, training, education, assessments, guidance and best practices.

INTRODUCTION

The Tennessee Department of Transportation (TDOT) began the implementation of an Employee Safety Program in 2017 with the establishment of an Occupational Health & Safety (OHS) Division and the rollout of our Work 4 Us Culture. Prior to this time, there were few formal and standardized safety programs and/or guidance documents implemented at a statewide level. Once the HQ OHS Division and Regional Safety Teams were established, the program development and implementation began based on the top hazards and regulatory compliance. A significant amount of Safety program resources were and continue to be developed, but a need still existed to compile this information in a comprehensive and living document that contains safety information and resources for all categories of activities within TDOT.

The manual is organized by work activity and incorporates detailed hazards and controls for TDOT employees to review a Job Safety Assessment (JSA) prior to scheduled activities. Each activity section will contain links to all applicable programs and guidance relevant to employee safety. This manual is designed to be dynamic with the capability to view online or print relevant information to employee's selected work activity or topic.

The intention of the manual is to provide consistent statewide guidance so TDOT Staff may address common work operations safely. It does not address all possible activities performed. It is encouraged to conduct additional planning to address job-specific safety assessments not covered in this manual.

This TDOT Safety Manual is intended for TDOT Employees only.

HOW TO USE THIS MANUAL

The TDOT Safety Manual is a resource designed for all TDOT activities to provide safety-related information on hazards while working and how to control those hazards. Simply put, we answer the questions “How can I get hurt?” and “How do I keep from getting hurt?”. Our goal is to guide TDOT personnel in identifying workplace hazards and begin a conversation on how to create a safer workplace.

This manual is an electronic document which has quick links to access material related to the manual contents. TDOT safety written programs, policies, and guidance documents are included in the manual. In addition, the manual contains job-specific information gathered by facilitating job safety assessments (JSAs) for each activity performed by TDOT personnel.

The manual starts with a Table of Contents which allows users to click on a specific activity, job, or task and go directly to that page.

CONTENTS

The manual can be viewed electronically on a desktop computer, phone, or other mobile device. There is an option to print the manual in its entirety or in specific sections, as needed. Please be aware of the total page count prior to printing. You can print by clicking the “Print Section” button.

GENERAL OFFICE TASKS

JOB STEPS, HAZARDS & CONTROLS

Date Prepared: 7/19/2023 | Last Revision: 7/19/2023

Print Section

STEP

Performing General Administrative Tasks

Description:
General office and administrative tasks.

Hazards	Controls
• Ergonomic – Repetitive Motion Injuries, Muscle Strain, Soft-Tissue Injuries • Slips, Trips, and Falls • Eye Strain • Electrical Shock • Fire Hazards • Indoor Air Quality Hazards	• Ensure work station is properly adjusted to reduce body strain. • Ensure adequate lighting in work area to reduce eye fatigue. • Wear blue-light glasses or other vision correction to reduce eye fatigue. • Take regular breaks which should include walking, stretching, or otherwise moving to promote circulation and reduce strain injury potential. • Use ergonomic aids such as wrist support, ergonomic chairs, foot support, etc. to reduce ergonomic strain and repetitive motion injuries. • Never attempt to lift items greater than 50 pounds. • Keep office and work areas clear of debris. • Perform regular housekeeping and avoid storing items on the ground which may create a trip hazard. • Clean up spills immediately. • Regularly remove dust and other contaminants which may irritate allergies. • Always inspect electrical cords for damage or fraying prior to use. • Never attempt to operate faulty electrical equipment or overload circuits.

INCIDENT & INJURY REPORTING

At TDOT, all incidents and injuries should be reported no matter how small they may seem with the goal of identifying and correcting safety hazards and at-risk behaviors.

In short, we cannot fix what we don't know about.

WHEN TO REPORT AN INCIDENT OR INJURY?

An employee injury occurs no matter how small

An employee loses consciousness or has to go to the hospital while at work

Property damage occurs from TDOT personnel activities

TDOT equipment or vehicle accident

A near miss (i.e. an incident or injury that ALMOST occurred)

HOW TO REPORT AN INCIDENT

Incidents and Injuries should be reported verbally to direct supervision and electronically using the TDOT OHS website.

TDOT OHS Incident & Injury Reporting Page

TDOT OHS-009 Personal Injury and Property Damage Incident Reporting

TN TDOT Department of Transportation

work for us

Occupational Health & Safety Division: Safety Written Program		
OHS-009 Injury or Property Damage Incident Reporting	**Issued: 10/01/2023**	**Revised:**

I. INTRODUCTION

All safety related incidents must be reported in a timely manner and tracked. Data is gathered for two primary reasons. The first, is that we must track safety related incidents so that we can investigate why they occurred, identify important trends and implement solutions to prevent future incidents of the

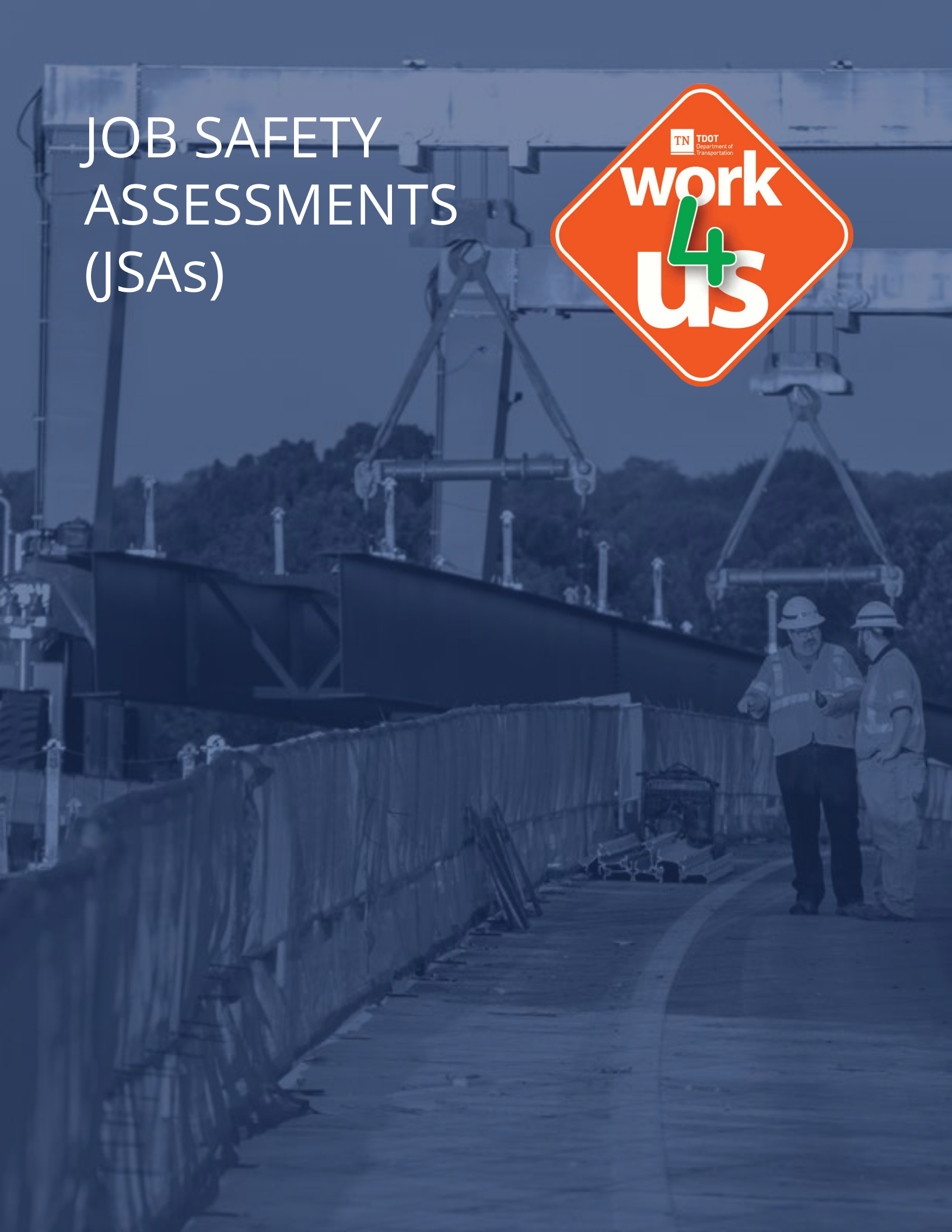
If you have any questions or need assistance with incident or injury reporting please contact a member of the TDOT Occupational Health and Safety team.

TDOT Occupational Health and Safety team

CONTENTS

OTHER RELATED PROGRAMS

JOB SAFETY ASSESSMENTS (JSAs)



JOB SAFETY ASSESSMENTS

ADMINISTRATIVE

SUMMARY OF ADMINISTRATIVE / IT

Administrative tasks serve as the backbone of the TDOT organization. From coordinating schedules and managing correspondence to ensuring smooth office operations, administrative professionals play a pivotal role in maintaining efficiency and facilitating effective communication. Administrative tasks and personnel play a vital role in supporting the broader goals and success of the TDOT organization. In today's technology-driven world, Information Technology (IT) tasks are at the heart of TDOT operations. From maintaining networks and securing data to providing technical support and driving innovation, IT professionals play a crucial role in ensuring the seamless functioning of digital systems. This introduction delves into the diverse spectrum of IT tasks, shedding light on their significance in powering modern businesses and facilitating a dynamic and secure technological environment.

TOP 5 HAZARDS

1. Ergonomic Strain
2. Soft Tissue Injuries from Lifting
3. Walking / Working Surfaces – Slips, trips, and falls
4. Lacerations from Office Equipment
5. Eye Strain and Fatigue

OHS SHAREPOINT

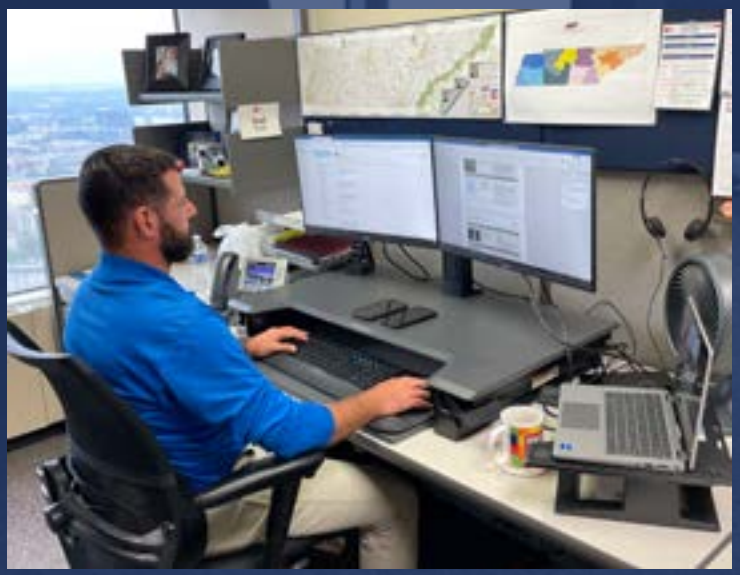
STANDARD PPE FOR GENERAL ADMINISTRATIVE/ IT

APPLICABLE TDOT OHS PROGRAMS

- OHS-002 Hazard Communication Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program Awareness
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Emergency Action Plans (EAPs)
- Memorandum - Lane Crossing

RELATED PROGRAMS AND REFERENCES

- Computer Workstation Ergonomics Self Assessment Checklist



GENERAL OFFICE TASKS

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 7/19/2023 | Last Revision: 7/19/2023

Performing General Administrative Tasks

Print Section

Description:
General office and administrative tasks.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Ergonomic – Repetitive Motion Injuries, Muscle Strain, Soft-Tissue Injuries • Slips, Trips, and Falls from Poor Housekeeping • Eye Strain from Prolonged Exposure to Video Display Terminals (VDTs) • Electrical Shock from Faulty or Damaged Electrical Equipment/Cords • Fire Hazards from Space Heaters, Candles, etc. • Indoor Air Quality Hazards	• Ensure work station is properly adjusted to reduce body strain. • Ensure adequate lighting in work area to reduce eye fatigue. • Wear blue-light glasses or other vision correction to reduce eye fatigue. • Take regular breaks which should include walking, stretching, or otherwise moving to promote circulation and reduce strain injury potential. • Use ergonomic aids such as wrist support, ergonomic chairs, foot support, etc. to reduce ergonomic strain and repetitive motion injuries. Utilize the TDOT COMPUTER WORKSTATION GUIDE. • Never attempt to lift items greater than 40 pounds (this may decrease depending on your physical abilities- get help from a co-worker). • Keep office and work areas clear of debris. • Perform regular housekeeping and avoid storing items on the ground which may create a trip hazard. • Clean up spills immediately. • Regularly remove dust which may irritate allergies. • Always inspect electrical cords for damage or fraying prior to use. • Never attempt to operate faulty electrical equipment or overload circuits. • Space heaters may NOT be used in the office setting due to the risk of fire even when they are not in operation. • Never burn open candles or similar products. • Be familiar with the facility evacuation route, fire extinguisher locations, and alarm sounds. Refer to the local Emergency Action Plans (EAPs).

IT AUDIO VISUAL PUBLIC EVENTS SUPPORT

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 8/11/2023 | Last Revision: 9/20/2023

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • Perform a pre trip inspection of the vehicle to ensure that all vehicle and safety system are operating as intended.

- 303-05 Motor Vehicle Utilization Policy

- Familiarize yourself with vehicle system operation prior to entering traffic.
- Ensure PPE is available for all personnel if intending to exit vehicle.
- Adjust the seat, mirrors, and steering wheel to driver.
- Always wear a seat belt when operating or riding in a vehicle.
- Follow all traffic laws while operating vehicle.
- Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist.
- Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)

- Injury or Death from Motor Vehicle Accident
- Contact with Pedestrian
- Vehicle or Object Damage
- Medical Emergency

Controls (How I keep from getting hurt?)

- Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle.
- If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed.
  - OHS-009 Injury and Property Damage Reporting
- If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail).
- Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.).
- If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable.
- Notify direct supervision of incident and initiate an incident report.
- Never turn your back to traffic.
- Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available).
- Call the TN Auto Accident Call Center at (855)-253-0629.
- Notify direct supervision of incident and initiate an incident report.
- Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (General, Non-Motorway)

Description:
Stopping, parking, and exiting a State-owned vehicle in a parking lot or other surface not on or near an active motorway.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Strike
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement

Controls (How I keep from getting hurt?)

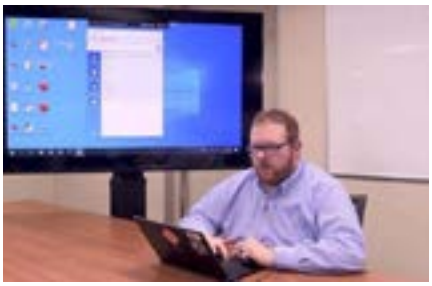
- Never attempt to park in on the side of an active highway without traffic control systems in place or complete road closure.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in

• Strain, Sprain, or Bone Fracture While Exiting Vehicle	gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot. • Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle. • Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls. • Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.

Public Events Support (Audio/Visual)

Description:
Delivery, setup, installation, and support for TDOT public events requiring AV equipment.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Ergonomic – Repetitive Motion Injuries, Muscle Strain, Soft-Tissue Injuries • Slips, Trips, and Falls from Poor Housekeeping or Cluttered Work Areas • Crush from Dropped Equipment • Fall from Ladder/Step Stool • Crush from Adjustable Height Loading Dock	• Use proper lifting technique when lifting, loading, unloading, and transferring equipment in and out of the vehicle. • Never attempt to lift items greater than 40 pounds (this may decrease depending on your physical abilities- get help from a co-worker). • Any large, awkward, or heavy items should be moved using mechanical means when possible. Utilize gravity to help load mechanical device. • Reduce travel distance to setup area when possible by positioning vehicle near presentation site. • Perform regular housekeeping and avoid storing items on the ground which may create a trip hazard. Avoid areas with uneven or soft ground. • Inspect the travel path prior to travel. Remove and avoid obstructions in walkway. • Keep hands and feet away from drop zone of equipment when unloading vehicle. • Only use short distance self-supporting ladders or step stools (<6'). • Maintain 3 points of contact when ascending/descending the ladder. • Position the ladder or step stool on solid ground with all legs making contact with surface. Ladder or step stool should not rock when in use. • If working overhead, maintain a solid stance on the ladder or have a partner support the ladder. • Prior to using adjustable height loading dock ensure owner's manual, training, or orientation has been performed. • Never place any part of the body between the loading dock and a solid surface to prevent a crush hazard. • Know the capacity limits of the adjustable height loading dock and do not exceed. • Always perform a pre-use inspection on adjustable height loading dock device prior to each use.



Performing General Administrative Tasks

Description:
Performance of general office tasks, providing software support, etc

Hazards (How can I get hurt?)

- Ergonomic – Repetitive Motion Injuries, Muscle Strain, Soft-Tissue Injuries
- Slips, Trips, and Falls
- Eye Strain
- Electrical Shock
- Fire Hazards
- Indoor Air Quality Hazards

Controls (How I keep from getting hurt?)

- Ensure work station is properly adjusted to reduce body strain.
- Ensure adequate lighting in work area to reduce eye fatigue.
- Wear blue-light glasses or other vision correction to reduce eye fatigue.
- Take regular breaks which should include walking, stretching, or otherwise moving to promote circulation and reduce strain injury potential.
- Use ergonomic aids such as wrist support, ergonomic chairs, foot support, etc. to reduce ergonomic strain and repetitive motion injuries. Utilize the TDOT COMPUTER WORKSTATION GUIDE.
- Never attempt to lift items greater than 40 pounds (this may decrease depending on your physical abilities- get help from a co-worker).
- Keep office and work areas clear of debris.
- Perform regular housekeeping and avoid storing items on the ground which may create a trip hazard.
- Clean up spills immediately.
- Regularly remove dust which may irritate allergies.
- Always inspect electrical cords for damage or fraying prior to use.
- Never attempt to operate faulty electrical equipment or overload circuits.
- Space heaters may NOT be used in the office setting due to the risk of fire even when they are not in operation.
- Never burn open candles or similar products.
- Be familiar with the facility evacuation route, fire extinguisher locations, and alarm sounds. Refer to the local Emergency Action Plans (EAPs).

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)

- Injury or Death from Motor Vehicle Accident
- Contact with Pedestrian
- Vehicle or Object Damage

Controls (How I keep from getting hurt?)

- Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle.
  - 303-05 Motor Vehicle Utilization Policy
- Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended.
- Familiarize yourself with vehicle system operation prior to entering traffic.
- Ensure PPE is available for all personnel if intending to exit vehicle.
- Adjust the seat, mirrors, and steering wheel to driver.

- Always wear a seat belt when operating or riding in a vehicle.
- Follow all traffic laws while operating vehicle.
- Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist.
- Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629. • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (General, Non-Motorway)

Description:
Stopping, parking, and exiting a State-owned vehicle in a parking lot or other surface not on or near an active motorway.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Strike • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot. • Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.

- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- When possible, pull through parking spot to be facing forward.

Equipment Receiving, Loading, Unloading, and Shipping

Description:
Equipment receiving and shipping operations to include operation of an electric pallet jack and unpacking boxes.

Hazards (How can I get hurt?)

- Ergonomic – Repetitive Motion Injuries, Muscle Strain, Soft-Tissue Injuries
- Slips, Trips, and Falls from Poor Housekeeping or Cluttered Work Areas
- Lacerations from Use of Box Cutter/Razor Knife
- Crush from Electric Pallet Jack
- Crush from Adjustable Height Loading Dock

Controls (How I keep from getting hurt?)

- Use proper lifting technique when lifting, loading, unloading, and transferring equipment.
- Never attempt to lift items greater than 40 pounds (this may decrease depending on your physical abilities- get help from a co-worker).
- Any large, awkward, or heavy items should be moved using mechanical means (e.g. large curve monitors, UPS, etc.).
- Perform regular housekeeping and avoid storing items on the ground which may create a trip hazard.
- Inspect the travel path prior to travel. Remove and avoid obstructions in walkway.
- Use mechanical lifting devices or team lifts when possible to move material.
- When possible, use an alternative box opening tool to the box cutter/razor knife.
- Wear proper PPE when using a box cutter/razor knife:
  - Cut-resistant gloves (ANSI A5 or higher)
- When operating a box cutter/razor knife, always cut away from the body.
- Maintain a sharp blade on box cutter/razor knives.
- Read instruction manual for electric pallet jack prior to use.
- When operating a pallet jack, wear proper PPE:
  - Hard toe boots
- Always keep feet away from pallet jack wheels and forks.
- Always secure pallet jack when not in use to prevent runaway.
- Never attempt to take a pallet jack up or down a slope of greater than 5 degrees.
- Prior to using adjustable height loading dock ensure owner's manual, training, or orientation has been performed.
- Never place any part of the body between the loading dock and a solid surface to prevent a crush hazard.
- Know the capacity limits of the adjustable height loading dock and do not exceed.
- Always perform a pre-use inspection on adjustable height loading dock device prior to each use.

Computer Hardware Installation and Support

Description:
Installation and delivery of computer hardware equipment to TDOT personnel.

Hazards (How can I get hurt?)

- Slips, Trips, and Falls – Floor Obstructions, Boxes, Packaging, Wiring, etc.
- Ergonomic Strain – Awkward Positions
- Dropped Objects
- Ergonomic Strain – Lifting and Positioning Computer Hardware/Boxes
- Lacerations from Use of Box Cutter/Razor Knife

Controls (How I keep from getting hurt?)

- Always remove non-essential equipment and materials from the work area prior to beginning work in the office or installation location.
- Evaluate work area to determine best staging location for equipment, tools, etc. prior to beginning work.
- When possible, reposition body and/or equipment to reduce the ergonomic strain.
- Frequently reposition body and stance to reduce ergonomic strain during installation work.
- Maintain a firm grip on equipment and position on a stable surface to avoid dropped objects.
- Always maintain an ergonomic lifting stance and proper lifting technique.
- Never attempt to lift items greater than 40 pounds (this may decrease depending on your physical abilities- get help from a co-worker).
- When possible, use an alternative box opening tool to the box cutter/razor knife.
- Wear proper PPE when using a box cutter/razor knife:
  - Cut-resistant gloves (ANSI A5 or higher)
- When operating a box cutter/razor knife, always cut away from the body.
- Maintain a sharp blade on box cutter/razor knives.

Server Maintenance

Description:
Unracking/racking of servers and running short distances of cabling for maintenance, upgrades, relocation, or decommissioning of servers.

Hazards (How can I get hurt?)

- Slips, Trips, and Falls – Floor Obstructions, Boxes, Packaging, Wiring, etc.
- Puncture from Hand Tool Slip
- Dropped Objects
- Ergonomic Strain – Lifting and Positioning Blade Servers (~10-30lbs)

Controls (How I keep from getting hurt?)

- Always remove non-essential equipment and materials from the work area prior to beginning server work.
- Pre-plan moving task to identify where servers will go once removed from racking.
- If possible, utilize waist-height mobile storage locations for servers to reduce the amount of bending/stooping and reduce the number of lifting tasks performed.
- Prior to removal of servers ensure that all cabling has been removed from the unit.
- Wear proper PPE when unracking/racking servers:
  - Hard toe shoes
  - Safety glasses
  - Cut-resistant gloves (ANSI A4 or greater)
- Ensure that hand tools used (screwdriver) are appropriately sized for the fasteners in the server rack.
- Always maintain a solid grip and pressure on hand tool during use.
- Never attempt to lift a server with wiring attached or tools in hand.
- Minimize the travel distance with servers during lift along with the height of reach.
- If a step stool or ladder is required for blade unracking/racking utilize a partner to hand the servers to. Never climb a step stool/ladder with items in hand.
- Always maintain an ergonomic lifting stance and proper lifting technique.

Facility Walkthroughs and Inspections

Description:
Facility inspections, walkthroughs, and inspections of TDOT facilities during new installations and construction.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Slips, Trips, and Falls – Floor Obstructions, Construction Debris, etc. • Puncture/Laceration from Nails and Other Construction Debris • Falls from Height from Unfinished Construction • Dropped Objects and Overhead Items	• Perform a visual inspection of travel space prior to performing walkthrough. Avoid areas with obstructions or remove obstructions in the walkway. • Avoid walking and looking upwards. Always maintain eyes on walking path while in motion. • Stay in the designated walkway when in construction sites. • Avoid touching or walking near unfinished walls, studs, etc. • Do not step on floor obstructions such as wood, debris, etc. which may have nails or other laceration/puncture potential. • Do not approach floor or wall openings with an unprotected fall. • Do not attempt to access the roof. • Visually inspect area for overhead hazards or unsecured items/tools. • Never walk under active construction areas, aerial lift work, or other overhead hazards.

SITE INSPECTIONS - VARIOUS

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 9/23/2023 | Last Revision: 9/23/2023

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629. • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (General, Non-Motorway)

Description:
Stopping, parking, and exiting a State-owned vehicle in a parking lot or other surface not on or near an active motorway.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If entering or working in a TDOT WORK ZONE refer to the JSA: – VEHICLE OPERATIONS – WORK ZONE VISITS • If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway in low-light conditions. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off. • Communicate pull-off maneuver with turn signals well in advance of move. • Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.

- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

General Roadway Worksite Inspections

Description:
TDOT personnel may visit various state roadway projects or proposed locations.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Injury or Death from Vehicle Striking Stopped Vehicle
• Injury or Death from Vehicle Striking Personnel Outside Vehicle
• Contact from Road Debris or Ejected Roadway Debris
• Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
• Slip, Trip, Fall
	• Always have an escape route when outside of a vehicle in a work zone. The escape route should be a clear path available at all times to escape an errant motorist. The escape route should include:
	  – A clear path away from danger
	  – Level ground free of obstructions
	  – Avoid being on the danger side of stationary objects (vehicles, heavy equipment, guardrails, etc. which may block exit.
	• NEVER turn your back to traffic.
	• Upon exiting the vehicle, don the proper work zone PPE:
	  – Safety toe boots
	  – Hard hat (class G or equivalent)
	  – High visibility vest (class 3)
	  – ANSI Z87.1 rated safety glasses
	• Avoid walking on steep slopes, areas with disturbed soil, or areas with loose debris.
	• Always plan walking route and maintain eyes on path.
	• Do not operate a cell phone or similar electronic device while walking.
	• Do not enter demarcated areas without authorization and always communicate intentions to include travel path and duration of stay.

Environmental Inspections

Description:
TDOT personnel may have to visit roadside locations to perform environmental inspections.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Contact with Stinging/Biting Insects, Poisonous Plants, Wild Animals, and Other Pests
• Weather Concerns / Heat and Cold Stress
	• Wear proper PPE:
	  – Hiking or treaded boot with ankle support
	  – High visibility vest (class 3)
	  – ANSI Z87.1 rated safety glasses
	• When applicable, wear rubber (muck) boots or snake boots

• Sunburn and Natural UV Exposure • Slip, Trip, Fall from Varied Terrain • Lacerations from Brush Clearing Tools • Falls from Height (>4') • Contact with Vehicles and Other Traffic • Encounters with Public Persons	• Wear insect repellent and avoid contact with poisonous vectors when possible. • Always check weather forecast for the area prior to planning trip. • Tailor clothing choices to anticipated weather conditions. • Always pack hydration supplements and regularly intake water. • Never attempt to drink from untreated, natural sources. • Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress. • Always inspect travel path and select the terrain with least obstacles and elevation change. Avoid slopes and loose substrates. • Only use machetes and other brush clearing tools when necessary. • Always swing away from body parts arcing away from body. • Always wear cut-resistant gloves (ANSI A4 or greater) when operating machetes or other brush clearing tools. • Never approach cliffs, holes, culverts, or other drop offs. • Be aware of traffic patterns and avoid working near roadways when possible. • Be aware of public persons and always assume a neutral, non-engaging demeanor. If confrontation occurs or is suspected evacuate the area and contact local authorities if warranted. • When possible, avoid working alone and communicate travel plans with a supervisor. Stick to planned travel route at all times. • Always carry maps, GPS, radio, cell phones and other tools to prevent getting lost.

JOB SAFETY
ASSESSMENTS

AERONAUTICS

SUMMARY OF AERONAUTICS

The Aeronautics Division supports, promotes, and delivers services that encourage and enhance a sustainable, efficient and safe air transportation system in Tennessee. The division provides financial and technical assistance to publicly owned airport operators for the planning, development, promotion, construction and operation of public-use airports throughout the state. Other engineering and planning services include aviation planning studies, environmental planning and compliance assistance, airport geographic information system (AGIS) studies, and project design consultation services to state public-use airports. Additionally, the Aeronautics Division administers and programs both state and federal funding for Airport Capital Improvement Plan (ACIP) projects in accordance with applicable state and federal regulations. The division is also responsible for annual airport safety and maintenance inspections, maintaining a statewide airport system plan, promoting aviation education throughout the state, and providing flight services to all branches of state government. Tennessee's 77 public-use airports are critical components of the nation's and state's transportation networks, linking and providing access to regional, national and global transportation systems. The mission of the Aeronautics Division is to provide Tennessee with a quality, integrated aviation system that is safe, efficient, economical and sensitive to environmental concerns, serves the needs of local communities; and, provides state government with safe, professional, courteous flight services in an efficient, comfortable manner.

TOP 5 HAZARDS

1. Unintended Aircraft / Equipment Movement
2. Pinch / Crush Hazards
3. Chemical Exposure
4. Power Tool Entanglement / Laceration
5. Walking / Working Surfaces – Slips, trips, falls

OHS SHAREPOINT

STANDARD PPE FOR GENERAL AERONAUTICS

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-003 Facility Lockout Tagout Program
- OHS-006 Personal Fall Protection Systems
- OHS-007 Powered Industrial Truck Operation Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- OHS-010 Hot Work Program
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program Awareness
- 305-03 Motor Vehicle Utilization
- TDOT LOTO Periodic Inspection Checklist
- PIT Operator Evaluation
- TDOT PIT Daily Pre-Op Checklist
- Guidance for Voluntary Respirator Use- General
- TDOT Aeronautics Tugger Daily Pre Op Checklist
- TDOT Aircraft Tugger Operator Evaluation
- Emergency Action Plans (EAPs)

RELATED PROGRAMS AND REFERENCES

- Tugger Operator/Maintenance Manual
- TDOT Small Unmanned Aircraft Systems SOG
- Use of Safety Vest and Radio on Airports

Print Section

Fabrication and Tool Usage

Description:
Various hand and portable power tool usage for the fabrication and finishing of parts made or modified in-house.

Hazards (How can I get hurt?)

- Contact/Puncture/Laceration from Slipped or Broken Tool
- Awkward Posture – Soft-Tissue Injury
- Tool Break Apart
- Entanglement in Tool Fixture
- Laceration or Puncture from Tool Attachment
- Electrical Shock
- Elevated Noise Levels
- Fire from Lubrication Chemicals

Controls (How I keep from getting hurt?)

- Always select the proper tool for the job.
- Always ensure that the tool is properly seated and adequate leverage is applied to tool.
- Ensure all hand and power tools are inspected prior to use.
- Always review and reference the operator's manual prior to use.
- Wear proper PPE:
  - Safety glasses
  - Face shield
  - Cut-resistant gloves (ANSI A4 or higher)
  - Hearing protection
- When operating a grinder, ensure that the wheel speed rating matches or exceeds the grinder speed rating.
- When operating a grinder, ensure that the wheel is compatible with the grinder size, type, and material application.
- When working with equipment that produces a spark or open flame, HOT WORK PROTOCOL shall be followed.
- Never attempt to grind non-ferrous metals.
- Before grinding, the tool rest must be kept adjusted closely to the wheel with a maximum opening of 1/8".
- Keep hands and body parts away from power tools during use.
- Remove jewelry, secure loose clothing, long hair, to prevent entanglement with machine.
- Anticipate the potential failure path of the tool and position the body outside of the line of fire.
- Avoid working around electrical equipment or outlets; ensure insulation on electrical cord is unbroken. Take out of service and DO Not use if insulation is compromised.
- When replacing a tool fixture, disconnect the power source.
- Use ear protection; erect enclosures around machines; practice timely and regular maintenance; add material to reduce vibration (damping).
- Use appropriate lubrication oils and grease for the tool or cutting/drilling process being performed.

Performing Basic Airplane Maintenance

Description:
Performing oil change, fluid fill up, tire change, brake service, and other similar service.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Entanglement in Moving Engine Parts including propeller. • Burns from Hot Parts • Chemical Exposure from Airplane Chemicals • Ergonomics Concerns from Lifting Heavy Tires • Periodic lifting/climbing/ bending/stooping/awkward Postures • Crush from Unintended Airplane Movement • Fall from ladders or walking on top of airplane for inspection.	• LOTO procedures should be followed to prevent plane from starting up. • Allow engine enough time to cool prior to maintenance activities. • Wear proper PPE: – Safety glasses – Cut-resistant gloves (ANSI A4 or higher) – Nitrile gloves (when using chemicals) – Hearing protection • Use proper lifting techniques; Ergonomic training; use dolly/cart • Select proper ladder; maintain 4:1 slope ratio with straight ladders; seek assistance in dangerous and high traffic areas; don't carry tools while climbing; use personal fall arrest system (if applicable)

Propeller Removal/Replacement

Description:
Removing propellers engine/service swaps, transmission service/swaps, brake service, hydraulic service, and other similar advanced service (No Fuel System Service).

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Entanglement in Moving Engine Parts including propeller. • Ergonomics Concerns from Lifting Heavy Tires • Periodic lifting/climbing/ bending/stooping/awkward Postures • Crush from Unintended Airplane Movement	• LOTO procedures should be followed to prevent plane from starting up. • Wear proper PPE: – Safety glasses – Cut-resistant gloves (ANSI A4 or higher) • Designate two personnel to aid in lifting propeller. • Proper lifting technique • Utilize lifting devices and inspected slings if needed • Properly chock airplane tires to keep plane from moving. Refer to OHS-001 VEHICLE AND EQUIPMENT LOTO. • Use of certified hoist or forklift should be properly rated for load. • Operator certification required prior to staff use of hoists or forklift. • Proper rigging techniques and equipment required.

Lifting Nose on Airplane

Description:
When changing the front tires/brakes or landing gear maintenance the nose of the plane is lifted and the tail is secured. Crew pushes down on tail and secures ant attaches tail down with tail stand weight. The front is then secured with jack stands to prevent nose from falling.

Hazards (How can I get hurt?)

- Ergonomics Concerns from force of pushing down tail
- Crush from Unintended Airplane Movement

Controls (How I keep from getting hurt?)

- LOTO procedures should be followed to prevent plane from starting up.
- Wear proper PPE:
  - Safety glasses
  - Cut-resistant gloves (ANSI A4 or higher)
  - Safety Toed Boots
- Designate two personnel to aid in lifting propeller.
- Proper lifting technique
- Use of certified hoist or forklift should be properly rated for load.
- Operator certification required prior to staff use of hoists or forklift.
- Proper rigging techniques and equipment required.
- Utilize lifting devices and inspected slings if needed.
- Properly chock airplane tires to keep plane from moving.
  - OHS-001 VEHICLE AND EQUIPMENT LOTO.

JOB SAFETY ASSESSMENTS

BRIDGE INSPECTION

SUMMARY OF BRIDGE INSPECTION

The Tennessee Department of Transportation (TDOT) Bridge Inspection Group is responsible for ensuring the safety and integrity of bridges throughout the state of Tennessee. Their primary function is to conduct regular inspections of bridges to assess their condition, identify any structural deficiencies or maintenance needs, and recommend appropriate actions to maintain or improve bridge safety. The group conducts routine inspections of bridges in accordance with federal regulations and guidelines. They assess various aspects of the bridge's structural components, including piers, abutments, decks, beams, and other elements, to evaluate their condition and identify any signs of deterioration or damage. In the event of accidents, natural disasters, or other emergencies that impact bridge structures, the Bridge Inspection Group plays a crucial role in assessing the damage, determining the bridge's safety, and recommending appropriate actions for repair or closure.

TOP 5 HAZARDS

1. Contact with Vehicles / Traffic
2. Falls from Height (>4')
3. Contact with Biting/Stinging Insects
4. Slip, Trip, Fall from Varied Terrain
5. Bodies of Water >4' in Depth

OHS SHAREPOINT

STANDARD PPE FOR GENERAL BRIDGE INSPECTION

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-006 Personal Fall Protection Systems
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- OHS-012 Confined Space Entry Program
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Confined Space Structure Entry Determination Table
- CSE Bridge Box Bridge and Culvert Guidance
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)
- Memorandum - Bridge Inspection TTC
- Memorandum - Lane Crossing
- Memorandum - TTC Inside Shoulder Advance Warning Sign Placement
- Memorandum - Winter Equipment Safety
- Truck and Trailer Mounted Attenuator Manual

RELATED PROGRAMS AND REFERENCES

- TDOT Work Zone Field Manual
- TDOT Standard Specifications for Road and Bridge Construction
- TDOT Small Unmanned Aircraft Systems SOG

Print Section

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway or exiting the vehicle in low-light conditions. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off. • Communicate pull-off maneuver with turn signals well in advance of move. • Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot. • Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle. • Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards. • Avoid jumping down from high ground clearance vehicles. • Wear proper PPE: – High visibility vest (class 3) • Once out of the vehicle, remain away from the road or behind solid obstructions. • Do not attempt to cross lanes of an active roadway.

Walking Under Bridge to Complete Inspection

Description:
Inspecting bridge from underneath.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Injury or Death from Vehicle Slips, trips, and falls due to unstable terrain.
• Drowning hazards if bridge is over waterway.
• Contact with Stinging/Biting Insects, Poisonous Plants, Wild Animals, and Other Pests
• Weather Concerns / Heat and Cold Stress
	• Wear proper PPE:
	  – Hiking or treaded boot with ankle support
	  – High visibility vest
	  – Safety Glasses
	• When applicable, wear rubber (muck) boots or snake boots
	• Wear insect repellent and avoid contact with poisonous vectors when possible.
	• Always check weather forecast for the area prior to planning trip.
	• Tailor clothing choices to anticipated weather conditions.
	• Always pack hydration supplements and regularly intake water.

- Sunburn and Natural UV Exposure
- Falls from Height (>4')
- Encounters with homeless population

- Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress.
- Always inspect travel path and select the terrain with least obstacles and elevation change. Avoid slopes and loose substrates.
- Never approach cliffs, holes, culverts, or other drop offs.
- Be aware of homeless population or public persons and always assume a neutral, non-engaging demeanor. If confrontation occurs or is suspected evacuate the area and contact local authorities if warranted.

Inspecting Metal for Corrosion

Description:
TDOT worker utilizes a wire brush to scrape off rust/metal corrosion and or using hammer to determine condition from ground level or Reach All.

Hazards (How can I get hurt?)

- Slips, trips, and falls due to unstable terrain.
- Drowning hazards if bridge is over waterway.
- Lacerations from Wire Brush or hammer
- Awkward Posture, strains while uses wire brush
- Dust nuisance from wire brushing corrosive metal
- Impact to hand with hammer during inspection
- Fall <4' from basket of Reach All
- Biological Exposure (Waterborne Pathogens, Viruses, Bacteria, etc.)
- Swift Currents

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Hiking or treaded boot with ankle support
  - High visibility vest
  - Safety Glasses
  - Harness/Lanyard or SRL
  - Life Jacket if applicable
- When applicable, wear rubber (muck) boots or snake boots
- Wear insect repellent and avoid contact with poisonous vectors when possible.
- Always check weather forecast for the area prior to planning trip.
- Tailor clothing choices to anticipated weather conditions.
- Always pack hydration supplements and regularly intake water.
- Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress.
- Always inspect travel path and select the terrain with least obstacles and elevation change. Avoid slopes and loose substrates.
- Never approach cliffs, holes, culverts, or other drop offs.
- Be aware of homeless population or public persons and always assume a neutral, non-engaging demeanor. If confrontation occurs or is suspected evacuate the area and contact local authorities if warranted.
- Utilize Buddy system when inspecting under bridges.
- Utilize boat with life-saving devices during Reach All inspections.
- Pre-Inspection of Reach All shall be performed prior to daily use.
- When working within 6' of waterways, marshes, creeks, streams, ponds, lakes, or other body of water ensure proper PPE is worn:
- Personal flotation device (PFD)
- Working on a bridge or crossing with unprotected edges is considered working within 6' of a waterway.
- If wearing waders, ensure that PFD does not interfere with the removal of waders in the event of an emergency.
- When working around waterways never work alone. Drowning may occur in as little as 6" of water.
- Always survey work site to look for waterway obstructions, slick embankments, and other hazards which may cause persons to become fully submerged.
- Never drink untreated water and wash hands with soap after touching untreated water sources.
- Do not expose open cuts, wounds, or sores to untreated water.
- Never attempt to cross water with a swift current regardless of depth.

JOB SAFETY ASSESSMENTS

BRIDGE REPAIR

SUMMARY OF BRIDGE REPAIR

TDOT maintains multiple divisions and units responsible for bridge maintenance, repairs, and rehabilitation within their overall bridge program. These divisions work collectively to ensure the safe and efficient operation of bridges throughout Tennessee. The bridge maintenance group focuses on routine maintenance activities to keep bridges in good condition. They conduct inspections, repairs minor damage, clean bridge surfaces, remove debris, and address issues such as drainage, vegetation control, and general upkeep to ensure the longevity of bridges. The bridge repair and rehabilitation group address structural deficiencies identified during inspections or reported by the public. This can include repairs to concrete or steel elements, reinforcement of weakened components, replacement of damaged or deteriorated materials, and rehabilitation of bridge decks or superstructures. In the event of accidents, natural disasters, or unforeseen incidents that cause damage to bridges, TDOT's teams respond quickly to assess the extent of the damage, develop repair plans, and coordinate the necessary repairs to restore the bridge's functionality.

TOP 5 HAZARDS

1. Contact with Vehicles / Traffic
2. Falls from Height (>4')
3. Contact with Heavy Equipment
4. Crush from Falling Objects
5. Pinch/Crush Injuries to Hands

OHS SHAREPOINT

STANDARD PPE FOR GENERAL BRIDGE REPAIR

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-006 Personal Fall Protection Systems
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- OHS-012 Confined Space Entry Program
- 05-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Confined Space Structure Entry Determination Table
- CSE Bridge Box Bridge and Culvert Guidance
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)
- Memorandum - Bridge Inspection TTC
- Memorandum - TTC Inside Shoulder Advance Warning Sign Placement
- Memorandum - Winter Equipment Safety
- Memorandum - Lane Crossing
- Truck and Trailer Mounted Attenuator Manual

RELATED PROGRAMS AND REFERENCES

- TDOT Work Zone Field Manual
- TDOT Standard Specifications for Road and Bridge Construction
- TDOT Small Unmanned Aircraft Systems SOG

Print Section

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629

- Notify direct supervision of incident and initiate an incident report.
- Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (On or near Bridge)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If entering or working in a TDOT WORK ZONE refer to the JSA: – VEHICLE OPERATIONS – WORK ZONE VISITS • If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway in low-light conditions. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • If parked within a work zone, position vehicle in front of vehicle(s) equipped with a standard lighting package. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off. • Communicate pull-off maneuver with turn signals well in advance of move. • Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot. • Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle. • Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards. • Avoid jumping down from high ground clearance vehicles. • Wear proper PPE: – High visibility vest (class 3) • Once out of the vehicle, remain away from the road or behind solid obstructions. • Do not attempt to cross lanes of an active roadway. • Plan an escape route

General Upkeep of Bridge Structure

Description:
General upkeep of bridge can include bridge cleaning, loose debris removal, culvert repair, and vegetation control. This includes removing debris from gratings and scuppers.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Structural instability • Exposure to traffic • Slip, trip, and fall • Working at heights • Fatigue and heat stress • Weather conditions • Electrical hazards • Exposure to chemicals	• Wear proper PPE: – Safety-toed boots – High visibility vest/shirt – Safety Glasses – Leather Gloves – Hard Hat – Chemical-resistant gloves (if applicable) • Use appropriate fall protection equipment, such as safety harnesses and lanyards, when working at elevated heights. • Erect guardrails, safety nets, or barricades to prevent falls from the edge of the bridge. • Establish exclusion zones below the cleaning area to prevent workers or the public from entering the danger zone. • If possible, turn off electrical systems during cleaning operations. • Ensure electrical equipment and lighting systems are properly maintained and grounded. • Conduct thorough inspections of the bridge before cleaning to identify any structural issues that need to be addressed. • Schedule regular breaks and rotate workers to minimize fatigue. • Monitor weather forecasts and avoid cleaning during adverse weather conditions. • Exercise care to ensure debris or chemicals aren't introduced into surrounding waterways.

Working Over or Around Deep Waterways (>4')

Description:
Field surveying personnel may travel in a variety of terrains which may include waterways, rivers, lakes, streams, etc. >4' while performing job functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Drowning • Biological Exposure (Waterborne Pathogens, Viruses, Bacteria, etc.) • Swift Currents • Contact with Boats and Other Watercraft	• When working within 6' of waterways, rivers, lakes, streams, ponds, or other body of water ensure proper PPE is worn: – Personal flotation device (PFD) • Working on a bridge or crossing with unprotected edges is considered working within 6' of a waterway. • If wearing waders, ensure that PFD does not interfere with the removal of waders in the event of an emergency. • When working around waterways never work alone. Drowning may occur in as little as 6" of water. • Always survey work site to look for waterway obstructions, slick embankments, and other hazards which may cause persons to become fully submerged.

- Never drink untreated water and wash hands with soap after touching untreated water sources.
- Do not expose open cuts, wounds, or sores to untreated water.
- Never attempt to cross water with a swift current regardless of depth.
- If on a boat or dock a PFD must be worn.
- If operating or riding on a watercraft ensure all boating navigation and safety laws are followed.
- Always yield to other watercraft and operate the watercraft defensively.
- Utilize a spotter to watch for other watercraft when operating in a stationary position.

Working at a height (>6')

Description:
Bridge repair activities might include use of ladders, walk boards, or aerial lift devices.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Falls from Height • Falling Objects • Falls from Ladders • Falls from Roof • Structural Collapse • Electrical Hazards • Machinery Hazards • Suspension Trauma	• In addition to standard PPE, when operating any aerial lift device, the following must be worn: – Fall arrest harness – Self-retracting lifeline • Whenever possible, aerial devices with man baskets should be used when an unguarded or protected edge fall hazard is present. • When using a ladder, ensure it is of the proper type, height, and style. • Always use a fall protection competent person to help calculate the fall distance prior to working at height. • Always perform a pre-use inspection on ladder systems. • Always secure tools, equipment, etc. to prevent dropping to a lower level. • Always block or demarcate the area underneath the work area. • Prevent unauthorized personnel from traveling through work area. • Avoid overextending on a ladder or using the top of a self-supporting ladder. • Prior to installing a ladder, inspect work area for elevated machinery hazards and exposed electrical hazards. • Use fall arrest equipment as a last resort. • Always inspect ALL components of a fall arrest system prior to use (anchor point, connecting device, and harness). • Never work alone and always have a plan if a fall occurs.

Heavy Equipment Operation

Description:
Track hoes, long boom, skid steer, backhoes, or crane trucks can be used to perform bridge repair activities

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Overhead utilities • Underground utilities	• Wear proper PPE: – Safety toe boots

- Excavation hazards/cave-ins.
- Structural stability.
- Striking objects/people
- Falls/ejections
- Noise and vibration
- Injury or Death from Motor Vehicle Accident.
- Weather Concerns / Heat and Cold Stress.

  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
  - Cut-resistant gloves (ANSI A4 or greater)
  - Hard Hat
- Only operate equipment if qualified to do so.
- Complete a pre-operation inspection before starting work.
- Conduct a site assessment to evaluate stability in the area.
- Establish exclusion zones and warning systems around the site to prevent unauthorized access and provide early warning in case of emergency.
- Perform a work area inspection to identify overhead powerlines and other obstructions prior to operating heavy equipment.
- Always ensure an up-to-date utility marking service has been completed prior to performing excavation work (breaking ground).
- Establish clear communication methods with ground personnel and other operators working nearby, such as hand signals or two-way radios.
- Ensure all safety devices, such as backup alarms, warning lights, and mirrors, are functional and used correctly.
- Always remain in the cab during operation and operate with the doors closed.
- Utilize walkways and handrails to access equipment. Never climb on equipment.
- If available, equipment operators must wear seat belts when operating.
- Never approach or allow personnel to approach operating equipment.
- Remain focused on operating the equipment and be aware of blind spots. Utilize a spotter if necessary.
- Always check weather forecast for the area prior to planning trip.
- Never attempt to operate heavy equipment in hazardous weather conditions (lightning, tornado, heavy storm, flooding, etc.)
- Turn off the equipment and allow it to cool before refueling. Handle fuel with care and avoid smoking near the refueling area.
- Conduct regular inspections of the site to identify any changes in ground conditions and stability.
- Do not attempt to perform service on the machinery. Only minor service can be performed such as fluid additions, filter changes, etc.)

Using Material Removing Tools to Perform Bridge Repair Activities

Description:
Material removal tools can include the following jackhammers, grinders, and chisels

Hazards (How can I get hurt?)

- Hand-arm vibration
- Noise
- Flying debris
- Abrasive wheel hazards
- Sparks and fire
- Dust and fumes
- Electrical hazards
- Musculoskeletal strain
- Pinch points
- Weather Concerns / Heat and Cold Stress.

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Safety-toed boots
  - High visibility vest/shirt
  - ANSI Z87.1 rated safety glasses
  - Leather Gloves
  - Hard Hat
  - Vibration dampening gloves (if applicable)
  - If working in environments greater than 85dBA wear hearing protection. If greater than 100dBA wear double hearing protection.
- Limit the duration of continuous jackhammer use and provide frequent rest breaks.
- Use protective screens or barriers to shield others from flying debris.
- Use cable or hose management systems to keep cords and hoses organized and out of the operator's way.

- Provide proper lighting in the work area to prevent tripping accidents.
- Ensure the grinder's wheel guard is in place and adjusted properly.
- Use the correct type of grinding wheel for the specific task to reduce the risk of kickback.
- Regularly inspect cords and plugs for damage and replace if necessary.
- Use ground fault circuit interrupters (GFCIs) to protect against electrical shocks.

Concrete Repair

Description:
Concrete repair can include cutting, pouring, replacing slabs, and patching activities. Concrete mixers, rebar cutters and benders, saws, epoxy injection systems, and others may be used to complete bridge repair tasks.

Hazards (How can I get hurt?)

- Dust and silica exposure
- Chemical exposure
- Noise
- Excessive vibration
- Falls from heights
- Muscle strains
- Puncture, cuts, or impalement injuries
- Hot weather hazards

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
  - Leather Gloves
  - Hard Hat
  - Vibration dampening gloves (if applicable)
  - If working in environments greater than 85dBA wear hearing protection. If greater than 100dBA wear double hearing protection.
- Always use proper guarding on tools and equipment.
- Use wet methods or local exhaust ventilation to control dust generation during cutting and grinding.
- Limit the duration of exposure to loud noise by rotating tasks or providing quiet rest areas.
- Rotate workers to minimize prolonged exposure to vibrating tools.
- Implement lockout/tagout procedures to prevent accidental energization during maintenance.
- Keep the work area organized and free of tripping hazards to prevent accidental falls onto sharp objects.
- Use rebar caps or covers to protect exposed rebar ends.
- Use proper body mechanics when lifting heavy objects. Always ask for assistance when possible. Use mechanical aids when available.
- Ensure there is an emergency eye wash station available.
- Inspect electrical equipment regularly, use ground-fault circuit interrupters (GFCIs)
- Take frequent breaks, especially in hot weather.
- Review SDS sheets prior to using chemicals.

Rigging and Hoisting

Description:
While crane operation is sub-contracted, rigging and hoisting activities can be performed by TDOT personnel during bridge repair activities.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Falling loads
• Pinch points
• Hoist tipping
• Struck-by incidents
• Contact with power lines
• Contact with high voltage
• Unstable crane
	• Wear proper PPE:
	  – Safety toe boots
	  – High visibility vest/shirt (class 3)
	  – ANSI Z87.1 rated safety glasses
	  – Leather Gloves
	  – Hard Hat
	• Confirm there is good communication in place with the crane operator.
	• Stay out from under the load when it is being lifted and moved.
	• Use a tag line to control the load.
	• Watch placement of feet when receiving the load.
	• Rig the load so it will be lifted straight up.
	• Confirm there are no power lines or other obstructions in the lift path.
	• Inspect each sling before use.
	  – Confirm identification tag is still attached
	  – Check for melting or charring
	  – Look for cuts, tears, snags, discoloration, kinks, snags, or fiber damage
	  – Look for any broken or worn stitching
	  – DO NOT use slings that show any damage or defect
	• Inspect rigging hardware prior to use.
	• Consider adding padding or corner protectors to reduce likelihood for cuts and tears.
	• Raise load a few inches off the ground to conduct test lift.
	• Clear the area under the lift area and areas under the path the load will travel.
	• Ensure the crane operator, signal person, and rigger know the standardized hand signals.
	• For critical lifts, be sure to have a critical lift plan designed specifically for that lift and signed off by lead rigger and site foreman.

Hot Work

Description:
Hot work can include stick welding or using a cutting torch.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Burns from Torch Tip and Hot Parts
• Burns from Torch Flashback and hot parts
• Ultraviolet Radiation Exposure to Skin and Eyes
• Explosions From Gas Cylinder
	• Wear proper PPE:
	  – ANSI Z87.1 rated safety glasses
	  – Safety toe boots
	  – Flame retardant jacket
	  – Welding gloves
	  – Shaded face shield (shade 5 or 10 minimum depending on the activity)

Damage/Tip Over
- Air Contaminants – Metal Fume
- Air Contaminants – Carbon Monoxide
- Air Contaminants – Hexavalent Chromium (Stainless Steel)
- Air Contaminants – Zinc (Galvanized Metals)
- Sparks and molten metals

  - Long sleeve shirt and pants (FR or 100% cotton)
- Remove all combustible materials within 35' of hot work activities.
- Insulate welder from ground by using dry insulation.
- Evaluate adequacy of ventilation
- Be sure to complete hot work permit prior to starting work (except in designated areas)
- Only experienced operators should perform welding cutting activities.
- Ensure a 20lb fire extinguisher is in good working order and available in the immediate vicinity at all times.
- Ensure a fire watch is present during and after all hot work activities.
- Never touch cylinder with electrode
- Always ensure that compressed gas cylinders are properly secured.
- Ensure that gas connections are compatible and in good working order.
- Perform a pre-use inspection of all equipment prior to use.
- Only perform welding outdoors or with local exhaust ventilation present.
- Assume all welded parts are hot. Do not touch without welding gloves on.
- Never attempt to weld galvanized, stainless steel, painted, or other non-ferrous metals.
- Prior to the cut, evaluate the cut plan to ensure material will fall away from operator when cut free.
- Ensure torch tip is free of debris and obstructions. Clean before each use.
- Ensure a flashback arrestor is equipped on the torch.
- Ensure first aid materials are available at all times.

Hand and Power Tool Usage

Description:
Bridge repair activities require tools such as saws, drills, grinders, compressors, nail guns, etc.

Hazards (How can I get hurt?)

- Contact/Puncture/Laceration from Slipped or Broken Tool
- Awkward Posture – Soft-Tissue Injury
- Tool Break Apart
- Entanglement in Tool Fixture
- Laceration or Puncture from Tool Attachment

Controls (How I keep from getting hurt?)

- Always select the proper tool for the job.
- Always ensure that the tool is properly seated and adequate leverage is applied to tool.
- Ensure all hand and power tools are inspected prior to use.
- Always review and reference the operator's manual prior to use.
- Wear proper PPE:
  - Safety-toed boots
  - ANSI Z87.1 rated safety glasses
  - Face shield
  - Cut-resistant gloves (ANSI A4 or higher)
  - Hearing protection
- When operating a grinder, ensure that the wheel speed rating matches or exceeds the grinder speed rating.
- When operating a grinder, ensure that the wheel is compatible with the grinder size, type, and material application.
- Never attempt to grind non-ferrous metals
- Keep hands and body parts away from power tools during use.
- Anticipate the potential failure path of the tool and position the body outside of the potential failure path.
- When replacing a tool fixture, disconnect the tool from the power source

Working Around a Leading Edge

Description:
A leading edge is when there is a drop of 6 foot or greater between the working surface and lower level and the edge is not guarded.

Hazards (How can I get hurt?)

- Falls from height
- Unstable ground
- Structural instability
- Sharp edges or protrusions

Controls (How I keep from getting hurt?)

- Always wear proper PPE:
  - Safety toe boots
  - ANSI Z87.1 rated safety glasses
  - In addition to standard PPE, when operating any aerial lift device or when working near a leading edge >6', the following must be worn:
  - Personal fall arrest harness
  - Retractable lanyard (6ft max)
  - Body belt are prohibited as part of a personal fall arrest system
- When possible, aerial lifts should be used when working around unguarded leading edges.
- Regularly inspect the site and leading edge to identify issues or evidence of structural defects.
- Clearly mark and barricade to warn of potential hazards.
- Be sure employees who are working around leading edges are trained as competent personnel

Media Blasting and Painting

Description:
Performing touch-up painting or small recoating tasks using spray paint or similar paint coatings.

Hazards (How can I get hurt?)

- Inhalation of Toxic VOCs and Particulates
- Skin and Eye Irritation
- Flammability
- Explosion

Controls (How I keep from getting hurt?)

- Only paint in a well-ventilated area.
- Avoid painting indoors unless in a dedicated area for painting operations.
- Never attempt to paint inside a confined space or in a restricted area.
- Always wear proper PPE:
  - Safety toed boots
  - Long sleeve shirt and pants
  - ANSI Z87.1 rated safety glasses
  - Nitrile or similar exam gloves
- Prior to painting remove all sources of ignition from within 35 feet from the painting operation.
- Always read the manufacturer's instructions and review the SDS prior to use.
- Always store spray cans in a flammable storage cabinet when not in use.
- Do not store spray cans in direct sunlight or in areas with high temperatures.
- Do not attempt to puncture or modify a spray can unless empty.

Operating a Chainsaw

Description:
Using a chainsaw involves cutting, felling, and trimming trees or wood materials with a motorized chainsaw. The task requires proper handling of the chainsaw and adherence to safety protocols to prevent accidents and injuries.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Personnel while operating Chipper near roadway
- Cuts and Lacerations
- Kickback
- Struck by flying vegetation/ debris
- Falling objects
- Slips/Trips/Falls
- Exposure to high noise and vibration
- Exhaust Fumes (Gasoline Models)
- Weather Concerns / Heat and Cold Stress
- Sunburn and Natural UV Exposure
- Biological (plants/inspects)

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
  - Cut-resistant gloves (ANSI A6 or greater)
  - Chainsaw Chaps
  - Hearing protection
  - Helmet with a face shield
- Implement third party traffic control if possible.
- Avoid distractions when operating equipment
- Establish a clear work zone with barriers or signs to prevent unauthorized access.
- Workers should wear appropriate personal protective equipment (PPE), including chainsaw chaps or pants, gloves, and a helmet with a face shield and hearing protection.
- Train workers on safe handling and operation of the chainsaw, including proper cutting techniques.
- Regularly inspect and maintain the chainsaw to ensure it is in good working condition.
- Use a chainsaw with a chain brake or anti-kickback features.
- Hold the chainsaw with both hands, maintain a firm grip, and use proper cutting techniques to reduce the risk of kickback.
- Stand to the side of the chainsaw while cutting and avoid cutting with the tip of the bar.
- Be cautious when transitioning between different surfaces (e.g., from lawn to pavement)
- Workers should wear hearing protection when operating the chainsaw ear plugs and muffs.
- Use anti-vibration gloves to reduce the impact of tool vibrations on hands and arms.
- Limit exposure time to noisy equipment if possible and wear hearing protection
- Operate gas-powered chainsaw in well-ventilated areas or in the open air.
- Follow the manufacturer's instructions for mixing fuel and ensure proper fueling practices.
- Always check weather forecast for the area prior to planning trip.
- Tailor clothing choices to anticipated weather conditions.
- Always pack hydration supplements and regularly intake water.
- Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress.
- Train workers to identify and avoid contact with poisonous plants.
- Provide workers with insect repellent and protective clothing to prevent insect bites.

Performing Work near Active Landslide, Culvert Slides, or Other Similar Lane Closures

Description:
Performing field surveys in areas where landslides have occurred or may occur.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Falls or slips from ground instability • Injury from falling debris • Injury or death from soil liquification • Injury or death from rapid landslides • Release of hazardous material from disrupted gas pipelines or storage tanks	• Conduct a site assessment to evaluate stability in the area. • Provide proper safety training to workers to ensure they understand hazards associated with the work site. • Ensure workers have the proper PPE based on the identified risks in the area. • Establish exclusion zones and warning systems around the site to prevent unauthorized access and provide early warning in case of emergency. • Conduct regular inspections of the site to identify any changes in ground conditions and stability.

TN TDOT Department of Transportation

work 4 us

JOB SAFETY ASSESSMENTS

CONSTRUCTION INSPECTION

SUMMARY OF CONSTRUCTION INSPECTION

Construction Engineering and Inspection (CE&I) includes the monitoring of construction work through inspection and testing. Inspection and testing is essential to ensuring projects are constructed in accordance with the approved plans, specifications, and contract provisions. Inspection personnel are required to be certified and to inspect all materials delivered to the worksite and confirm that materials and work meet the contract requirements. Additionally, it is the role of the construction staff to monitor progress against the construction schedule, verify correct interim and final payments, administer changes, and document that the project was built in accordance with the approved plans and specifications. Proper inspection requires good communication and documentation skills, judgment, diplomacy, common sense, and a thorough understanding of the work, plans, and specifications.

TOP 5 HAZARDS

1. Contact with Vehicles / Traffic
2. Contact/Crush by Construction Equipment
3. Ergonomic / Soft Tissue Injury
4. Slip, Trip, Fall Hazards including Falls from Height
5. Burns and Chemical Exposure

OHS SHAREPOINT

STANDARD PPE FOR GENERAL HIGHWAY MAINTENANCE ROADWAY REPAIR

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-003 Facility Lockout Tagout Program
- OHS-006 Personal Fall Protection Systems
- OHS-007 Powered Industrial Truck Operation Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- OHS-010 Hot Work Program
- OHS-012 Confined Space Entry Program
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- TDOT PIT Daily Pre-Op Checklist
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)
- Memorandum - Lane Crossing
- 4-Us Checklists
- TTC Inside Shoulder
- Winter Equipment
- TMA Operator Reference Guide
- Truck and Trailer Mounted Attenuator Manual
- Chainsaw Checklists

RELATED PROGRAMS AND REFERENCES

- TDOT Work Zone Field Manual
- Winter Equipment Operations SOG
- TDOT Fleet Vehicle Conspicuity
- Standard Specs for Road and Bridge Construction
- Manual on Uniform Traffic Control Devices (MUTCD)
- Construction Inspection Guide Reference

Operating State Fleet Vehicle

Print Section

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629. • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (General, Non-Motorway)

Description:
Stopping, parking, and exiting a State-owned vehicle in a parking lot or other surface not on or near an active motorway.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If entering or working in a TDOT WORK ZONE refer to the JSA: – VEHICLE OPERATIONS – WORK ZONE VISITS • If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway in low-light conditions. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off. • Communicate pull-off maneuver with turn signals well in advance of move. • Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot. • Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle. • Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls. • Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting. • Wear proper PPE: – High visibility vest (class 3) • Once out of the vehicle, remain away from the road or behind solid obstructions. • Do not attempt to cross lanes of an active roadway.

Construction Worksite Inspections

Description:
TDOT personnel site visits to construction sites along state routes and in various locations.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris	• Always have an escape route when outside of a vehicle in a work zone. The escape route should be a clear path available at all times to escape an errant motorist. The escape route should include: – A clear path away from danger – Level ground free of obstructions – Avoid being on the danger side of stationary objects (vehicles, heavy equipment, guardrails, etc. which may block exit.

- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Slip, Trip, Fall
- Injury or Death from Contact with Heavy Equipment
- Injury or Death from Ejection of Debris from Heavy Equipment Operations
- Equipment of Load Instability
- Contact with Heavy Equipment Counterweight
- Dropped Load

- Upon exiting the vehicle, don the proper work zone PPE:
  - Safety toe boots
  - Hard hat (class G or equivalent)
  - High visibility vest (class 3)
  - ANSI Z87.1 rated safety glasses
- Avoid walking on steep slopes, areas with disturbed soil, or areas with loose debris.
- Always plan walking route and maintain eyes on path.
- Do not operate a cell phone or similar electronic device while walking.
- When possible, avoid approaching heavy equipment (within 20').
- Do not enter demarcated areas without authorization and always communicate intentions to include travel path and duration of stay.
- Always establish communication with heavy equipment operator (radio, visual, verbal) if transitioning within 20' of vehicle (in front or immediately behind).
- Do not approach heavy equipment unless equipment is in a safe condition (bucket lowered, parking brake set, blade down, etc.).
- Anticipate the fall path for any object being carried or moved and avoid the "shadow of the load".
- Always check weather forecast for the area prior to planning trip.
- Wear long sleeves and pants when possible to avoid UV exposure. Wear sunscreen.
- Never attempt to operate heavy equipment in hazardous weather conditions (lightning, tornado, heavy storm, flooding, etc.)
- Never stand under or near a suspended load.
- Never attempt to enter or approach within 6' of an excavation slope or trench.
- Conduct regular inspections of the site to identify any changes in ground conditions and stability.

INCIDENTAL CONSTRUCTION SITE INSPECTIONS

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 10/27/2023 | Last Revision: 10/27/2023

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)

- Injury or Death from Motor Vehicle Accident
- Contact with Pedestrian
- Vehicle or Object Damage

Controls (How I keep from getting hurt?)

- Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle.
  - 303-05 Motor Vehicle Utilization Policy
- Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended.
- Familiarize yourself with vehicle system operation prior to entering traffic.
- Ensure PPE is available for all personnel if intending to exit vehicle.
- Adjust the seat, mirrors, and steering wheel to driver.
- Always wear a seat belt when operating or riding in a vehicle.
- Follow all traffic laws while operating vehicle.
- Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist.
- Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)

- Injury or Death from Motor Vehicle Accident
- Contact with Pedestrian
- Vehicle or Object Damage
- Medical Emergency

Controls (How I keep from getting hurt?)

- If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed.
  - OHS-009 Injury and Property Damage Reporting
- If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail).
- Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.).
- If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable.
- Notify direct supervision of incident and initiate an incident report.
- Never turn your back to traffic.
- Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available).
- Call the TN Auto Accident Call Center at (855)-253-0629.
- Notify direct supervision of incident and initiate an incident report.
- Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (General, Non-Motorway)

Description:
Stopping, parking, and exiting a State-owned vehicle in a parking lot or other surface not on or near an active motorway.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Strain, Sprain, or Bone Fracture While Exiting Vehicle

Controls (How I keep from getting hurt?)

- If entering or working in a TDOT WORK ZONE refer to the JSA:
  - VEHICLE OPERATIONS – WORK ZONE VISITS
- If possible, perform survey or job from within vehicle. Only exit if necessary.
- Avoid pulling off of the roadway in low-light conditions.
- Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder.
- Avoid pulling into an unprotected median or on the left side shoulder.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off.
- Communicate pull-off maneuver with turn signals well in advance of move.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.

- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

Incidental Construction Site Inspections

Description:
TDOT personnel site visits to construction sites along state routes and in various locations to inspect guardrails, signage, signals, lighting, etc.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Slip, Trip, Fall from Slope, Uneven Terrain, Rock, or Gravel
- Injury or Death from Contact with Heavy Equipment
- Injury or Death from Ejection of Debris from Heavy Equipment Operations
- Equipment of Load Instability
- Laceration or Puncture from Exposure Rebar or Steel
- Operating Aerial Lifts
- Working at Height >4’

Controls (How I keep from getting hurt?)

- Always have an escape route when outside of a vehicle in a work zone. The escape route should be a clear path available at all times to escape an errant motorist. The escape route should include:
  - A clear path away from danger
  - Level ground free of obstructions
  - Avoid being on the danger side of stationary objects (vehicles, heavy equipment, guardrails, etc. which may block exit.
- NEVER turn your back to traffic.
- Upon exiting the vehicle, don the proper work zone PPE:
  - Safety toe boots
  - Hard hat (class G or equivalent)
  - High visibility vest (class 3)
  - ANSI Z87.1 rated safety glasses
- Avoid walking on steep slopes, areas with disturbed soil, or areas with loose debris.
- Always plan walking route and maintain eyes on path.
- Do not operate a cell phone or similar electronic device while walking.
- When possible, avoid approaching heavy equipment (within 20’).
- Do not enter demarcated areas without authorization and always communicate intentions to include travel path and duration of stay.
- Always establish communication with heavy equipment operator (radio, visual, verbal) if transitioning within 20’ of vehicle (in front or immediately behind).
- Do not approach heavy equipment unless equipment is in a safe condition (bucket lowered, parking brake set, blade down, etc.).
- Avoid sharp objects and protruding rebar when inspecting the worksite. When possible, avoid touching worksite materials and assume all surfaces are sharp.
- If contact with sharp object is required, wear proper PPE:
  - Cut resistant gloves (ANSI A4 or greater)
- Only properly trained personnel may operate an aerial lift.
- Always perform a pre-use inspection of aerial lifts. Never operate an aerial lift with damage or defective safety systems.
- Personnel inside the aerial lift should wear a fall protection PPE at all times:
  - Fall arrest harness
  - Self-retracting lifeline

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629. • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (General, Non-Motorway)

Description:
Stopping, parking, and exiting a State-owned vehicle in a parking lot or other surface not on or near an active motorway.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If entering or working in a TDOT WORK ZONE refer to the JSA: – VEHICLE OPERATIONS – WORK ZONE VISITS • If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway in low-light conditions. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off. • Communicate pull-off maneuver with turn signals well in advance of move. • Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot. • Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle. • Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls. • Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting. • Wear proper PPE: – High visibility vest (class 3) • Once out of the vehicle, remain away from the road or behind solid obstructions. • Do not attempt to cross lanes of an active roadway.

Construction Worksite Inspections – Roadside Maintenance and Development Sites

Description:
TDOT personnel site visits to construction sites along state routes and in various locations to include seeding, landscaping, erosion control, etc.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris	• Always have an escape route when outside of a vehicle in a work zone. The escape route should be a clear path available at all times to escape an errant motorist. The escape route should include: – A clear path away from danger – Level ground free of obstructions – Avoid being on the danger side of stationary objects (vehicles, heavy equipment, guardrails, etc. which may block exit.

- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Slip, Trip, Fall from Slope or Uneven Terrain
- Sting or Bite from Insects
- Exposure to UV Radiation
- Heat Stress

- NEVER turn your back to traffic.
- Upon exiting the vehicle, don the proper work zone PPE:
  - Safety toe boots
  - Hard hat (class G or equivalent)
  - High visibility vest (class 3)
  - ANSI Z87.1 rated safety glasses
- Avoid walking on steep slopes, areas with disturbed soil, or areas with loose debris.
- Always plan walking route and maintain eyes on path.
- Do not operate a cell phone or similar electronic device while walking.
- Always inspect the area for obvious signs of stinging insect activity, such as, swarming bees, holes in the ground, visible nests, rotting tree roots, etc.
- Wear insect repellent when working outdoors to repel stinging and biting insects.
- When possible, wear long sleeves and pants to reduce UV exposure to the skin. Wear sunscreen on exposed skin and regularly re-apply sunscreen if exposure persists.
- Balance UV protection garments with heat stress load. Take regular breaks, consume plenty of water, and avoid direct sunlight when possible.
- If signs of heat stress are recognized stop work immediately and contact emergency support.

ROADWAY BASE, SUBGRADE, AND ROADWAY SURFACES SITE INSPECTION

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 10/27/2023 | Last Revision: 10/27/2023

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)

- Injury or Death from Motor Vehicle Accident
- Contact with Pedestrian
- Vehicle or Object Damage

Controls (How I keep from getting hurt?)

- Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle.
  - 303-05 Motor Vehicle Utilization Policy
- Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended.
- Familiarize yourself with vehicle system operation prior to entering traffic.
- Ensure PPE is available for all personnel if intending to exit vehicle.
- Adjust the seat, mirrors, and steering wheel to driver.
- Always wear a seat belt when operating or riding in a vehicle.
- Follow all traffic laws while operating vehicle.
- Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist.
- Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629. • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Construction Worksite Inspections – Roadway Base, Subgrade, and Roadway Surfaces Sites

Description:
TDOT personnel site visits to construction sites along state routes and in various locations to inspect roadway base, asphalt application, rigid surfaces, etc.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Slip, Trip, Fall • Injury or Death from Contact with Heavy Equipment • Injury or Death from Ejection of Debris from Heavy Equipment Operations • Equipment of Load Instability • Burns from Contact with Hot Asphalt	• Always have an escape route when outside of a vehicle in a work zone. The escape route should be a clear path available at all times to escape an errant motorist. The escape route should include: – A clear path away from danger – Level ground free of obstructions – Avoid being on the danger side of stationary objects (vehicles, heavy equipment, guardrails, etc. which may block exit. • NEVER turn your back to traffic. • Upon exiting the vehicle, don the proper work zone PPE: – Safety toe boots – Hard hat (class G or equivalent) – High visibility vest (class 3) – ANSI Z87.1 rated safety glasses • Avoid walking on steep slopes, areas with disturbed soil, or areas with loose debris. • Always plan walking route and maintain eyes on path. • Do not operate a cell phone or similar electronic device while walking. • ALWAYS ensure moving equipment has come to a complete stop and no work is in progress when inspection activities are underway.

• Inhalation of Dust and Silica	• When possible, avoid approaching heavy equipment (within 20'). • Do not enter demarcated areas without authorization and always communicate intentions to include travel path and duration of stay. • Always establish communication with heavy equipment operator (radio, visual, verbal) if transitioning within 20' of vehicle (in front or immediately behind). • Do not approach heavy equipment unless equipment is in a safe condition (bucket lowered, parking brake set, blade down, etc.). • Anticipate the fall path for any object being carried or moved and avoid the "shadow of the load". • Never stand under or near a suspended load. • Never attempt to enter or approach within 6' of an excavation slope or trench. • Never attempt to touch or approach newly applied hot asphalt, tack, or similar materials. • If any asphalt, tack, paint, cement, etc. contact skin remove immediately. • When inspecting cement mixing operations avoid breathing visible dust emissions from mixing process.

TDOT STRUCTURE SITES INSPECTIONS

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 10/27/2023 | Last Revision: 10/27/2023

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

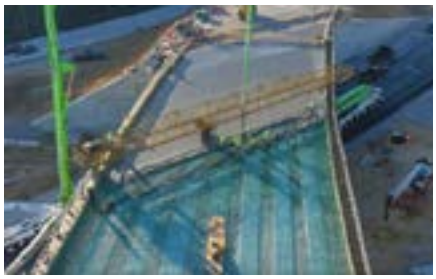
Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629. • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (General, Non-Motorway)

Description:
Stopping, parking, and exiting a State-owned vehicle in a parking lot or other surface not on or near an active motorway.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If entering or working in a TDOT WORK ZONE refer to the JSA: – VEHICLE OPERATIONS – WORK ZONE VISITS • If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway in low-light conditions. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off. • Communicate pull-off maneuver with turn signals well in advance of move. • Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions.

- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.



Construction Worksite Inspections – TDOT Structure Sites (Bridges, Retaining Walls, Foundations, etc.)

Description:
TDOT personnel site visits to construction sites along state routes and in various locations to perform inspection of structures under construction.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Slip, Trip, Fall
- Injury or Death from Contact with Heavy Equipment
- Injury or Death from Ejection of Debris from Heavy Equipment Operations
- Equipment of Load Instability
- Contact with Heavy Equipment Counterweight
- Dropped Load
- Falls from Height from Unprotected Edges >4'
- Engulfment from Excavation/ Loose Soil

Controls (How I keep from getting hurt?)

- Always have an escape route when outside of a vehicle in a work zone. The escape route should be a clear path available at all times to escape an errant motorist. The escape route should include:
  - A clear path away from danger
  - Level ground free of obstructions
  - Avoid being on the danger side of stationary objects (vehicles, heavy equipment, guardrails, etc. which may block exit.
- NEVER turn your back to traffic.
- Upon exiting the vehicle, don the proper work zone PPE:
  - Safety toe boots
  - Hard hat (class G or equivalent)
  - High visibility vest (class 3)
  - ANSI Z87.1 rated safety glasses
- Avoid walking on steep slopes, areas with disturbed soil, or areas with loose debris.
- Always plan walking route and maintain eyes on path.
- Do not operate a cell phone or similar electronic device while walking.
- When possible, avoid approaching heavy equipment (within 20').
- Do not enter demarcated areas without authorization and always communicate intentions to include travel path and duration of stay.
- Always establish communication with heavy equipment operator (radio, visual, verbal) if transitioning within 20' of vehicle (in front or immediately behind).
- Do not approach heavy equipment unless equipment is in a safe condition (bucket lowered, parking brake set, blade down, etc.).
- Anticipate the fall path for any object being carried or moved and avoid the "shadow of the load".
- Never stand under or near a suspended load.
- Never attempt to enter or approach within 6' of an excavation slope or trench.
- Avoid the "face" or underside of a new excavation, embankment, or culvert
- Never approach an unprotected edge greater than 4' in height.
- Avoid leaning on or touching temporary construction handrails.

JOB SAFETY
ASSESSMENTS

ENVIRONMENTAL

SUMMARY OF ENVIRONMENTAL

The TDOT Environmental Division is responsible for identifying, assessing, mitigating and documenting environmental risk to TDOT on projects and operations from early project development through construction and into maintenance. Environmental risk reduction is accomplished by: integrating environmental considerations and regulatory requirements into TDOT's transportation programs and operations, providing a broad range of technical expertise in the natural and human environment, providing environmental (NEPA) documents and permits for TDOT projects and activities, and coordinating with regulatory agencies to streamline the environmental review and permit processes.

TOP 5 HAZARDS

1. Contact with Vehicles / Traffic
2. Contact/Crush by Construction Equipment
3. Ergonomic / Soft Tissue Injury
4. Slip, Trip, Fall Hazards including Falls from Height
5. Biting Insects/Animal Exposure

OHS SHAREPOINT

STANDARD PPE FOR GENERAL ENVIRONMENTAL

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- OHS-010 Hot Work Program
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- TDOT LOTO Periodic Inspection Checklist
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)
- Memorandum - Lane Crossing

RELATED PROGRAMS AND REFERENCES

- TDOT Work Zone Field Manual
- Ecology Field Safety Manual
- Model 15-C Electrofisher Manual
- Shocker Manual AS2

Print Section

Traveling and Working in Wooded Areas

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Contact with Stinging/Biting Insects, Poisonous Plants, Wild Animals, and Other Pests • Weather Concerns / Heat and Cold Stress • Sunburn and Natural UV Exposure • Slip, Trip, Fall from Varied Terrain • Lacerations from Brush Clearing Tools • Falls from Height (>4') • Contact with Vehicles and Other Traffic • Encounters with Public Persons • Loss of Orientation	• Wear proper PPE: – Hiking or treaded boot with ankle support – High visibility vest • When applicable, wear rubber (muck) boots or snake boots • Wear insect repellent and avoid contact with poisonous vectors when possible. • Always check weather forecast for the area prior to planning trip. • Tailor clothing choices to anticipated weather conditions. • Always pack hydration supplements and regularly intake water. • Never attempt to drink from untreated, natural sources. • Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress. • Always inspect travel path and select the terrain with least obstacles and elevation change. Avoid slopes and loose substrates. • Only use machetes and other brush clearing tools when necessary. • Always swing away from body parts arcing away from body. • Always wear cut-resistant gloves (ANSI A4 or greater) when operating machetes or other brush clearing tools. • Never approach cliffs, holes, culverts, or other drop offs. • Be aware of traffic patterns and avoid working near roadways when possible. • Be aware of public persons and always assume a neutral, non-engaging demeanor. If confrontation occurs or is suspected evacuate the area and contact local authorities if warranted. • When possible, avoid working alone and communicate travel plans with a supervisor. Stick to planned travel route at all times. • Always carry maps, GPS, radio, cell phones and other tools to prevent getting lost.

Working Over or Around Shallow Waterways (<4')

Description:
Field surveying personnel may travel in a variety of terrains which may include waterways, marshes, creeks, streams, etc. <4' while performing job functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Drowning • Biological Exposure (Waterborne Pathogens, Viruses, Bacteria, etc.) • Swift Currents	• Do not approach waterways deeper than 4'. If you are unsure of the depth of a waterway do not approach. • When working within 6' of waterways, marshes, creeks, streams, ponds, lakes, or other body of water ensure proper PPE is worn: ◆ Personal flotation device (PFD)

- Working on a bridge or crossing with unprotected edges is considered working within 6’ of a waterway.
- If wearing waders, ensure that PFD does not interfere with the removal of waders in the event of an emergency.
- When working around waterways never work alone. Drowning may occur in as little as 6” of water.
- Always survey work site to look for waterway obstructions, slick embankments, and other hazards which may cause persons to become fully submerged.
- Never drink untreated water and wash hands with soap after touching untreated water sources.
- Do not expose open cuts, wounds, or sores to untreated water.
- Never attempt to cross water with a swift current regardless of depth.

STEP Performing Backpack Electrofishing

Description:
Using a portable electric shock system to capture fish and invertebrates for evaluation. Electrofishing device includes a battery system and shock electrode wand.

Hazards (How can I get hurt?)

- Electric shock
- Slips, trips, and falls when working in aquatic environments
- Drowning
- Equipment malfunction
- Wildlife interactions

Controls (How I keep from getting hurt?)

- Never attempt to operate electrofishing equipment alone. A minimum of three persons are required to performing electrofishing activities.
- A minimum of two persons (not including the operator) must be training in first aid and cardiopulmonary resuscitation (CPR).
- Wear proper PPE:
  - Lineman gloves (5000V minimum rating)
  - Personal flotation device (PFD)
  - Waders
- Always inspect lineman gloves prior to each use and ensure proper 3rd party inspection schedule is maintained.
- Any damage to lineman gloves should prompt retirement. Always carry an extra pair of lineman gloves.
- Inspect all gear prior to each use for insulation damage.
- Never enter the water during shocking operations.
- Always disconnect the battery when the unit is not in use.
- Ensure all dip nets are equipped with insulated handles and are inspected for damage prior to each use.
- Be cautious and maintain proper footing to avoid hazards that may lead to injuries.
- When working within 6’ of waterways, marshes, creeks, streams, ponds, lakes, or other body of water ensure proper PPE is worn:
- Personal flotation device (PFD)
- Perform regular maintenance on electrofishing equipment to mitigate potential injuries.
- Be cognizant of surrounding wildlife, including encounters with stinging insects, venomous snakes, and wild animals.

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629. • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If entering or working in a TDOT WORK ZONE refer to the JSA: – VEHICLE OPERATIONS – WORK ZONE VISITS • If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway in low-light conditions. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off. • Communicate pull-off maneuver with turn signals well in advance of move. • Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot. • Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle. • Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls. • Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting. • Wear proper PPE: – High visibility vest (class 3) • Once out of the vehicle, remain away from the road or behind solid obstructions. • Do not attempt to cross lanes of an active roadway.

Traveling and Working in Wooded Areas

Description:
Environmental mitigation personnel may travel in a variety of terrains from roadside to rural environments while performing job functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Contact with Stinging/Biting Insects, Poisonous Plants, Wild Animals, and Other Pests • Weather Concerns / Heat and Cold Stress	• Wear proper PPE: – Hiking or treaded boot with ankle support – High visibility vest • When applicable, wear rubber (muck) boots or snake boots • Wear insect repellent and avoid contact with poisonous vectors when possible. • Always check weather forecast for the area prior to planning trip.

- Sunburn and Natural UV Exposure
- Slip, Trip, Fall from Varied Terrain
- Lacerations from Brush Clearing Tools
- Falls from Height (>4')
- Contact with Vehicles and Other Traffic
- Encounters with Public Persons
- Loss of Orientation

- Tailor clothing choices to anticipated weather conditions.
- Always pack hydration supplements and regularly intake water.
- Never attempt to drink from untreated, natural sources.
- Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress.
- Always inspect travel path and select the terrain with least obstacles and elevation change. Avoid slopes and loose substrates.
- Do not attempt to clear brush or use machetes.
- Never approach cliffs, holes, culverts, or other drop offs.
- Be aware of traffic patterns and avoid working near roadways when possible.
- Be aware of public persons and always assume a neutral, non-engaging demeanor. If confrontation occurs or is suspected evacuate the area and contact local authorities if warranted.
- Never work alone and communicate travel plans with a supervisor. Stick to planned travel route at all times.
- Always carry maps, GPS, radio, cell phones and other tools to prevent getting lost.

Working Over or Around Shallow Waterways (<4')

Description:
Environmental mitigation personnel may travel in terrains which include waterways, marshes, creeks, streams, etc. <4' while performing job functions.

Hazards (How can I get hurt?)

- Drowning
- Biological Exposure (Waterborne Pathogens, Viruses, Bacteria, etc.)
- Swift Currents

Controls (How I keep from getting hurt?)

- Do not approach waterways deeper than 4'. If you are unsure of the depth of a waterway do not approach.
- When working within 6' of waterways, marshes, creeks, streams, ponds, lakes, or other body of water ensure proper PPE is worn:
  - Personal flotation device (PFD)
- Working on a bridge or crossing with unprotected edges is considered working within 6' of a waterway.
- If wearing waders, ensure that PFD does not interfere with the removal of waders in the event of an emergency.
- When working around waterways never work alone. Drowning may occur in as little as 6" of water.
- Always survey work site to look for waterway obstructions, slick embankments, and other hazards which may cause persons to become fully submerged.
- Never drink untreated water and wash hands with soap after touching untreated water sources.
- Do not expose open cuts, wounds, or sores to untreated water.
- Never attempt to cross water with a swift current regardless of depth.

Collecting and Analyzing Samples

Description:
Environmental mitigation personnel may collect and analyze samples during inspection activities.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Ergonomic – Heavy Lifting / Repetitive Motion Strain / Soft Tissue Injury • Chemical Exposure – Sample Media (Alcohol) • Laceration or Contact from Hand Tools	• Never exceed 50 pounds when carrying material, supplies, or samples. • Ensure all hand tools are secured when carrying to prevent unintended contact or slip. • When operating hand tools (shovel) always wear proper PPE: – Safety glasses – Hard-toe boots – Cut-resistant gloves (ANSI A4 or higher) • When digging, maintain a secure foothold and take small shovel loads at a time. • When possible, switch operators performing digging/sampling activities on a regular basis. • Personnel should not be within 6’ of operator during digging activities.

HISTORIC PRESERVATION SURVEY

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 6/6/2023 | Last Revision: 9/22/2023

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629. • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway or exiting the vehicle in low-light conditions. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off. • Communicate pull-off maneuver with turn signals well in advance of move. • Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions.

- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

Performing Property Inspections – Residential/Agricultural/Wooded Locations

Description:
Environmental personnel may have to visit a property to review and or meet with property owners to determine historic preservation.

Hazards (How can I get hurt?)

- Uneven Surfaces/Changes in Floor Elevation
- Obstructions in Walking Surface
- Poor Structural Integrity
- Chemical Exposure (Chemicals, Asbestos, etc.)
- Biological Exposure (Body Fluids, Mold, etc.)
- Illicit Narcotics Exposure
- Aggressive Persons/Animals

Controls (How I keep from getting hurt?)

- Always attempt to contact the property owner and establish presence when entering private property.
- Wear proper PPE:
  - Safety toe boots
  - ANSI Z87.1 rated safety glasses
  - High visibility vest
  - Long sleeve shirt and pants
  - N95 Respirator (Dust Mask) as needed for mold
    - Guidance for Voluntary Respirator Use- General
- Perform a visual assessment of the property and each dwelling prior to entering to evaluate potential structural integrity hazards. If hazards are identified do not enter dwelling.
- Always bring a flashlight when entering a dwelling.
- When possible, avoid touching any items or structures in the dwelling.
- Prior to entering a new portion of the dwelling (new room, new level, entering building) stop and scan the area for hazards and obstructions in the walkway.
- Any signs of open hazardous chemicals, unusual chemical smells, narcotics paraphernalia, etc. should prompt an immediate evacuation of the dwelling.
- Avoid any unknown fluids, blood, other body fluids, medical devices, needles, and other potential items potential containing blood borne pathogens.
- 305-02 Bloodborne Pathogens Program
- Avoid dwelling with visual mold contamination. Wear an N95 respirator (dust mask) as needed or evacuate the dwelling.
- Assume a neutral disposition with property owners.
- Always avoid confrontation with property owners and always maintain a distance of 6’ or greater from unknown persons.
- If a confrontation or argument occurs exit the dwelling immediately without turning your back on the occupant and notify the authorities.
- Always communicate travel plans with a supervisor, check in regularly, and avoid working alone when possible.

Performing Property Inspections – Commercial/Industrial Locations

Description:
Environmental personnel may have to visit commercial or industrial locations to perform cultural inspections on private property.

Hazards (How can I get hurt?)

- Industrial Equipment & Machine Hazards
- Obstructions in Walking Surface
- Machinery Hazards
- Dropped Loads/Crush
- Contact with Mobile Equipment
- Poor Structural Integrity
- Chemical Exposure (Chemicals, Asbestos, etc.)
- Aggressive Persons
- Elevated Noise Exposure

Controls (How I keep from getting hurt?)

- Always attempt to contact the property owner and establish presence when entering private property.
- At a minimum, adhere to the facility's PPE requirements.
- Wear proper PPE:
  - Safety toe boots
  - ANSI Z87.1 rated safety glasses
  - High visibility vest
  - Hearing Protection (as needed)
  - Cut-resistant gloves (ANSI A4 or greater) (as needed)
- Perform a visual assessment of the property prior to entering to evaluate potential structural integrity hazards. If hazards are identified do not enter property.
- Report any hazards to the TDOT Right of Way Agent Senior for immediate steps for hazard removal.
- Always bring a flashlight when entering a building or structure.
- Do not touch any items or attempt to operate machinery.
- Keep distance from all machinery and mobile equipment to avoid contact.
- Never walk under a suspended load.
- Do not enter any confined spaces, tunnels, pits, or excavations.
- Prior to entering a new portion of the property (new room, new level, entering building) stop and scan the area for hazards and obstructions in the walkway.
- Any signs of open hazardous chemicals, unusual chemical smells, etc. which may cause harm should prompt an immediate evacuation of the dwelling.
- Assume a neutral disposition with property owners.
- Always avoid confrontation with property owners and always maintain a distance of 6' or greater from unknown persons.
- If a confrontation or argument occurs exit the property immediately without turning your back on the occupant and notify the authorities.
- Always communicate travel plans with a supervisor, check in regularly, and avoid working alone when possible.
- Determine an adequate evacuation route and assembly area in the event of an emergency.
- Any elevated noise areas (>85dBA) or areas where it is difficult to speak with another at an arm's length away requires ear plugs.

Performing Property Inspections – Construction Site Locations

Description:
Environmental personnel may have to visit construction site locations to perform cultural surveys and inspections on private property.

Hazards (How can I get hurt?)

- Industrial Equipment & Machine Hazards
- Obstructions in Walking Surface
- Poor Structural Integrity
- Machinery Hazards
- Dropped Loads/Crush
- Contact with Mobile Equipment
- Falls from Height
- Aggressive Persons
- Slips and Trips
- Uneven Terrain
- Fabrication and Formwork – Lacerations, Sharps, Impalement Hazards, etc.

Controls (How I keep from getting hurt?)

- Always attempt to contact the property owner and establish presence when entering private property.
- Wear or have on person, identification (badge, logo apparel, or business cards).
- Ensure that an escort is available to show restricted versus unrestricted access areas on the construction site.
- At a minimum, adhere to the site's PPE requirements.
- Wear proper PPE:
- Safety toe boots
- ANSI Z87.1 rated safety glasses
- High visibility vest
- Hard hat
- Inspect the walking surface for uneven surfaces, loose dirt/gravel/sand, pits, drop-offs, and trenches. Avoid these obstacles.
- Always maintain a minimum distance of 35' from operating machinery.
- Do not touch any items or attempt to operate machinery.
- Never walk under a suspended load.
- Do not enter any confined spaces, tunnels, pits, or excavations.
- Prior to entering a new portion of the property (new room, new level, entering building) stop and scan the area for hazards and obstructions in the walkway.
- Assume a neutral disposition with property owners.
- Always avoid confrontation with property owners and always maintain a distance of 6' or greater from unknown persons.
- If a confrontation or argument occurs exit the property immediately without turning your back on the occupant and notify the authorities.
- Always communicate travel plans with a supervisor, check in regularly, and avoid working alone when possible.
- Determine an adequate evacuation route and assembly area in the event of an emergency.
- Avoid any active construction work.
- Do not approach any unprotected falls from height (greater than 4'). Maintain a distance of 15' from unprotected edge.
- Do not access any roof, crawl space, basement, or attic space.
- Avoid edges near bodies of water, streams or holding ponds due to slip and entrapment potential.

Traveling and Working in Wooded/ Urban Areas

Description:
Environmental personnel may travel in a variety of terrains from urban environments to rural environments while performing job functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Contact with Stinging/Biting Insects, Poisonous Plants, Wild Animals, and Other Pests • Weather Concerns / Heat and Cold Stress • Sunburn and Natural UV Exposure • Slip, Trip, Fall from Varied Terrain • Lacerations from Brush Clearing Tools • Falls from Height (>4') • Contact with Vehicles and Other Traffic • Encounters with Public Persons • Loss of Orientation	• Wear proper PPE: – Hiking or treaded boot with ankle support – High visibility vest • When applicable, wear rubber (muck) boots or snake boots • Wear insect repellent and avoid contact with poisonous vectors when possible. • Always check weather forecast for the area prior to planning trip. • Tailor clothing choices to anticipated weather conditions. • Always pack hydration supplements and regularly intake water. • Never attempt to drink from untreated, natural sources. • Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress. • Always inspect travel path and select the terrain with least obstacles and elevation change. Avoid slopes and loose substrates. • Only use machetes and other brush clearing tools when necessary. • Always swing away from body parts arcing away from body. • Always wear cut-resistant gloves (ANSI A4 or greater) when operating machetes or other brush clearing tools. • Never approach cliffs, holes, culverts, or other drop offs. • Be aware of traffic patterns and avoid working near roadways when possible. • Be aware of public persons and always assume a neutral, non-engaging demeanor. If confrontation occurs or is suspected evacuate the area and contact local authorities if warranted. • When possible, avoid working alone and communicate travel plans with a supervisor. Stick to planned travel route at all times. • Always carry maps, GPS, radio, cell phones and other tools to prevent getting lost.

Performing Archaeological Evaluation

Description:
Environmental personnel may perform soil excavations of 2-3' during a cultural survey.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Weather Concerns / Heat and Cold Stress • Sunburn and Natural UV Exposure • Slip, Trip, Fall from Excavations • Falls from Height (>4') • Contact with Underground Utilities • Contact with Hand Tools	• Wear proper PPE: – Hiking or treaded boot with ankle support – Cut-resistant gloves (ANSI A4 or greater) • Prior to making any excavations, ensure that the area has been surveyed for underground utilities and that utilities are marked. • Always check the weather forecast prior to traveling outdoors or planning a site visit. • Dress according to the predicted weather conditions. • Wear sunscreen, bug spray, and long sleeve shirt/pants to reduce insect and UV exposure.

• Exposure to Buried Chemicals or Unknown Hazardous Debris	• Demarcate excavation area to notify persons of uneven terrain or excavations. • Do not attempt to step down into an excavation of greater than 12”. Create “steps” to allow for easy access into excavation area. • Do not create an excavation of greater than 4’ without proper sloping, benching, or trench box. Refer to applicable program – OHS-004 Trenching and Excavation Program • Inspect all hand tools prior to use for damage, stress fractures, etc. Do not use damaged hand tools. • Be away of the tool path when using hand tools to ensure other personnel are not in the “line of fire”. • If unknown barrels, drums, or other suspected hazardous chemicals are unearthed stop immediately and contact TDOT OHS.

PETROLEUM TANK INVESTIGATION

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 6/6/2023 | Last Revision: 8/11/2023

Investigating Petroleum Leaks/ Odors/Tanks

Description:
When a petroleum odor is reported to TDOT, Environmental Technicians responds to site to investigate via TDOT vehicle.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. – 303-05 Motor Vehicle Utilization Policy • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic.

Parking and Exiting Vehicle (On or Near Motorway or investigation area)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksites such as UST Investigation.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway or exiting the vehicle in low-light conditions. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off. • Communicate pull-off maneuver with turn signals well in advance of move. • Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot. • Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.

- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards.
- Avoid jumping down from high ground clearance vehicles.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

Investigating Petroleum Leaks/Odors/Tanks

Description:
Investigation near exposed tank/leak/odor area.

Hazards (How can I get hurt?)

- Injury or Death from Flammable Fumes/Liquids Potential Igniting
- Injury from Inhalation of Petroleum Fumes
- Fall Into Possible Excavation or Trench
- Struck By Heavy Equipment
- Confined Space Entry Hazards
- Excavation or Trench Collapse Potential

Controls (How I keep from getting hurt?)

- If possible, perform air monitoring for Lower Explosive Limit (LEL) and Volatile Organic Compounds (VOCs) to ensure safe approach. If no meter, a safe distance to investigation area should be established.
- Stay up wind from odor.
- No smoking permitted near or around investigation area.
- No Flames or non-intrinsically safe devices are to be near or around investigation area.
- Wear proper PPE:
  - ANSI Z87.1 rates safety glasses
  - Hard Hat (Class G or equivalent)
  - Safety toed boots
  - High visibility vest (class 3)
- Do not approach trench or excavations more than 6 feet to the edge.
- Do not enter excavation or trench.
- Do not attempt to enter a tank, shaft, pit, or other confined space.
- OHS-012 Confined Space Entry Program
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.
- Always check for moving equipment and other hazards prior to approaching investigation area.

JOB SAFETY ASSESSMENTS

FACILITY MAINTENANCE

SUMMARY OF FACILITIES MAINTENANCE

The Tennessee Department of Transportation (TDOT) Facilities Maintenance Division is responsible for the maintenance, repair, and upkeep of various facilities and properties owned or operated by TDOT throughout the state of Tennessee. These facilities include administrative buildings, maintenance depots, rest areas, weigh stations, and other infrastructure used to support the department's transportation operations.

TOP 5 HAZARDS

1. Lacerations from Tools and Equipment
2. Electrical/Machinery Hazards - Mechanical
3. Ergonomic Hazards from Lifting/Awkward Posture
4. Electrical Hazards - Shock
5. Slip, Trip, Fall from Work Area Hazards

OHS SHAREPOINT

STANDARD PPE FOR GENERAL FACILITIES MAINTENANCE

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-003 Facility Lockout Tagout Program
- OHS-006 Personal Fall Protection Systems
- OHS-007 Powered Industrial Truck Operation Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- OHS-012 Confined Space Entry Program
- OHS-010 Hot Work Program
- TDOT LOTO Periodic Inspection Checklist
- TDOT PIT Daily Pre-Op Checklist
- PIT Operator Evaluation
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)

RELATED PROGRAMS AND REFERENCES

- OSHA Safety and Health Topics

Print Section

General Work Area Hazards

Description:
General construction or industrial environment hazards.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Slips, Trips, and Falls • Pests • Hot and Cold Environments • Ergonomics • High Noise Environments	• Always inspect the work area prior to beginning work to look for walking and working surface hazards. – OHS-008 Walking Working Surfaces • Remove any debris and perform general housekeeping to create a clean work area. • Inspect the work area for stinging and biting insects along with other pests prior to starting work. • Monitor other employees for signs of heat and cold stress, take regular breaks, and wear proper clothing for the weather type. • Do not lift items over 40lbs and avoid awkward postures. • If working in environments greater than 85dBA wear hearing protection. If greater than 100dBA wear double hearing protection. • Always be aware and in communication with other work operations/ contractors in the vicinity of the work area.

Hand and Power Tool Usage

Description:
Various hand and portable power tool usage for performing general carpentry tasks.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Contact/Puncture/Laceration from Slipped or Broken Tool
• Awkward Posture – Soft-Tissue Injury
• Tool Break Apart
• Entanglement in Tool Fixture
• Laceration or Puncture from Tool Attachment
	• Always select the proper tool for the job.
	• Always ensure that the tool is properly seated and adequate leverage is applied to tool.
	• Ensure all hand and power tools are inspected prior to use.
	• Always review and reference the operator's manual prior to use.
	• Wear proper PPE:
	  – Safety glasses
	  – Face shield
	  – Cut-resistant gloves (ANSI A4 or higher)
	  – Hearing protection
	• When operating a grinder, ensure that the wheel speed rating matches or exceeds the grinder speed rating and only use in an approved Hot Work area.
	  – OHS-010 Hot Work Program
	• When operating a grinder, ensure that the wheel is compatible with the grinder size, type, and material application.
	• Never attempt to grind non-ferrous metals
	• Keep hands and body parts away from power tools during use.

- Anticipate the potential failure path of the tool and position the body outside of the line of fire.
- When replacing a tool fixture, disconnect the tool from the power source.

STEP Specialized Carpentry Tool Usage

Description:
Various specialized carpentry tool usage, to include: drill/driver, router, table saw, jointer, planer, band saw, sander, chisel, etc.

Hazards (How can I get hurt?)

- Laceration or Amputation from Table Saw, Circular Saw, etc.
- Puncture from Chisels, Nail Guns, etc.
- Entanglement from Drill, Router, etc.
- Electrical Shock
- Flying Debris and Dust
- High Noise
- Saw Kickback

Controls (How I keep from getting hurt?)

- Only use woodworking tools which are in proper working order.
- Do not use any tool without the proper machine guarding controls in place per the manufacturer.
- Do not attempt to bypass or modify any machine guards or safety systems.
- When using a table saw, jointer, or other woodworking tool where fingers approach the blade ensure to use a remote “bite” stick to secure the part.
- Avoid the “line of fire” for power tools to include puncture or cut through by the tool.
- Always secure the part to avoid loss of control or kickback.
- Never attempt to cut small pieces of wood with large power tools.
- Always wear proper PPE when operating woodworking equipment:
  - Safety glasses
  - Hard-toe shoes/boots
  - Hearing protection
  - Cut-resistant gloves (when handling wood, nails, staples or other sharps)
  - Dust mask (voluntary)
- Always cut away from the body with chisels or other hand-powered carpentry tools.
- When operating rotating equipment like a drill or router always ensure the bit, collar, and chuck are securely tightened.
- Always secure the part prior to performing cut.
- Always maintain a solid grip on the drill or router using two hands.
- Only use approved bits with the appropriate speed rating in the respective drill or router.
- Always inspect electrical cords prior to use, ensure the ground prong is equipped, and no damage to wiring insulation is present.
- Never adjust saw or setup while operating.
- Ensure that the blade is intended for the material to be cut.

Work on Electrical Systems

Description:
Performing work on electrical systems (live or dead) or in the vicinity of live electrical systems.

Hazards (How can I get hurt?)

- Shock from contact with AC power
- Shock from contact with DC power
- Arc flash or blast
- Shock from stored electrical energy (capacitors)

Controls (How I keep from getting hurt?)

- Only qualified electricians may perform work on electrical systems.
- Inspect electrical installations for electrical and arc flash information prior opening panel.
- Always assume electrical equipment is energized until proven otherwise.
- Do not work beyond your abilities. Know your limits and consult additional resources when needed.
- Always use rated, insulated, and properly inspected electrical testing equipment and tools.
- Utilize the LIVE, DEAD, LIVE method to ensure electrical test equipment is operating correctly during use.
- Wear proper electrical PPE:
  - Always refer to the latest version of NFPA 70E for proper electrical PPE based upon incident energy
  - Safety glasses
  - Hard hat (Class E) with face shield
  - Hearing protection
  - Electrical-rated gloves (insulated inner/outer work gloves)
  - 100% cotton or FR long-sleeve shirt and pants
  - Electrically-rated hard toe boots
- Ensure all electrical PPE is within date and inspected before use.
- Always use LOTO on electrical systems and only perform work live as a last resort.
  - OHS-003 Facility Lockout Tagout Program
- Do not work on high voltage electrical systems (>600v) without proper training.
- Work on low voltage systems or control power should still require electrical safety controls.

Removal of Flooring System (Tile, Stone, Ceramic, and Other Similar Rigid Flooring Systems)

Description:
Manual or powered removal of floor system to include cementitious under coating.

Hazards (How can I get hurt?)

- Potential hazardous materials (asbestos and lead)
- Airborne contaminants – respirable dust and silica
- Lacerations from sharp tile and stone
- Lacerations from scrapers, pry bars, and similar hand tools
- Ergonomics - soft-tissue injuries / awkward position
- Contact with hammer/hand tools
- Crush/Contact with Powered Floor Scraper
- Flying Debris
- Excessive Noise and Vibration
- Uneven surfaces

Controls (How I keep from getting hurt?)

- Always perform a hazardous materials building survey of flooring components prior to beginning floor removal process.
- If asbestos products are present or suspected in flooring systems stop work until properly training asbestos contractors can verify presence of asbestos and perform abatement.
- Always wear PPE when handling tile or operating tools:
  - ANSI Z87.1 rated safety glasses
  - Cut-resistant gloves (ANSI A4 or higher)
  - Safety toe boots
- Floor tiles, stone, ceramic, and other similar rigid flooring systems are sharp and can create a laceration hazard. Avoid handling tiles particularly damaged flooring components.
- Always inspect hand tools prior to use for damage, dulling, cracking, or other damage. Remove damaged hand tools from service immediately.
- Always operate scrapers away from the body and other person.
- Maintain a two-handed grip on the scraper while in operations.
- When the scraper is not being used ensure a sheath or other blade cover is installed.
- When operating a pry bar always anticipate the path of release by the pry bar. Never position body parts in release path (line of fire).
- Do not attempt to lift greater than 40lbs.
- When possible, use mechanical means or a buddy to lift and move items.
- Limit time bending, stooping, and/or on knees. Use knee pads and other ergonomic positioning devices when possible.
- Never attempt to use fuel-powered (propane) floor scraping tool indoors.
- When using an electrical floor scraping tool always perform a pre-use inspection per the manufacturer's specifications.
- Clear the area of personnel during powered floor scraper operations.
- Never attempt to dismount or remotely operate the powered floor scraper during operation.
- Ensure safety systems are in place and operating (machine guards, seat kill switch, etc.).
- Always wear proper PPE when operating powered floor scraper:
  - Safety glasses
  - Hearing protection
- Clear area of debris and tripping hazards on a regular basis.
- Any immovable floor hazards should be demarcated or otherwise blocked.

Removal of Flooring System (Carpet, Linoleum, Wood, Vinyl, and Other Similar Flooring Systems)

Description:
Manual or powered removal of floor system to include adhesive or mastic under coating

Hazards (How can I get hurt?)

- Potential hazardous materials (asbestos)
- Lacerations from sharp tools
- Ergonomics - soft-tissue injuries / awkward position
- Contact with hammer/hand tools
- Airborne/Dermal Exposure to Solvents (Mineral Spirits, Acetone, IPA)
- Flammable Hazards from Solvents
- Power saws / tools
- Sweeping
- Removing tacks, etc.
- Crush/Contact with Powered Floor Scraper
- Flying Debris
- Excessive Noise and Vibration
- Uneven surfaces

Controls (How I keep from getting hurt?)

- Always perform a hazardous materials building survey of flooring components prior to beginning floor removal process.
- If asbestos products are present or suspected in flooring systems stop work until properly training asbestos contractors can verify presence of asbestos and perform abatement.
- Always wear PPE when operating tools:
  - ANSI Z87.1 rated safety glasses
  - Cut-resistant gloves (ANSI A4 or higher)
  - Safety toe boots
- Always inspect hand tools prior to use for damage, dulling, cracking, or other damage. Remove damaged hand tools from service immediately.
- Always operate scrapers away from the body and other person.
- Maintain a two-handed grip on the scraper while in operations.
- When the scraper is not being used ensure a sheath or other blade cover is installed.
- When operating a pry bar always anticipate the path of release by the pry bar. Never position body parts in release path (line of fire).
- Do not attempt to lift greater than 40lbs.
- When possible, use mechanical means or a buddy to lift and move items.
- Limit time bending, stooping, and/or on knees. Use knee pads and rolling chairs when possible.
- When using solvents to remove flooring adhesive always review the SDS prior to use.
- When using solvents to remove flooring adhesive always ensure that adequate ventilation is present at all times.
- Wear proper PPE when using solvents to remove flooring adhesive:
  - Safety glasses
  - Chemical gloves (nitrile gauntlet)
- When using solvents remove sources of ignition from within 35’ of solvents.
- When solvents are not in use replace cap and secure solvents away from work area.
- When handling or removing tack strips beware of puncture potential.
- When operating circular saws always be aware of cut path and set the blade as shallow as possible.
- Always maintain two hands on the circular saw when in use and never attempt to rotate saw during the cut.
- Always inspect electrical components prior to use.
- Never attempt to use fuel-powered (propane) floor scraping tool indoors.
- When using an electrical floor scraping tool always perform a pre-use inspection per the manufacturer’s specifications.
- Clear the area of personnel during powered floor scraper operations.
- Never attempt to dismount or remotely operate the powered floor scraper during operation.
- Ensure safety systems are in place and operating (machine guards, seat kill switch, etc.).
- Always wear proper PPE when operating powered floor scraper:
  - ANSI Z87.1 rated safety glasses
  - Hearing protection
  - Safety toe boots
- Clear area of debris and tripping hazards on a regular basis.
- Any immovable floor hazards should be demarcated or otherwise blocked.

Preparation of Sub Floor

Description:
Preparation of sub floor for installation of a flooring system.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Exposure to Dust and Silica from Cleaning of Floor/Cracks • Ergonomic Strain from Stooping and Bending • Exposure to Hazardous Chemicals from Epoxy, Latex, or Cement-Based Fillers • Skin, Eye, Respiratory Irritation from Floor Leveling Compound • Chemical Burns from Floor Leveling Compound • Slip, Trip, and Fall from Slippery Surfaces • Fire Hazards from Floor Leveling Compound	• Ensure dust and dry compounds are vacuumed or collected wet instead of swept while dry. Minimize airborne dust generation from sweeping. • Reduce time spent stooping or bending. • When possible, utilize rolling seats or other methods which reduce time spent bent at the waist. • Regularly reposition to minimize strain from repetitive motions. • Wear proper PPE: – ANSI Z87.1 rated safety glasses – Hard toe shoes – Chemical resistant gloves (nitrile or butyl rubber) – Voluntary respirator use (dust mask or N95) for nuisance dusts ◆ TDOT Guidance for Voluntary Respirator Use • Read the manufacturer's instructions, warnings, and SDS prior to use of any chemical or compound. – OHS-002- Hazard Communication • Avoid contact of floor leveling compound or crack fillers with skin and eyes. • Always ensure adequate ventilation in the work space when handling, mixing, or applying crack fillers or floor leveling compound. • During drying or curing process evacuate the work area and ensure others are not present until curing process is complete. • Ensure other workers, contractors, and building occupants are notified about chemical use prior to application. • Isolate HVAC to the affected area during application to reduce fume spread. • Avoid walking on floor leveling compound or other floor coatings that do not have a grit agent added as they may be slippery. – OHS-008 Walking Working Surfaces • Always store flammable liquids in a secure location away from ignition sources and personnel.

Installation of Flooring System (Tile, Stone, Ceramic, and Other Similar Rigid Flooring Systems)

Description:
Installation of various, non-carpet/linoleum/wood flooring systems after preparation of sub floor

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Airborne Contaminants – Respirable Dust and Silica • Lacerations from Sharp Tile and Stone • Lacerations from Scrapers, Pry Bars, and Similar Hand Tools	• Ensure dust and dry compounds are vacuumed or collected wet instead of swept while dry. Minimize airborne dust generation from sweeping. • Reduce time spent stooping or bending. • When possible, utilize rolling seats or other methods which reduce time spent bent at the waist. • Regularly reposition to minimize strain from repetitive motions. • Wear proper PPE:

- Ergonomics - Soft-Tissue Injuries / Awkward Position
- Flying Debris
- Uneven Surfaces
- Lacerations from Cutting Tile, Stone, or Similar Floor System
- Lacerations from Tile Saw
- Exposure to Hazardous Chemicals from Epoxy, Latex, or Thinset
- Skin, Eye, Respiratory Irritation from Thinset
- Chemical Burns from Thinset

  - ANSI Z87.1 rated safety glasses
  - Hard toe shoes
  - Cut-resistant gloves (ANSI A4 or greater)
  - Chemical resistant gloves (nitrile or butyl rubber)
  - Hearing protection when operating tile saw
  - Voluntary respirator use (dust mask or N95) for nuisance dusts
    - TDOT Guidance for Voluntary Respirator Use
- Use water (wet methods) when operating tile saw to reduce dust emissions.
- Always operate tile saw per manufacturer's recommendations.
- Never put hands near tile saw blade during operation.
- Ensure all safety systems (machine guards, etc.) are equipped and installed during operation.
- Read the manufacturer's instructions, warnings, and SDS prior to use of any chemical or compound.
  - OHS-002- Hazard Communication.

Installation of Flooring System (Carpet, Linoleum, Wood, Vinyl, and Other Similar Flooring Systems)

Description:
Installation of various, non-tile/rigid flooring systems after preparation of sub floor.

Hazards (How can I get hurt?)

- Lacerations/Amputation from Wood Saw (Miter/Table Saw)
- Lacerations from Carpet Knives, Wood Tools, and Similar Sharp Hand Tools
- Ergonomics - Soft-Tissue Injuries / Awkward Position
- Flying Debris
- Uneven Surfaces
- Airborne Contaminants – Wood and Respirable Dust
- Puncture from Nail Gun Usage
- Excessive Noise from Saw and Nail Gun Usage
- Respiratory Irritation from Carpet and Other Flooring Preservative Chemicals

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - ANSI Z87.1 rated safety glasses
  - Hard toe shoes
  - Cut-resistant gloves (ANSI A4 or greater)
  - Hearing protection when operating power tools
  - Voluntary respirator use (dust mask or N95) for nuisance dusts
    - TDOT Guidance for Voluntary Respirator Use
- Always ensure box cutter or similar knife has a sharp blade.
- Always cut away from the body when operating box cutter.
- Only properly trained personnel should operate wood cutting saws.
- Always read manufacturer's instructions prior to operating tooling.
- Reduce time spent stooping or bending.
- When possible, utilize rolling seats or other methods which reduce time spent bent at the waist.
- Regularly reposition to minimize strain from repetitive motions.
- Do not attempt to lift more than 40lbs without assistance. Personal lifting restrictions may vary.
- Use mechanical lifting devices when possible.
- Perform regular housekeeping and keep debris away from work areas.
- Ensure wood dusts are vacuumed or collected wet instead of swept while dry. Minimize airborne dust generation from sweeping.
- When operating a nail gun, ensure nail gun is in proper working order and only approved nails are used.
- Ensure all safety systems are in place prior to use.
- Always know what is behind the object being nailed and be aware of nail penetration depth.
- Always operate nail gun with two hands and never point at another person.
- Ensure adequate ventilation during flooring installation.
- Allow flooring systems to off-gas over time. Personnel should evacuate work area when possible to allow flooring systems to off-gas and dissipate.

STEP General Work Area Hazards

Description:
General construction or industrial environment hazards.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Exposure to Biological Hazards – Legionella, Mold, Bacteria, and Fungus • Carbon Monoxide Poisoning • Slips, Trips, and Falls • Pests • Hot and Cold Environments • Ergonomics • High Noise Environments	• Inspect the unit for standing water, signs of mold growth, or musty smells prior to beginning work. • When possible, spray moldy or other contaminated surfaces with a diluted bleach solution to reduce the spread of spores. – OHS-002- Hazard Communication • Limit time in obvious or suspected biological hazard areas and avoid disturbing areas of biological growth when possible. • When in areas of obvious or suspected biological hazards do not proceed and evacuate the work area. • When working on or around natural gas or other fuel burning systems utilize a portable carbon monoxide direct reading sensor. • If carbon monoxide direct reading values are 35ppm or greater evacuate the work area and notify supervision. • Always inspect the work area prior to beginning work to look for walking and working surface hazards. • Remove any debris and perform general housekeeping to create a clean work area. – OHS-008 Walking Working Surfaces • Inspect the work area for stinging and biting insects along with other pests prior to starting work. • Monitor other employees for signs of heat and cold stress, take regular breaks, and wear proper clothing for the weather type. • Do not lift items over 40lbs and maintain a neutral working position. • If working in environments greater than 85dBA wear hearing protection. If greater than 100dBA wear double hearing protection.

STEP Hand and Power Tool Usage

Description:
Various hand and portable power tool usage for performing general maintenance tasks.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Contact/Puncture/Laceration from Slipped or Broken Tool • Awkward Posture – Soft-Tissue Injury • Tool Break Apart • Entanglement in Tool Fixture	• Always select the proper tool for the job. • Always ensure that the tool is properly seated and adequate leverage is applied to tool. • Ensure all hand and power tools are inspected prior to use. • Always review and reference the operator's manual prior to use. • Wear proper PPE:

• Laceration or Puncture from Tool Attachment	– Safety glasses – Face shield – Cut-resistant gloves (ANSI A4 or higher) – Hearing protection • When operating a grinder, ensure that the wheel speed rating matches or exceeds the grinder speed rating. • When operating a grinder, ensure that the wheel is compatible with the grinder size, type, and material application. • Never attempt to grind non-ferrous metals • Keep hands and body parts away from power tools during use. • Anticipate the potential failure path of the tool and position the body outside of the line of fire. • When replacing a tool fixture, disconnect the tool from the power source.

Work on or with Refrigerants

Description:
HVAC systems which contain refrigerants that require service, refrigerant replacement, and recover.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Chemical Toxicity from CFCs, HCFCs, HFCs, Hydrocarbon Refrigerants, etc. • Flammability from Hydrocarbon Refrigerants (e.g. R-290 and R-600a) • Environmental Damage • Cryogenic Burns • Stored Energy/Pressure	• Only properly certified persons may attempt to handle refrigerants. • Always wear proper PPE: – Chemical resistant gloves (nitrile or butyl rubber) – Safety goggles and face shield – Long sleeve shirt and pants – Respiratory protection (if in confined areas) • Always reference the applicable refrigerant SDS. • NEVER attempt to service refrigerant systems without the proper certifications and experience. Only use certified HVAC Technicians.

Working at Height (>4')

Description:
Use of ladders or working on HVAC systems located on a roof structure.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Falls from Height • Falling Objects • Falls from Ladders • Falls from Roof • Structural Collapse • Electrical Hazards • Machinery Hazards • Suspension Trauma	• When possible, avoid working at height. – OHS-008 Walking Working Surfaces – OHS-006- Personal Fall Protection Systems • Only use ladders to work at height as a last resort. • When using a ladder, ensure it is of the proper type, height, and style. • Always perform a pre-use inspection on ladder systems. • Always secure tools, equipment, etc. to prevent dropping to a lower level. • Always block or demarcate the area underneath the work area. • Prevent unauthorized personnel from traveling through work area.

- When using a ladder, ensure the proper ladder is used for the application.
- Avoid overextending on a ladder or using the top of a self-supporting ladder.
- When accessing a roof, watch for skylights and other structurally weak components.
- Where a parapet is not present, avoid approaching within 10’ of the roof ledge.
- Prior to installing a ladder, inspect work area for elevated machinery hazards and exposed electrical hazards.
- Use fall arrest equipment as a last resort.
- Always inspect ALL components of a fall arrest system prior to use (anchor point, connecting device, and harness).
- If fall arrest PPE is required wear the following PPE:
  - Full-body fall arrest harness (lap belts are prohibited)
  - Shock absorbing self-retracting lifeline (SRL) or lanyard
  - Safety glasses
  - Hard toe shoes
  - Hard hat
- Always use a fall protection competent person to help calculate the fall distance prior to working at height.
- Never work alone and always have a plan if a fall occurs.

Performing Work on Electrical Systems

Description:
Performing work on electrical systems (live or dead) or in the vicinity of live electrical systems.

Hazards (How can I get hurt?)

- Shock from contact with AC power
- Shock from contact with DC power
- Arc flash or blast
- Shock from stored electrical energy (capacitors)

Controls (How I keep from getting hurt?)

- Only qualified electricians may perform work on electrical systems.
- Inspect electrical installations for electrical and arc flash information prior opening panel.
- Always use rated, insulated, and properly inspected electrical testing equipment and tools.
- Wear proper electrical PPE:
  - Always refer to the latest version of NFPA 70E for proper electrical PPE based upon incident energy
  - Safety glasses
  - Hard hat (Class E) with face shield
  - Hearing protection
  - Electrical-rated gloves (insulated inner/outer work gloves)
  - 100% cotton or FR long-sleeve shirt and pants
  - Electrically-rated hard toe boots
- Ensure all electrical PPE is within date and inspected before use.
- Always use LOTO on electrical systems and only perform work live as a last resort.
  - OHS-003 Facility Lockout Tagout Program
- Do not work on high voltage electrical systems (>600v) without proper training.
- Work on low voltage systems or control power should still require electrical safety controls.

PLUMBING WORK

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 7/10/2023 | Last Revision: 9/11/2023

General Work Area Hazards

Description:
General construction or industrial environment hazards.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Slips, Trips, and Falls • Pests • Hot and Cold Environments • Ergonomics • Awkward Postures • High Noise Environments	• Always inspect the work area prior to beginning work to look for walking and working surface hazards. – OHS-008 Walking Working Surfaces • Remove any debris and perform general housekeeping to create a clean work area. • Inspect the work area for stinging and biting insects along with other pests prior to starting work. • Monitor other employees for signs of heat and cold stress, take regular breaks, and wear proper clothing for the weather type. • Do not lift items over 40lbs and avoid awkward postures. • If working in environments greater than 85dBA (such as operating a circular saw, etc.) wear hearing protection. If greater than 100dBA wear double hearing protection. • Always be aware and in communication with other work operations/ contractors in the vicinity of the work area.

Hand and Power Tool Usage

Description:
Various hand and portable power tool usage for performing general plumbing/ maintenance tasks.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Contact/Puncture/Laceration from Slipped or Broken Tool
• Awkward Posture – Soft-Tissue Injury
• Tool Break Apart
• Entanglement in Tool Fixture
• Laceration or Puncture from Tool Attachment
	• Always select the proper tool for the job.
	• Always ensure that the tool is properly seated and adequate leverage is applied to tool.
	• Ensure all hand and power tools are inspected prior to use.
	• Always review and reference the operator's manual prior to use.
	• Wear proper PPE:
	  – ANSI Z87.1 rated safety glasses
	  – Face shield
	  – Cut-resistant gloves (ANSI A4 or higher)
	  – Hearing protection
	  – Safety toe boots
	• When operating a grinder, ensure that the wheel speed rating matches or exceeds the grinder speed rating.
	• When operating a grinder, ensure that the wheel is compatible with the grinder size, type, and material application.
	• Never attempt to grind non-ferrous metals

- Keep hands and body parts away from power tools during use.
- Anticipate the potential failure path of the tool and position the body outside of the potential failure path.
- When replacing a tool fixture, disconnect the tool from the power source.

Unclogging Drains

Description:
Removing obstructions or blockages from various piping systems.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Electric Shock • Biological Exposure – Body Fluids, Disease Causing Bacteria, Viruses • Chemical Exposure – Drain Cleaners • Rotating Equipment – Powered Drain Auger • Injury or Death from Confined Space Entry • Contents Under Pressure	• Avoid using AC electrical (plug and cord) tools in the presence of water. • Always inspect electrical equipment and cordage for damage prior to use. • Never use equipment with damaged electrical components. • Always us GFCI equipped equipment. • Treat all water sources as non-potable and contaminated. • Avoid contact water, sludge, or other organics with open cuts and always wear exposure PPE: – ANSI Z87.1 rated safety glasses – Nitrile or similar gloves • Regularly wash hands with soap and water. • Avoid touching face or mouth and do not eat, drink, smoke, or apply cosmetics without washing hands with soap and water. • When using chemical drain cleaners always wear the proper PPE: – ANSI Z87.1 rated safety glasses – Face shield – Chemical gloves – Nitrile or Butyl (not exam gloves) • Avoid contact with eyes, face, or skin. • Never mix drain cleaners with other chemicals. • Maintain the SDS for the chemical and review prior to each use. • Always have quick-drenching facilities within 10 seconds of work area when using drain cleaning chemicals. • Avoid splashing when possible. • Only use drain chemicals in a well-ventilated area. • When using a powered drain auger always read the owner's manual prior to use. • Avoid wearing gloves with excessive bulk or high grip surfaces to reduce the likelihood of entanglement. • Always maintain control of the auger speed and power. Always use a dead-man switch or foot pedal. • Monitor powered drain auger for tension buildup. If recognized, reverse the rotation to release the stored energy from the cable. • Never enter a confined space to perform plumbing work. • When removing sections of piping that may be under pressure always open drains, faucets, or other fixtures to help release pressure on the line. • When releasing pipe connections always slowly remove the connection to release pressure in a controlled way.

Working with Metal Piping (Copper, Brass, Steel, and Similar)

Description:
Installing, modifying, or removing metal piping to include fixtures such as valves, unions, tees, etc.

Hazards (How can I get hurt?)

- Laceration/Puncture from Metal Piping or Debris
- Laceration or Injury from Pipe Cutting Operations
- Pinch/Crush from Crimp Tools
- Ergonomic – Muscle Strain
- Burns
- Lead Exposure from Solder Fumes

Controls (How I keep from getting hurt?)

- Always wear proper PPE when handling metal:
  - NSI Z87.1 rated safety glasses
  - Cut-resistant gloves (ANSI A4 or higher)
  - Hard-toe shoes/boots
- Clean metal scrap and debris from the work area regularly.
- When cutting pipe, utilize a reciprocating saw and NOT a grinder with cut-off wheel.
- When using reciprocating saw wear the proper PPE:
  - ANSI Z87.1 rated safety glasses
  - Face shield
  - Hearing protection
  - Cut-resistant gloves (ANSI A4 or higher)
  - Safety toe boots
- Always secure the pipe and ensure the cut path is clear.
- Maintain two hand control on the saw at all times.
- Always inspect electrical cordage prior to use for damage.
- When using crimpers, keep fingers away from crimping operation.
- Never attempt to lift greater than 50lbs.
- Always assume a neutral position when lifting or carrying material.
- Use additional person or mechanical means to manipulate material into place.
- When using solder on pipe joints wear the proper PPE:
  - ANSI Z87.1 rated safety glasses
  - Long sleeves
  - Heat-resistant gloves
- Always keep a fire extinguisher nearby.
- Only solder joints in a well ventilated area.
- Avoid solder in the breathing zone.
- Always wash hands after handling solder.

Working with Synthetic Piping (PVC, CPVC, PEX, and Similar)

Description:
Installing, modifying, or removing synthetic piping to include fixtures such as valves, unions, tees, etc.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Laceration or Injury from Pipe Cutting Operations
• Pinch/Crush from Crimp Tools
• Exposure to Hazardous Chemicals – Pipe Bonding Agent
	• Always store pipe cutter with the blade covered.
	• When operating pipe cutter wear proper PPE:
	  – ANSI Z87.1 rated safety glasses
	  – Cut-resistant gloves
	• Keep fingers away from pipe cutter during cutting operations.
	• When using crimpers, keep fingers away from crimping operation.
	• When not in use, store pipe bonding chemicals with the lid on and away from personnel.
	• Wear proper PPE when applying pipe bonding agent:
	  – ANSI Z87.1 rated safety glasses
	  – Chemical gloves – Nitrile or Butyl (not exam gloves)
	• Always apply bonding agent in a well-ventilated area.
	• Clear ignition sources from area during bonding agent use.

TN TDOT Department of Transportation

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JOB SAFETY ASSESSMENTS

FIELD SURVEYING

SUMMARY OF FIELD SURVEYING

The Tennessee Department of Transportation (TDOT) Field Surveying Group is responsible for conducting surveys and gathering geospatial data related to transportation infrastructure, roadways, and various other aspects of the state's transportation system. Their work involves collecting accurate and precise measurements and data that are essential for planning, designing, constructing, and maintaining transportation projects. The TDOT Field Surveying Group plays a vital role in the development, maintenance, and improvement of Tennessee's transportation infrastructure. Their work helps ensure that transportation projects are planned, designed, and executed with precision and accuracy.

TOP 5 HAZARDS

1. Contact with Vehicles / Traffic
2. Slip, Trip, Fall from Varied Terrain
3. Exposure to Heat and Cold Stress
4. Contact with Biting/Stinging Insects and Plants
5. Falls from Height (>4')

OHS SHAREPOINT

STANDARD PPE FOR GENERAL FIELD SURVEYING

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-004 Trenching and Excavation (Awareness Level)
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- OHS-012 Confined Space Entry Program
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)
- Memorandum - Lane Crossing
- Safety Memo – Survey Activity TTC (2018)
- Memorandum - TTC Inside Shoulder Advance Warning Sign Placement
- Truck and Trailer Mounted Attenuator Manual

RELATED PROGRAMS AND REFERENCES

- TDOT Work Zone Field Manual
- TDOT Small Unmanned Aerial Systems SOG
- Survey Standards Manual

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Print Section

Operating State Fleet Vehicle

Description:
When a petroleum odor is reported to TDOT, Environmental Technicians responds to site to investigate via TDOT vehicle.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629.

- Notify direct supervision of incident and initiate an incident report.
- Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (On or Near Motorway)

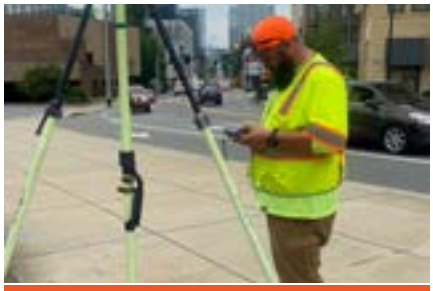
Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Strain, Sprain, or Bone Fracture While Exiting Vehicle

Controls (How I keep from getting hurt?)

- If entering or working in a TDOT WORK ZONE refer to the JSA:
  - VEHICLE OPERATIONS – WORK ZONE VISITS
- If possible, perform survey or job from within vehicle. Only exit if necessary.
- Avoid pulling off of the roadway in low-light conditions.
- Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder.
- Avoid pulling into an unprotected median or on the left side shoulder.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off.
- Communicate pull-off maneuver with turn signals well in advance of move.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.



Opening Manholes

Description:
Removing manhole or other sub-surface lids for inspection and measurement.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Ergonomic Concerns from Prying Lids • Hand/Finger Crush from Lid • Fall from Height (>4') Into Open Pit • Confined Space Hazards	• Wear Proper PPE: – Safety toe boots – Cut-resistant gloves (ANSI A4 or higher) • Clear debris and buildup from around manhole lid prior to lift. • Always use a manhole pulling tool when prying lid free. • Never attempt to lift lid with hands. Always use tool to position lid to the side of the hole. • Only approach opening for inspection or measurement tasks. • Never leave open manhole unattended and promptly replace lid. • Never attempt to enter the manhole.

Performing Work in Near Active Lane Areas and On Shoulder Areas

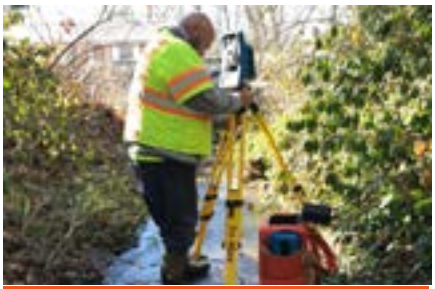
Description:
Performing work in or near lanes and shoulders where active traffic is occurring.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Uneven surfaces and trip hazards	• Find a safe spot to park, such as an emergency lane, shoulder, or other designated parking area. • Stay inside your vehicle unless it's necessary to leave the vehicle to perform work. • Follow traffic control plan. • Let others know your location in case of emergencies. • Use warning devices such as hazard flashers, warning triangles, and hi-visibility vests to alert drivers of your presence. • Stay alert of passing traffic and other potential hazards. • Avoid distractions such as loud music or excessive phone use.

Traveling and Working in Wooded/Urban Areas

Description:
Field surveying personnel may travel in a variety of terrains from urban environments to rural environments while performing job functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Contact with Stinging/Biting Insects, Poisonous Plants, Wild Animals, and Other Pests • Weather Concerns / Heat and Cold Stress • Sunburn and Natural UV Exposure • Slip, Trip, Fall from Varied Terrain • Lacerations from Brush Clearing Tools • Falls from Height (>4') • Contact with Vehicles and Other Traffic • Encounters with Public Persons • Loss of Orientation	• Wear proper PPE: – Hiking or treaded boot with ankle support – High visibility vest • When applicable, wear rubber (muck) boots or snake boots • Wear insect repellent and avoid contact with poisonous vectors when possible. • Always check weather forecast for the area prior to planning trip. • Tailor clothing choices to anticipated weather conditions. • Always pack hydration supplements and regularly intake water. • Never attempt to drink from untreated, natural sources. • Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress. • Always inspect travel path and select the terrain with least obstacles and elevation change. Avoid slopes and loose substrates. • Only use machetes and other brush clearing tools when necessary. • Always swing away from body parts arcing away from body. • Always wear cut-resistant gloves (ANSI A4 or greater) when operating machetes or other brush clearing tools. • Never approach cliffs, holes, culverts, or other drop offs. • Be aware of traffic patterns and avoid working near roadways when possible. • Be aware of public persons and always assume a neutral, non-engaging demeanor. If confrontation occurs or is suspected evacuate the area and contact local authorities if warranted. • When possible, avoid working alone and communicate travel plans with a supervisor. Stick to planned travel route at all times. • Always carry maps, GPS, radio, cell phones and other tools to prevent getting lost.



Working Over or Around Shallow Waterways (<4')

Description:
Field surveying personnel may travel in a variety of terrains which may include waterways, marshes, creeks, streams, etc. <4' while performing job functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Drowning • Biological Exposure (Waterborne Pathogens, Viruses, Bacteria, etc.) • Swift Currents	• When working within 6' of waterways, marshes, creeks, streams, ponds, lakes or other body of water ensure proper PPE is worn: – Personal flotation device (PFD) • Working on a bridge or crossing with unprotected edges is considered working within 6' of a waterway. • If wearing waders, ensure that PFD does not interfere with the removal of waders in the event of an emergency. • When working around waterways never work alone. Drowning may occur in as little as 6" of water.

- Always survey work site to look for waterway obstructions, slick embankments, and other hazards which may cause persons to become fully submerged.
- Never drink untreated water and wash hands with soap after touching untreated water sources.
- Do not expose open cuts, wounds, or sores to untreated water.
- Never attempt to cross water with a swift current regardless of depth.

STEP Working Over or Around Deep Waterways (>4')

Description:
Field surveying personnel may travel in a variety of terrains which may include waterways, rivers, lakes, streams, etc. >4' while performing job functions.

Hazards (How can I get hurt?)

- Drowning
- Biological Exposure (Waterborne Pathogens, Viruses, Bacteria, etc.)
- Swift Currents
- Contact with Boats and Other Watercraft

Controls (How I keep from getting hurt?)

- When working within 6' of waterways, rivers, lakes, streams, ponds, or other body of water ensure proper PPE is worn:
  - Personal flotation device (PFD)
- Working on a bridge or crossing with unprotected edges is considered working within 6' of a waterway.
- If wearing waders, ensure that PFD does not interfere with the removal of waders in the event of an emergency.
- When working around waterways never work alone. Drowning may occur in as little as 6" of water.
- Always survey work site to look for waterway obstructions, slick embankments, and other hazards which may cause persons to become fully submerged.
- Never drink untreated water and wash hands with soap after touching untreated water sources.
- Do not expose open cuts, wounds, or sores to untreated water.
- Never attempt to cross water with a swift current regardless of depth.
- If on a boat or dock a PFD must be worn.
- If operating or riding on a watercraft ensure all boating navigation and safety laws are followed.
- Always yield to other watercraft and operate the watercraft defensively.
- Utilize a spotter to watch for other watercraft when operating in a stationary position.

STEP Unmanned Aerial Systems (UAS) or Drone Operation

Description:
Operation of quadcopter drones or other unmanned aerial systems (UAS) to perform field surveying activities.

Hazards (How can I get hurt?)

- Contact/Laceration from Propeller Blades
- Catastrophic Interference with Commercial, Military, Law Enforcement, and Emergency Aircraft
- Property Damage from UAS Loss of Control

Controls (How I keep from getting hurt?)

- Familiarize yourself with the applicable laws and regulations regarding drone operation in your country or region. Follow all legal requirements and obtain any necessary permits or licenses.
- All UAS operators must have the proper FAA licenses for operation.
- Read and understand the user manual or operating instructions provided by the manufacturer for your specific drone model.
- Conduct a pre-flight inspection of your drone, checking for any physical damage, loose parts, or malfunctioning components.

- Always maintain adequate distance from rotating propellers or other moving parts during operation. Do not approach operating drone.
- Choose a suitable flying location that is away from people, buildings, and other aircraft. Avoid flying near airports, helipads, or other restricted areas.
- Maintain visual line of sight with your drone at all times during flight. Avoid relying solely on the camera feed from the drone.
- Be aware of weather conditions before flying. Avoid flying in strong winds, rain, or other adverse weather conditions that may affect the stability and control of the drone.
- Be cautious of your surroundings and avoid distractions while operating the drone. Focus on maintaining control and awareness of the flight.
- Do not fly your drone at excessive altitudes or beyond your visual range. Maintain a safe height and distance from the ground and other objects.
- In case of any emergencies or malfunctions, maintain calm and follow the manufacturer's instructions for troubleshooting or safely landing the drone.

STEP Working near Active Railways

Description:
Performing field work at, or within close proximity to, operational railroad tracks.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or death from contact with train/railcar • Trips/Falls from uneven surfaces at/around rail tracks and from degraded railroad tracks • Puncture – railroad spikes • Lack of Reflective Surfaces – Vehicle Operations • Low visibility – low sunlight conditions	• Contact rail scheduler prior to work at/around railroad. • Establish site staging area at a minimum distance of 25 feet from an active railroad. • Maintain a "lookout" during field work taking place within 25 feet of a railroad track. • Be aware of uneven footing, missing railroad track footers or ballasts, loose ties, or loose/exposed spikes. • Wear proper PPE including Hi-Viz vest/clothing and leather safety-toed boots with ankle support while performing work. • When operating a vehicle, inspect track and surrounding area to make sure all crossings are marked, and any hazardous conditions identified. If needed, consider installation of warning labeling, reflective safety tape, mounted safety lights, or other visual indicators of traffic flow, crossings, or hazards. • Utilize adequate lighting when working in low light conditions (dawn/dusk/night) or in the case of heavy fog. Utilize warning lights when working within 25 feet of railroad track to signify proximity to track.

STEP Operating Utility Task Vehicle (UTV)

Description:
UTV operations in the field.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or death from impact with vehicle/object • Uneven Surfaces – fall/flip hazard	• Always ensure that proper vehicle operation documents are current and available while operating a UTV. • Perform a pre-use inspection of the UTV to ensure that all vehicle and safety systems are operating as intended. • Employee familiarization and/or training in UTV operations.

- Maintain awareness of terrain hazards, such as holes, loose/shifting soil, stumps, ruts, culverts, wires, fences and large rocks during UTV operation. Additional site-specific hazards, such as excavations, trenches, water features, or UTV-restricted areas should be identified prior to operation.

Performing Work near Active Landslide, Culvert Slides, or Other Similar Lane Closures

Description:
Performing field surveys in areas where landslides have occurred or may occur.

Hazards (How can I get hurt?)

- Falls or Slips from Ground Instability
- Injury From Falling Debris
- Injury or Death from Soil Liquification
- Injury or Death from Rapid Landslides
- Release of Hazardous Material from Disrupted Gas Pipelines or Storage Tanks
- Contact with Overhead Utilities from Damaged Support Structures

Controls (How I keep from getting hurt?)

- Conduct a site assessment to evaluate stability in the area.
- Do not enter the hazard area until approved to do so by an overseeing Civil/ Geological Engineer.
- Ensure a hazard briefing has been attended to communicate and understand hazards associated with the work site.
- Avoid walking on soil and rock debris in work area.
- Avoid walking on steep slopes.
- Wear proper PPE:
  - Safety toe boots
  - ANSI Z87.1 rated safety glasses
  - Hard hat
  - High visibility vest or shirt (class 3)
- Establish exclusion zones and warning systems around the site to prevent unauthorized access and provide early warning in case of emergency.
- Conduct regular inspections of the site to identify any changes in ground conditions and stability.
- Ensure underground utilities have been identified and determined to be structurally sound.
- Ensure all overhead utilities have been identified and support structures determined to be structurally sound.

TN TDOT Department of Transportation

work 4 us

JOB SAFETY ASSESSMENTS

GARAGE

SUMMARY OF GARAGE

TDOT garages maintain the TDOT vehicle and heavy equipment fleet by performing necessary service to keep the equipment in proper working order. Garage facilities are located throughout the State of Tennessee in every county. TDOT maintains approximately 7,000 vehicles ranging from subcompact sedans to 50,000 pound tandem road tractors, and the equipment ranges from lawn mowers to bulldozers. Garage maintenance personnel perform a variety of service tasks from engine oil changes and tire changes to transmission swaps. Employees utilize a variety of hand, power, and fixed tools at the garage locations while also performing mobile equipment maintenance.

TOP 5 HAZARDS

1. Suspended Loads
2. Pinch / Crush Hazards
3. Lacerations
4. Chemical Exposure
5. Walking / Working Surfaces – Slips, trips, falls

OHS SHAREPOINT

STANDARD PPE FOR GENERAL GARAGE

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-003 Facility Lockout Tagout Program
- OHS-005 Incident Analysis Report Program
- OHS-006 Personal Fall Protection Systems
- OHS-007 Powered Industrial Truck Operation Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- OHS-010 Hot Work Program
- OHS-012 Confined Space Entry Program
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- 305-04 Vehicle and Equipment Incident Review Team
- TDOT Incident Investigation Guide
- TDOT LOTO Periodic Inspection Checklist
- TDOT PIT Daily Pre-Op Checklist
- PIT Operator Evaluation
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)
- Memorandum - Lane Crossing
- Tailgate Removal Procedures

RELATED PROGRAMS AND REFERENCES

- Garage Operations Manual SOG

Print Section

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629. • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Strain, Sprain, or Bone Fracture While Exiting Vehicle

Controls (How I keep from getting hurt?)

- If entering or working in a TDOT WORK ZONE refer to the JSA:
  - VEHICLE OPERATIONS – WORK ZONE VISITS
- If possible, perform survey or job from within vehicle. Only exit if necessary.
- Avoid pulling off of the roadway in low-light conditions.
- Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder.
- Avoid pulling into an unprotected median or on the left side shoulder.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off.
- Communicate pull-off maneuver with turn signals well in advance of move.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

Hand and Power Tool Usage

Description:
Various hand and portable power tool usage for the fabrication and finishing of parts made or modified in-house.

Hazards (How can I get hurt?)

- Contact/Puncture/Laceration from Slipped or Broken Tool
- Awkward Posture – Soft-Tissue Injury
- Tool Break Apart
- Entanglement in Tool Fixture

Controls (How I keep from getting hurt?)

- Always select the proper tool for the job.
- Always ensure that the tool is properly seated and adequate leverage is applied to tool.
- Ensure all hand and power tools are inspected prior to use.
- Always review and reference the operator's manual prior to use.
- Wear proper PPE:

- Laceration or Puncture from Tool Attachment

  - ANSI Z87.1 rated safety glasses
  - Face shield
  - Cut-resistant gloves (ANSI A4 or higher)
  - Hearing protection
- When operating a grinder, ensure that the wheel speed rating matches or exceeds the grinder speed rating.
- When operating a grinder, ensure that the wheel is compatible with the grinder size, type, and material application.
- Never attempt to grind non-ferrous metals
- Keep hands and body parts away from power tools during use.
- Anticipate the potential failure path of the tool and position the body outside of the potential failure path.
- When replacing a tool fixture, disconnect the tool from the power source.

Performing Basic Vehicle Maintenance

Description:
Performing oil change, fluid fill up, tire change, brake service, and other similar vehicle service

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Burns from Hot Parts
• Chemical Exposure from Vehicle Chemicals
• Ergonomics Concerns from Lifting Heavy Tires
• Asbestos and Lead Exposure
• Awkward Postures
• Crush from Unintended Vehicle Movement
• Entanglement in Moving Engine Parts
• Lacerations from Sharp Parts
	• Wear the proper PPE for the work task.
	  – ANSI Z87.1 rated safety glasses
	  – Hard-toe shoes
	  – Cut-resistant gloves (ANSI A4 or higher)
	• Know the weight of parts prior to attempting a lift.
	• Utilize proper lifting techniques or assisted lifting techniques/equipment.
	• Be aware of vehicle components which may contain asbestos or lead. Be sure to work on the components in a way so as not to disturb/break apart asbestos or lead and cause exposure. Follow manufacturer guidelines.
	• Ensure vehicles are elevated properly and placed in park when performing service. Use jacks, wheel chalks, or other blocking devices as necessary when performing work under vehicles.
	• Perform LOTO on vehicle prior to maintenance activities when possible.
	• Always chock vehicle tires to prevent unintended movement.
	• Ensure the vehicle has cooled to <140 degrees F before contacting hot parts.
	• Never attempt to service a vehicle while it is actively running (engine operating).

Performing Advanced Vehicle Maintenance

Description:
Performing engine/service swaps, transmission service/swaps, hydraulic service, and other similar advanced service (No Fuel System Service)

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Burns from Hot Parts
• Chemical Exposure from Vehicle Chemicals
• Ergonomics Concerns from Lifting Heavy Tires
	• Wear the proper PPE for the work task.
	  – ANSI Z87.1 rated safety glasses
	  – Hard-toe shoes
	  – Cut-resistant gloves (ANSI A4 or higher)
	• Know the weight of parts prior to attempting a lift.

- Awkward Postures
- Crush from Unintended Vehicle Movement
- Entanglement in Moving Engine Parts
- Stored Energy – Hydraulics, etc.
- Lacerations from Sharp Parts

- Utilize proper lifting techniques or assisted lifting techniques/equipment.
- Utilize mechanical means to move parts when possible (vehicle lift, jib crane, etc.)
- If using mechanical lifting devices ensure proper training has been completed.
- Ensure vehicles are placed in park when performing service. Use jacks, wheel chalks, or other blocking devices as necessary when performing work under vehicles.
- Anticipate the path of component travel when suspended and never travel below a suspended load.
- Perform LOTO on vehicle prior to maintenance activities when possible.
- Always chock vehicle tires to prevent unintended movement.
- Ensure the vehicle has cooled to <140 degrees F before contacting hot parts.

Specialized Equipment Service (Large, Complex, and Unique Equipment)

Description:
Performing various service on large, complex, and unique equipment to include blade replacement

Hazards (How can I get hurt?)

- Falls from Height (>4')
- Fall from Aerial Lift
- Stored Energy from Hydraulic Systems
- Death from Confined Space Entry
- Lacerations from Sharp Parts
- Crushing from Being in Line of Fire of Heavy Parts and Components

Controls (How I keep from getting hurt?)

- Wear the proper PPE for the work task.
  - ANSI Z87.1 rated safety glasses
  - Safety toe boots
  - Cut-resistant gloves (ANSI A4 or greater)
- Ensure vehicles are placed in park when performing service. Use jacks, wheel chalks, or other blocking devices as necessary when performing work under vehicles.
- When working at height (including on top of vehicles) ensure handrails or other fall protections systems are in place to prevent a fall.
- When possible, use a rolling staircase of aerial lift to work at height.
- Always perform a pre-use inspection on fall protection devices and equipment prior to use.
- Ensure all training has been completed and is up to date if operating aerial lifts, fall protection equipment, etc.
- When inside ANY aerial or scissor lift a fall protection harness and self-retracting lifeline must be used.
- Never attempt to service a vehicle while it is actively running (engine operating).
- Always assume hydraulic components are active and stored energy is present. Watch for accumulator valves and other energy storing devices.
- When performing hydraulic maintenance, always put components in a secured or home position to prevent hydraulic drift.
- When releasing line pressure, slowly open connections to allow fluid to drain in a controlled manner.
- Never attempt to enter any tank or enclosure on a vehicle.
- When replacing blades and other cutting components on TDOT equipment avoid handling the cutting component edge.

Fuel System Service

Description:
Performing various maintenance tasks on fuel system lines, tanks, or other components where fuel is actively present.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Fire and Explosion • Slips, Trips, and Falls from Fuel Spills • Air Contaminants – Toxic Fumes • Chemical Exposure – Fuel • Stored Energy from Pressurized Fuel Systems	• Always remove sources of ignition from within 35' of fuel system service tasks. • Always turn off ignition to vehicle prior to beginning service and remove connections to vehicle's battery. • Never attempt to perform fuel system service on an actively running vehicle. • Do not use power tools or hot work tools on fuel systems. • Never attempt to cut into fuel system lines or tanks with power tools. • Avoid uncontained release of fuel when performing fuel system service. • Always attempt to drain fuel from system in a controlled manner. • Any spills or leaks should be contained immediately. • Treat containment area and absorption media as flammable. • Always perform maintenance in areas with adequate ventilation. Never service fuel systems in a pit or other confined area. • Always wear proper PPE: – ANSI Z87.1 rated safety glasses – Chemical gloves (nitrile gauntlet) • Avoid fuel contact with exposed skin, eyes, and other parts of the body. • Always ensure an eyewash is within 10 seconds of work area and in proper working order. • Immediately wash hands after contact with fuel or fuel systems. • Always ensure a fire extinguisher is present in the work area.

Performing Electrical Service on Equipment

Description:
Performing various electrical system maintenance to include maintenance on batteries.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Shock from contact with DC power • Shock from stored electrical energy (batteries) • Short Circuit • Exposure to Corrosive Chemicals • Electromagnetic Interference • Fire	• Only qualified electricians may perform work on electrical systems. • Always assume electrical equipment is energized until proven otherwise. • Do not work beyond your abilities. Know your limits and consult additional resources when needed. • Always use rated, insulated, and properly inspected electrical testing equipment and tools. • Utilize the LIVE, DEAD, LIVE method to ensure electrical test equipment is operating correctly during use. • Wear proper electrical PPE: – ANSI Z87.1 rated safety glasses – Electrical-rated gloves (insulated inner/outer work gloves) – 100% cotton or FR long-sleeve shirt and pants – Electrically-rated hard toe boots • Ensure all electrical PPE is within date and inspected before use.

- Always use LOTO on vehicle systems and remove the connections to the battery.
- Consult and follow the manufacturer's maintenance recommendations and procedures.
- When not in use, cover the battery connection terminals to prevent bridging of the terminals.
- Always inspect the battery for signs of damage, including: swelling, corrosion buildup, leaking, and damage.
- Never attempt to service or use batteries with identified damage.
- Always ensure an eyewash is within 10 seconds of work area and in proper working order.
- Immediately wash hands after contact with batteries systems.

PART FABRICATION

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 5/10/2023 | Last Revision: 9/4/2023

Material Handling

Description:
Handling of raw materials using for part fabrication.

Hazards (How can I get hurt?)

- Ergonomic – Lifting >40lbs
- Heavy/Awkward Items
- Dropped Objects
- Sharp Edges, Burs, Rough Edges, Splinters
- Lacerations from Metal Sheeting

Controls (How I keep from getting hurt?)

- Do not attempt to manually lift material by hand, greater than 40 lbs
- Utilize mechanical means to move materials when feasible
- Material >80lbs requires mechanical handling/assistance
- Wear proper PPE:
  - Steel toe boots
  - Cut-resistant gloves (ANSI A4 or higher)
- Inspect materials for sharp edges, burs, and rough edges prior to handling.

Hand and Power Tool Usage

Description:
Various hand and portable power tool usage for the fabrication and finishing of parts made or modified in-house.

Hazards (How can I get hurt?)

- Contact/Puncture/Laceration from Slipped or Broken Tool
- Awkward Posture – Soft-Tissue Injury
- Tool Break Apart
- Entanglement in Tool Fixture
- Laceration or Puncture from Tool Attachment

Controls (How I keep from getting hurt?)

- Always select the proper tool for the job.
- Always ensure that the tool is properly seated and adequate leverage is applied to tool.
- Ensure all hand and power tools are inspected prior to use.
- Always review and reference the operator's manual prior to use.
- Wear proper PPE:
  - ANSI Z87.1 rated safety glasses
  - Face shield
  - Cut-resistant gloves (ANSI A4 or higher)

  - Hearing protection
- When operating a grinder, ensure that the wheel speed rating matches or exceeds the grinder speed rating.
- When operating a grinder, ensure that the wheel is compatible with the grinder size, type, and material application.
- Never attempt to grind non-ferrous metals
- Keep hands and body parts away from power tools during use.
- Anticipate the potential failure path of the tool and position the body outside of the potential failure path.
- When replacing a tool fixture, disconnect the tool from the power source.

Hot Work – Oxy/Acetylene Torch Cutting

Description:
Performing torch cutting activities on various carbon steel materials.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Burns from Torch Tip and Hot Parts
• Burns from Torch Flashback
• Ultraviolet Radiation Exposure to Skin and Eyes
• Explosions From Gas Cylinder Damage/Tip Over
• Air Contaminants – Metal Fume
• Air Contaminants – Carbon Monoxide
	• Wear proper PPE:
	  – ANSI Z87.1 rated safety glasses
	  – Steel toe boots
	  – Flame retardant jacket
	  – Welding gloves
	  – Shaded face shield (shade 5 minimum)
	  – Long sleeve shirt and paints (FR or 100% cotton)
	• Only experienced operators should perform torch cutting activities.
	• Ensure a 20lb fire extinguisher is in good working order and available in the immediate vicinity at all times.
	• Ensure a fire watch is present during and after all torch cutting activities.
	  – OHS-010 Hot Work Program
	• Remove all combustible materials within 35’ of torch cutting activities.
	• Always ensure that compressed gas cylinders are properly secured.
	• Ensure that gas connections are compatible and in good working order.
	• Perform a pre-use inspection of all equipment prior to use.
	• Only operate torch cutting equipment outdoors or with local exhaust ventilation present.
	• Assume all torch tip parts and materials being cut are hot. Do not touch without welding gloves on.
	• Prior to the cut, evaluate the cut plan to ensure material will fall away from operator when cut free.
	• Ensure torch tip is free of debris and obstructions. Clean before each use.
	• Ensure a flashback arrestor is equipped on the torch.
	• Never attempt to cut galvanized, stainless steel, painted, or other non-ferrous metals with a torch.

Hot Work – Welding (Stick, MIG, TIG)

Description:
Performing welding activities for repair or during part fabrication.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Burns from Hot Parts
• Ultraviolet Radiation Exposure to Skin and Eyes
• Explosions From Gas Cylinder Damage/Tip Over
• Air Contaminants – Welding Fume
• Air Contaminants – Carbon Monoxide
• Air Contaminants – Hexavalent Chromium (Stainless Steel)
• Air Contaminants – Zinc (Galvanized Metals)
• Air Contaminants – Hexavalent Chromium (Stainless Steel)
• Air Contaminants – Zinc (Galvanized Metals)
	• Wear proper PPE:
	  – ANSI Z87.1 rated safety glasses
	  – Steel toe boots
	  – Flame retardant jacket
	  – Welding gloves
	  – Shaded face shield (shade 5 minimum)
	  – Long sleeve shirt and paints (FR or 100% cotton)
	• Only experienced operators should perform welding cutting activities.
	• Ensure a 20lb fire extinguisher is in good working order and available in the immediate vicinity at all times.
	• Ensure a fire watch is present during and after all hot work activities.
	• OHS-010 Hot Work Program
	• Remove all combustible materials within 35' of hot work activities.
	• Always ensure that compressed gas cylinders are properly secured.
	• Ensure that gas connections are compatible and in good working order.
	• Perform a pre-use inspection of all equipment prior to use.
	• Only perform welding outdoors or with local exhaust ventilation present.
	• Assume all welded parts are hot. Do not touch without welding gloves on.
	• Never attempt to weld galvanized, stainless steel, painted, or other non-ferrous metals.

Fabrication Machine Usage (Drill Press, Sheet Metal Brake, etc.)

Description:
Operating various machine shop equipment for part fabrication or modification.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Entanglement in Rotating Bit
• Crush Hazard from Jaws or Clamps
• Dropped Objects
• Laceration from Sharp Edges
• Part Ejection
	• Wear proper PPE:
	  – ANSI Z87.1 rated safety glasses
	  – Steel toe boots
	  – Cut resistant gloves when handling sharp objects
	• Only qualified persons may operate machine shop equipment.
	• Review the equipment operating manual and accompanying literature prior to initial use. Literature should be accessible to all operators.
	• Always ensure machinery is used as intended. Never attempt to perform a task for which the machine was not designed for.
	• Do not attempt to perform maintenance on equipment other than routine part changes, oiling, belt changes, etc.
	• Ensure that all machine guards are in place during operation and being properly used. If guarding is removed machine should be under LOTO.
	• Always keep hands are other parts of the body out of the line of fire and/or point of operation.

- Secure loose clothing and long hair prior to machine operation.
- Ensure all parts are secured to avoid part ejection.
- Ensure machine shop tools are secured to the floor with bolts, when applicable.

Parts Cleaning and Washing

Description:
Using a small parts washer containing either a solvent or caustic parts cleaning agent.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Inhalation of Toxic Solvent Vapors or Caustics • Skin and Eye Irritation from Solvents/Caustics • Flammability • Explosion • Chemical Incompatibility	• Always know what chemicals are being used in the parts washer. • Review the SDS prior to interacting with the parts washer. • Always ensure that the lid or other enclosure is secured on the parts washer when not in use. • When possible, use less hazardous chemicals in the parts washer • Treat any liquids inside the parts washer as hazardous. • Ensure adequate ventilation is present during use. • Wear proper PPE: – Long sleeve shirt and pants – ANSI Z87.1 rated safety glasses – Face shield – Nitrile or similar chemical gloves (gauntlet style) • Avoid overfilling the parts washer. • Remove any ignition sources within 35’ of parts washer prior to use. • Do not operate power tools within 35’ of parts washer during operation. • Refer to the SDS prior to adding additional chemicals or parts which were exposed to chemicals other than those used in the parts washer. Avoid incompatible chemicals such as: – Oxidizing agents (hydrogen peroxide, chlorine bleach, etc.) – Acids – Water reactive chemicals • Always ensure a fire extinguisher is situated at parts washer. • Ensure an eye was station is present within 10 seconds of the parts washer and in good working order. • Do not attempt to discard parts washing chemical. Contact a hazardous chemical contractor for handling and disposal.

Painting/Coating Parts

Description:
Performing touch-up painting or small recoating tasks using spray paint or similar paint coatings.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Inhalation of Toxic VOCs and Particulates • Skin and Eye Irritation • Flammability • Explosion	• Only paint in a well-ventilated area. • Avoid painting indoors unless in a dedicated area for painting operations. • Never attempt to paint inside a confined space or in a restricted area. • Always wear proper PPE: – Long sleeve shirt and pants

  - ANSI Z87.1 rated safety glasses
  - Nitrile or similar exam gloves
- Prior to painting remove all sources of ignition from within 35 feet from the painting operation.
- Always read the manufacturer's instructions and review the SDS prior to use.
- Always store spray cans in a flammable storage cabinet when not in use.
- Do not store spray cans in direct sunlight or in areas with high temperatures.
- Do not attempt to puncture or modify a spray can unless empty.

REGULAR EQUIPMENT SERVICE AT GARAGE FACILITY

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 5/16/2023 | Last Revision: 9/5/2023

Hand and Power Tool Usage

Description:
Various hand and portable power tool usage for the fabrication and finishing of parts made or modified in-house.

Hazards (How can I get hurt?)

- Contact/Puncture/Laceration from Slipped or Broken Tool
- Awkward Posture – Soft-Tissue Injury
- Tool Break Apart
- Entanglement in Tool Fixture
- Laceration or Puncture from Tool Attachment

Controls (How I keep from getting hurt?)

- Always select the proper tool for the job.
- Always ensure that the tool is properly seated and adequate leverage is applied to tool.
- Ensure all hand and power tools are inspected prior to use.
- Always review and reference the operator's manual prior to use.
- Wear proper PPE:
  - ANSI Z87.1 rated safety glasses
  - Face shield
  - Cut-resistant gloves (ANSI A4 or higher)
  - Hearing protection
- When operating a grinder, ensure that the wheel speed rating matches or exceeds the grinder speed rating.
- When operating a grinder, ensure that the wheel is compatible with the grinder size, type, and material application.
- Never attempt to grind non-ferrous metals
- Keep hands and body parts away from power tools during use.
- Anticipate the potential failure path of the tool and position the body outside of the potential failure path.
- When replacing a tool fixture, disconnect the tool from the power source.

Performing Basic Vehicle Maintenance

Description:
Performing oil change, fluid fill up, tire change, brake service, and other similar vehicle service

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Burns from Hot Parts • Chemical Exposure from Vehicle Chemicals • Ergonomics Concerns from Lifting Heavy Tires • Asbestos and Lead Exposure • Awkward Postures • Crush from Unintended Vehicle Movement • Entanglement in Moving Engine Parts • Lacerations from Sharp Parts	• Wear the proper PPE for the work task. – ANSI Z87.1 rated safety glasses – Hard-toe shoes – Cut-resistant gloves (ANSI A4 or higher) – Nitrile coated chemical gloves for chemical/petroleum products – Face shield, when applicable (for grinding, parts washing, etc.) • Know the weight of parts prior to attempting a lift. • Utilize proper lifting techniques or assisted lifting techniques/equipment. • Be aware of vehicle components which may contain asbestos or lead. Be sure to work on the components in a way so as not to disturb/break apart asbestos or lead and cause exposure. Follow manufacturer guidelines. • Ensure vehicles are elevated properly and placed in park when performing service. Use jacks, wheel chalks, or other blocking devices as necessary when performing work under vehicles. When using vehicle lift systems, follow all manufacturer requirements for operation. • Perform LOTO on vehicle prior to maintenance activities when possible. • Always chock vehicle tires to prevent unintended movement. • Ensure the vehicle has cooled to <140 degrees F before contacting hot parts. • Never attempt to service a vehicle while it is actively running (engine operating). • Ensure the vehicle has cooled to <140 degrees F before contacting hot parts. • Never attempt to service a vehicle while it is actively running (engine operating).

Performing Advanced Vehicle Maintenance

Description:
Performing engine/service swaps, transmission service/swaps, hydraulic service, and other similar advanced service (No Fuel System Service)

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Burns from Hot Parts • Chemical Exposure from Vehicle Chemicals • Ergonomics Concerns from Lifting Heavy Tires • Awkward Postures • Crush from Unintended Vehicle Movement • Entanglement in Moving Engine Parts • Stored Energy – Hydraulics, etc. • Lacerations from Sharp Parts	• Wear the proper PPE for the work task. – ANSI Z87.1 rated safety glasses – Hard-toe shoes – Cut-resistant gloves (ANSI A4 or higher) – Nitrile coated chemical gloves for chemical/petroleum products – Face shield, when applicable (for grinding, parts washing, etc.) • Know the weight of parts prior to attempting a lift. • Utilize proper lifting techniques or assisted lifting techniques/equipment. • Utilize mechanical means to move parts when possible (vehicle lift, jib crane, etc.) • If using mechanical lifting devices ensure proper training has been completed. • Ensure vehicles are placed in park when performing service. Use jacks, wheel chalks, or other blocking devices as necessary when performing work under vehicles. • Anticipate the path of component travel when suspended and never travel below a

suspended load. Keep all body parts out of the line of fire in case of a suspended load failure.
- Perform LOTO on vehicle prior to maintenance activities when possible.
- Always chock vehicle tires to prevent unintended movement.
- Ensure the vehicle has cooled to <140 degrees F before contacting hot parts.
- Never attempt to service a vehicle while it is actively running (engine operating).
- Always assume hydraulic components are active and stored energy is present. Watch for accumulator valves and other energy storing devices.
- When performing hydraulic maintenance, always put components in a secured or home position to prevent hydraulic drift.
- When releasing line pressure, slowly open connections to allow fluid to drain in a controlled manner.

Operating Vehicle Lift

Description:
Operation of jacks, jack stands, and any other equipment which elevates the height of the vehicle.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Crush from Falling Vehicle (Vehicle Instability) • Pinch/Crush from Lift Components • Falls from Height (>4') • Equipment Failure	• Only qualified and trained personnel should operate vehicle lifts. • Always refer to the manufacturer's specifications and training prior to operating lifts. • Ensure rated capacity is listed on the lift along with regular preventative maintenance service by the manufacturer. • Always perform a pre-use inspection on the lift prior to use. • Only attempt to lift compatible vehicles. • Never attempt to lift a vehicle greater than the posted lift load rating. • Always ensure the proper securement locations are selected on the vehicle. • When beginning lift, raise the vehicle up no greater than 12" and verify vehicle stability and location of securement struts. • When raising a vehicle clear the area of personnel and raise the vehicle from a protected location. • Never attempt to grab, adjust, or manipulate lift locks during raising. • Never attempt to get inside or stand on a vehicle in the raised position. • When using a portable jack, ensure the jack has a legible load rating and is in good working order. • When using a portable jack, always utilize alternate securement means such as jack stands in the event of unintended movement. • Never stack material on portable jacks to increase the raising height of the jack.

Specialized Equipment Service (Large, Complex, and Unique Equipment)

Description:
Performing various service on large, complex, and unique equipment to include blade replacement

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Falls from Height (>4') • Fall from Aerial Lift • Stored Energy from Hydraulic Systems	• Wear the proper PPE for the work task: – ANSI Z87.1 rated safety glasses – Hard-toe shoes

- Death from Confined Space Entry
- Lacerations from Sharp Parts

  – Cut-resistant gloves (ANSI A4 or higher)
- Ensure vehicles are placed in park when performing service. Use jacks, wheel chalks, or other blocking devices as necessary when performing work under vehicles.
- When working at height (including on top of vehicles) ensure handrails or other fall protections systems are in place to prevent a fall.
- When possible, use a rolling staircase of aerial lift to work at height.
- Always perform a pre-use inspection on fall protection devices and equipment prior to use.
- Ensure all training has been completed and is up to date if operating aerial lifts, fall protection equipment, etc.
- When inside ANY aerial or scissor lift a fall protection harness and self-retracting lifeline must be used.
- Never attempt to service a vehicle while it is actively running (engine operating).
- Always assume hydraulic components are active and stored energy is present. Watch for accumulator valves and other energy storing devices.
- When performing hydraulic maintenance, always put components in a secured or home position to prevent hydraulic drift.
- When releasing line pressure, slowly open connections to allow fluid to drain in a controlled manner.
- Never attempt to enter any tank or enclosure on a vehicle.
- When replacing blades and other cutting components on TDOT equipment avoid handling the cutting component edge.

Fuel System Service

Description:
Performing various maintenance tasks on fuel system lines, tanks, or other components where fuel is actively present.

Hazards (How can I get hurt?)

- Fire and Explosion
- Slips, Trips, and Falls from Fuel Spills
- Air Contaminants – Toxic Fumes
- Chemical Exposure – Fuel
- Stored Energy from Pressurized Fuel Systems

Controls (How I keep from getting hurt?)

- Always remove sources of ignition from within 35’ of fuel system service tasks.
- Always turn off ignition to vehicle prior to beginning service and remove connections to vehicle’s battery.
- Never attempt to perform fuel system service on an actively running vehicle.
- Do not use power tools or hot work tools on fuel systems.
- Never attempt to cut into fuel system lines or tanks with power tools.
- Avoid uncontained release of fuel when performing fuel system service.
- Always attempt to drain fuel from system in a controlled manner.
- Any spills or leaks should be contained immediately.
- Treat containment area and absorption media as flammable.
- Always perform maintenance in areas with adequate ventilation. Never service fuel systems in a pit or other confined area.
- Always wear proper PPE:
  – ANSI Z87.1 rated safety glasses
  – Chemical gloves (nitrile gauntlet)
- Avoid fuel contact with exposed skin, eyes, and other parts of the body.
- Always ensure an eyewash is within 10 seconds of work area and in proper working order.
- Immediately wash hands after contact with fuel or fuel systems.
- Always ensure a fire extinguisher is present in the work area.

Performing Electrical Service on Equipment

Description:
Performing various electrical system maintenance to include maintenance on batteries.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Shock from contact with DC power • Shock from stored electrical energy (batteries) • Short Circuit • Exposure to Corrosive Chemicals • Electromagnetic Interference • Fire	• Only qualified electricians may perform work on electrical systems. • Always assume electrical equipment is energized until proven otherwise. • Do not work beyond your abilities. Know your limits and consult additional resources when needed. • Always use rated, insulated, and properly inspected electrical testing equipment and tools. • Utilize the LIVE, DEAD, LIVE method to ensure electrical test equipment is operating correctly during use. • Wear proper electrical PPE: – ANSI Z87.1 rated safety glasses – Electrical-rated gloves (insulated inner/outer work gloves) – 100% cotton or FR long-sleeve shirt and pants – Electrically-rated hard toe boots • Ensure all electrical PPE is within date and inspected before use. • Always use LOTO on vehicle systems and remove the connections to the battery. • Consult and follow the manufacturer's maintenance recommendations and procedures. • When not in use, cover the battery connection terminals to prevent bridging of the terminals. • Always inspect the battery for signs of damage, including: swelling, corrosion buildup, leaking, and damage. • Never attempt to service or use batteries with identified damage. • Always ensure an eyewash is within 10 seconds of work area and in proper working order. • Immediately wash hands after contact with batteries systems.

STOCKROOM OPERATIONS

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 7/10/2023 | Last Revision:9/13/2023

Receiving materials via Loading Dock

Description:
Supplier delivers materials to Stockroom at the Loading Dock. TDOT Stockroom workers receive and unload.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Heavy/Awkward Items – Delivered Materials. • Struck by Falling Stacked Materials	• Wear proper PPE: – ANSI Z87.1 rated safety glasses – Cut-resistant gloves (ANSI A4 or greater)

- Crushed Between Loading Dock and Truck or Trailer
- Struck by Truck/Vehicle
- Struck By a Falling Dock Plate
- Strain or Sprain from Operating Dock Plate
- Laceration from Materials Improperly Stored or by Incorrectly Cutting Securement Bands
- Fall from Leading Edge of Loading Dock
- Slips, Trips, And Falls: Materials on Loading Dock
- Carbon Monoxide Exposure from Truck Fumes

  – Safety toe boots
- Never attempt to lift greater than 40 pounds.
- Utilize mechanical means or a team lift for items greater than 40lbs.
- Only use equipment (fork-lift) if authorized and trained to operate.
- Do not exceed the recommended load rating of the fork lift and attachments.
- Keep out of the way of moving equipment.
- Block the wheels of a vehicle before loading or unloading to prevent it from moving. Brakes alone can only do so much to stabilize a vehicle. Make sure dock plates are secured into position before using them.
- Use a "dock lock" or "wheel lock" system for delivery trucks to prevent movement during loading/unloading.
- Remove air from "air ride" or self-adjusting suspensions to improve trailer stability and reduce possible damage to the dock's bumper pads.
- Practice proper housekeeping and maintenance practices.
- Ensure all racking is load rated and stacked material does not exceed posted load ratings.
- Ensure all racks are secured to the floor, wall, and to each rack as necessary.
- Stack heavy items near the bottom of the rack and light items at the top.
- Ensure fall protection is in place on any dock that is 4 feet or higher with unprotected edges.
- Ensure all roll-up doors are closed to within 1' of closed when not in use.
- Keep passageways and stairs free of obstructions.
- Do not leave diesel, gasoline, propane, or natural gas vehicles running on a trailer while not in use.

Transporting Materials Via Forklift to Designated Area.

Description:
Forklifts are driven into tractor trailer to unload and transport pallets to designated storage area.

Hazards (How can I get hurt?)

- Crush By Forklift Overturning Due to Unstable Loads.
- Pedestrians May Be at Risk of Being Struck by a Forklift.
- Items Being Transported Can Fall from the Forklift and Cause Injuries.

Controls (How I keep from getting hurt?)

- Ensure only trained and certified forklift operators operate forklifts.
- Do not exceed the maximum load capacity of the forklift and attachment.
- Always perform a pre-use inspection on forklifts prior to each use. Do not operate forklift if damage is noted or safety systems are not functioning.
- Drive at a safe speed and avoid sharp turns.
- Utilize seat belts while operating a forklift at all times.
- Designate pedestrian walkways and restrict forklift access to these areas.
- Use horn signals and lights when approaching intersections or blind spots.
- Ensure clear visibility by maintaining clean mirrors and windows.
- Use appropriate attachments, such as safety cages or straps, for securing loads.
- Stack loads evenly and securely on the forks.
- Warn pedestrians to keep a safe distance during load handling.

Moving Materials Via Lifting and Storing in Designated Areas.

Description:
TDOT workers manual lift materials and place in designated location(s).

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Strains and Sprains from Lifting Loads Improperly or From Carrying Loads That are Either Too Large or Too Heavy. • Fractures and Bruises Caused by Being Struck by Materials or By Being Caught in Pinch Points. • Cuts and Bruises Caused by Falling Materials That Have Been Improperly Stored or By Incorrectly Cutting Ties or Other Securing Devices. • Fire Hazard – Flammable Chemicals and Compressed gases • Slips, Trips, and Falls – Stockroom	• Always know the weight of objects being moved. • Never attempt to lift items greater than 40lbs. • Items greater than 40lbs should be moved with mechanical means. • Always survey the travel path and remove obstructions to reduce likelihood of slips, trips, and falls. • Wear proper PPE: – ANSI Z87.1 rated safety glasses – Cut-resistant gloves (ANSI A4 or greater) – Safety toe boots • Separate incompatible materials (flammables, chemicals, etc.). • Properly store flammable materials in flammable cabinets. • Do not store compressed gas cylinders indoors. Ensure compressed gas cylinders are protected from tipping over, have valve covering, and are not stored with incompatible gases (oxygen and acetylene). • Properly store materials to prevent tip-over. Secure material by stacking, blocking, or interlocking to prevent it from sliding, falling, or collapsing. • Keep passageways and stairs free of obstructions and free from accumulated materials. • Never block exits or fire extinguishers with material.

Retrieving Materials Via Scissor Lift

Description:
The job involves operating a scissor lift to access elevated areas within the warehouse for various tasks, including stocking shelves, maintenance, and inventory management.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Fall From Height (Scissor Lift) • Death or Severe Injury from Tipping Over Due to Unsteady Surfaces • Electrocution from Overhead Electrical Power Lines or Equipment • Collided with Equipment, Objects, or Pedestrians • Ejection from Running Over Material	• Wear proper PPE: – ANSI Z87.1 rated safety glasses – Cut-resistant gloves (ANSI A4 or greater) – Safety toe boots – Fall arrest harness and self-retracting lifeline • Ensure all aerial lift operators are trained and certified. • Always wear a full body fall arrest harness with a self-retracting lifeline attached to the anchor point on the platform. • Keep both feet on the platform floor while operating the lift. Never climb over the handrails or step up on the mid-rail. • Avoid leaning over the handrails. • Conduct a pre-operational inspection to check for stability and proper functioning. • Never run over materials, no matter the size, as it may cause personnel to be ejected from the basket. • Avoid working on ramps or uneven terrain unless the lift is designed for such use. • Maintain a safe distance from power lines (minimum 20 feet).

- Establish a designated spotter to help the operator avoid contact with power lines.
- Use spotters when navigating in congested or tight spaces.
- Be aware of surroundings and potential obstacles.

Stacking Materials

Description:
The job involves operating a scissor lift to access elevated areas within the warehouse for various tasks, including stocking shelves, maintenance, and inventory management.

Hazards (How can I get hurt?)

- Falling Materials and Collapsing Loads Can Crush or Pin Workers, Causing Injuries or Death
- Laceration from Materials Improperly Stored or By Incorrectly Cutting Ties or Other Securing Devices
- Heavy/Awkward Items When Stacking
- Slips, Trips, and Falls
- Struck by Powered Equipment in Stock Room

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - ANSI Z87.1 rated safety glasses
  - Cut-resistant gloves (ANSI A4 or greater)
  - Safety toe boots
- Inspect all pallets and shipping materials for protruding nails before stacking.
- Ensure that stacks are stable and self-supporting.
- Do not store pipes and bars in racks that face main aisles to avoid creating a hazard to passersby when removing supplies.
- Stack bags and bundles in interlocking rows to keep them secure.
- Stack bagged material by stepping back the layers and cross keying the bags at least every ten layers (to remove bags from the stack, start from the top row first).
- Store super sack materials on pallets.
- Store baled paper and rags inside a building no closer than 18 inches to the walls, partitions, or sprinkler heads.
- Band boxed materials or secure them with crossties or shrink plastic fiber.
- Stack drums, barrels, and kegs symmetrically.
- Block the bottom tiers of drums, barrels, and kegs to keep them from rolling if stored on their sides.
- Place planks, sheets of plywood dunnage, or pallets between each tier of drums, barrels, and kegs to make a firm, flat, stacking surface when stacking on end.
- Chock the bottom tier of drums, barrels, and kegs on each side to prevent shifting in either direction when stacking two or more tiers high.
- Stack and block poles as well as structural steel, bar stock, and other cylindrical materials to prevent spreading or tilting unless they are in racks.
- Never attempt to lift greater than 40 pounds.
- Utilize mechanical means or a team lift for items greater than 40lbs.
- Practice proper housekeeping to reduce slip, trip, fall hazards.
- Keep passageways and stairs free of obstructions.
- Stay in designated aisle way to avoid traffic.
- Never allow personnel and forklifts to operate in the same area.
- Never store material in front of emergency exits for fire extinguishers.

TIRE MOUNTING, BALANCING, AND INFLATION

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 7/10/2023 | Last Revision: 8/11/2023

Tire Balancing

Description:
Operating a tire/wheel balancing machine to both check and adjust the balancing of a wheel/tire for use on a vehicle.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Ergonomic – Lifting >40lbs
• Heavy/Awkward Items - Tires
• Dropped Objects – Tires
• Entanglement from Tire Balancing Machine
• Pinch/Crush – Wheel Spindle/ Mounting Components
• Tire Explosion
• Flying Debris
• Slips, Trips, and Falls: Electrical Cords, Used Wheel Weights, Other Tires, etc.
	• Only trained personnel should operate a tire balancing machine.
	• Ensure all machine guards are in place prior to operation. Never attempt to operate a tire balancer without the proper safety controls in place.
	• Inspect the tire balancing machine prior to each use. Any damage should be reported immediately. Do not attempt to operate a damaged machine.
	• Wear proper PPE:
	  – ANSI Z87.1 rated safety glasses
	  – Cut-resistant gloves (ANSI A4 or greater)
	  – Safety toe boots
	• Never attempt to lift greater than 40 pounds.
	  – A standard passenger vehicle tire is approximately 40lbs
	  – A tractor trailer tire is approximately 110lbs
	• Utilize mechanical means or a team lift for items greater than 40lbs.
	• Always store tires on their side or secured in a rack to prevent unintended movement.
	• When operating tire balancer, never approach the tire during operation.
	• Never attempt to look around or reach into machine guarding cover.
	• Upon closing the tire balancer guard door the tire will rotate automatically.
	• When attaching wheel or operating wheel spindle keep fingers clear of pinch points.
	• Always inspect the tire prior to balancing for damage, dry rot, or other major integrity concerns. Never attempt to balance a damaged tire.
	• Fully secure the tire to the mounting point prior to beginning balancing operation.
	• Attempt to clean the tire to remove excess debris from the treading to prevent flying objects during balancing.

Tire Removal and Mounting

Description:
Removing and mounting tires on various vehicle systems and equipment.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Ergonomic – Lifting >40lbs
• Ergonomic – Manipulating Tires during Mounting Process
• Heavy/Awkward Items - Tires
	• Wear proper PPE:
	  – ANSI Z87.1 rated safety glasses
	  – Cut-resistant gloves (ANSI A4 or greater)
	  – Safety toe boots

- Dropped Objects – Tires
- Tire Explosion
- Crush from Unintended Vehicle Movement
- Pinch/Crush during Mounting
- Entanglement from Power Tool Operation
- Slips, Trips, and Fall Potential: Tools, Electric Cords, Pneumatic Lines, Lug Nuts, etc.

- Never attempt to lift greater than 40 pounds.
  - A standard passenger vehicle tire is approximately 40lbs
  - A tractor trailer tire is approximately 110lbs
- Utilize mechanical means or a team lift for items greater than 40lbs.
- Always store tires on their side or secured in a rack to prevent unintended movement.
- Ensure the vehicle or equipment is in Park or otherwise secured to prevent unintended movement.
- Always secure the vehicle or equipment with chocks to prevent unintended movement.
- When using vehicle lifts or jacks, ensure a redundant system is in use such as jack stands in the event of lift failure.
- Never attempt to mount a damaged tire.
- Take extreme caution if a tire shows signs of over-inflation. Attempt to release the pressure in a controlled manner prior to manipulating tire.
- Always keep body parts out of the pinch/crush points when mounting or removing tires. Be aware that tires may shift unexpectedly.
- When operating power tools to remove or mount tires, ensure two hands are used on the tool during use.
- Never over-tighten the lug nuts on a wheel and only torque to the manufacturer's specifications.

Tire Inflation

Description:
Adding air to tires either mounted or unmounted from vehicles/equipment.

Hazards (How can I get hurt?)

- Ergonomic – Lifting >40lbs
- Heavy/Awkward Items
- Dropped Objects
- Crush from Unintended Vehicle Movement
- Tire Explosion during inflation and Bead Seating
- Valve Stem/Core Ejection During Replacement or Repair
- Repair or Tire Plug Integrity

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - ANSI Z87.1 rated safety glasses
  - Cut-resistant gloves (ANSI A4 or greater)
  - Safety toe boots
- Never attempt to lift greater than 40 pounds.
  - A standard passenger vehicle tire is approximately 40lbs
  - A tractor trailer tire is approximately 110lbs
- Utilize mechanical means or a team lift for items greater than 40lbs.
- Always store tires on their side or secured in a rack to prevent unintended movement.
- Ensure the vehicle or equipment is in Park or otherwise secured to prevent unintended movement.
- Always secure the vehicle or equipment with chocks to prevent unintended movement.
- Always inspect tires for signs of damage, bulging, or deformation prior to inflation.
- When inflating a tire, ensure that a functioning pressure gauge is used.
- Only inflate tires within the manufacturer's specified limits.
- Never exceed the recommended inflation limit.
- Never attempt to inflate a damaged tire.
- Always use a tire cage when inflating non-mounted tires.
- Never stand over or on tires during inflation.

JOB SAFETY ASSESSMENTS

GEOTECHNICAL INVESTIGATION

SUMMARY OF GEOTECHNICAL INVESTIGATION

The Geotechnical Engineering Section (GES) of the Materials & Tests Division delivers geotechnical services in support of transportation improvement programs, and maintenance projects. In supporting the transportation improvement program initiatives, the GES provides recommendations for roadway improvements, bridge foundations, retaining wall foundations, and construction issues. In support of maintenance projects, the GES provides support for emergency geohazards such as karst sinkholes, landslides, and rockfall mitigation.

TOP 5 HAZARDS

1. Contact with Vehicles / Traffic
2. Pinch / Crush from Drill Rig Equipment
3. Entanglement from Drill Rig Equipment
4. Ergonomic / Soft Tissue Injury
5. Slips, Trips, and Falls from Varied Terrain

OHS SHAREPOINT

STANDARD PPE FOR GENERAL GEOTECHNICAL INVESTIGATION

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- 305-04 Vehicle and Equipment Incident Review Team
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)
- Memorandum - Lane Crossing

RELATED PROGRAMS AND REFERENCES

- TDOT Work Zone Field Manual
- Geotechnical Guidelines (November 2020)

Print Section

Mobilization and Preparation of Core Drill Equipment

Description:
Setup of drill/core truck at the core site location.

Hazards (How can I get hurt?)

- Contact with Overhead Power Lines, Obstructions, etc.
- Damage to Equipment or Public Property from Unsecured Equipment
- Pinch/Crush from Drill Equipment
- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Strain, Sprain, or Bone Fracture While Exiting Vehicle

Controls (How I keep from getting hurt?)

- Always ensure drill rig components are stowed and secured during transport.
- Perform a regular inspection of rig during transit to ensure all equipment is secured and has not shifted.
- Be aware of overhead obstructions such as bridges, power lines, etc. and know vehicle height.
- When securing or deploying drill rig components always keep hands and away from pinch/crush points.
- Ensure all personnel are away from truck and rig prior to manipulating drill mast.
- If entering or working in a TDOT WORK ZONE refer to the JSA:
  - VEHICLE OPERATIONS – WORK ZONE VISITS
- Avoid pulling off of the roadway in low-light conditions.
- Avoid pulling into an unprotected median or on the left side shoulder.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- Communicate pull-off maneuver with turn signals well in advance of move.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- Wear proper PPE:
  - High visibility vest (class 3)
  - Safety toe boot
  - Cut resistant gloves (ANSI A4 or higher)
  - ANSI Z87.1 rated safety glasses
  - Hearing protection
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

Drilling Site Preparation

Description:
Track hoes, graders, skid steer, backhoes, etc. used to perform site preparation and earth moving activities.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Overhead Utilities • Underground Utilities • Excavation Hazards/Cave-Ins • Structural Stability of Soil/ Work Area • Striking Objects/People • Falls/Ejections • Noise And Vibration • Injury or Death from Motor Vehicle Accident	• Wear proper PPE: – Safety toe boots – High visibility vest/shirt (class 3) – ANSI Z87.1 rated safety glasses – Cut-resistant gloves (ANSI A4 or greater) – Hard Hat • Only operate equipment if qualified to do so. • Complete a pre-operation inspection before starting work. • Conduct a site assessment to evaluate stability in the area. • Establish exclusion zones and warning systems around the site to prevent unauthorized access and provide early warning in case of emergency. • Perform a work area inspection to identify overhead powerlines and other obstructions prior to operating heavy equipment. • Always ensure an up-to-date utility marking service has been completed prior to performing excavation work (breaking ground). • Establish clear communication methods with ground personnel and other operators working nearby, such as hand signals or two-way radios. • Ensure all safety devices, such as backup alarms, warning lights, and mirrors, are functional and used correctly. • Always remain in the cab during operation and operate with the doors closed. • Utilize walkways and handrails to access equipment. Never climb on equipment. • If available, equipment operators must wear seat belts when operating. • Never approach or allow personnel to approach operating equipment. • Remain focused on operating the equipment and be aware of blind spots. Utilize a spotter if necessary. • Never attempt to operate heavy equipment in hazardous weather conditions (lightning, tornado, heavy storm, flooding, etc.) • Turn off the equipment and allow it to cool before refueling. Handle fuel with care and avoid smoking near the refueling area.

Soil Boring Operations

Description:
Operating drill/core rig to collect a core sample.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Lacerations from Sharp/ Jagged Edges on Drill Rig • Lacerations from Core Bit • Contact with Underground Utilities	• Always wear proper PPE: – High visibility vest (class 3) – Safety toe boot – Cut resistant gloves (ANSI A4 or higher)

- Slips, Trips, and Falls from Roadway or Rig Obstructions
- Entanglement in Core Shaft
- Elevated Noise Exposure (>85dBA)
- Burn from Hot Parts
- Contact with Flying Debris

  - ANSI Z87.1 rated safety glasses
  - Hearing protection
- Ensure all personnel operating or near the drill rig wear hearing protection.
- Do not directly handle the cutting portion of the core drill bit.
- Always ensure that underground utilities have been surveyed and marked within 30 days of drilling.
- Do not attempt to drill near marked utilities.
- Always perform regular housekeeping to remove debris, tools, and other materials which may present a slip, trip, or fall hazard.
- Do not approach the core drill during operation.
- Never attempt to guide, touch, or nudge core drill bit during operation.
- Avoid contacting core drill bit directly after operation as bit may be hot.
- Use wet methods when possible to reduce airborne dust during drilling.
- Remove unnecessary personnel from the area to reduce contact with potential flying debris.

Basic Drill Rig Maintenance

Description:
Performing basic maintenance on the drill truck and rig.

Hazards (How can I get hurt?)

- Contact/Puncture/Laceration from Slipped or Broken Tool
- Awkward Posture – Soft-Tissue Injury
- Laceration from Core Drill Cutting Edge
- Entanglement in Tool Fixture
- Exposure to Hydraulic Oils/ Chemicals
- Exposure to Pressurized Hydraulic Systems

Controls (How I keep from getting hurt?)

- Always select the proper tool for the job.
- Always ensure that the tool is properly seated and adequate leverage is applied to tool.
- Ensure all hand and power tools are inspected prior to use.
- Always review and reference the operator's manual prior to use.
- Wear proper PPE:
  - ANSI Z87.1 rated safety glasses
  - Safety toe boots
  - Cut-resistant gloves (ANSI A4 or higher)
- Anticipate the potential failure path of the tool and position body outside of the potential failure path (line of fire).
- Know the weight of material being lifted and use proper lifting technique.
- Always ensure drill components are powered off and truck is secured with parking brake.
- Avoid contact with hydraulic oils and other chemicals.
- Ensure hydraulic systems are without pressure prior to beginning service. Confirm on gauge and ensure no check or accumulator valves are in use.
- Review the SDS for the chemical prior to interaction.

Grading and Excavating

Description:
Track hoes, graders, skid steer, backhoes, etc. used to perform site preparation and earth moving activities.

Hazards (How can I get hurt?)

- Overhead Utilities
- Underground Utilities
- Excavation Hazards/Cave-Ins
- Structural Stability of Soil/ Work Area
- Striking Objects/People
- Falls/Ejections
- Noise And Vibration
- Injury or Death from Motor Vehicle Accident
- Weather Concerns / Heat and Cold Stress

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
  - Cut-resistant gloves (ANSI A4 or greater)
  - Hard Hat
- Only operate equipment if qualified to do so.
- Complete a pre-operation inspection before starting work.
- Conduct a site assessment to evaluate stability in the area.
- Establish exclusion zones and warning systems around the site to prevent unauthorized access and provide early warning in case of emergency.
- Perform a work area inspection to identify overhead powerlines and other obstructions prior to operating heavy equipment.
- Always ensure an up-to-date utility marking service has been completed prior to performing excavation work (breaking ground).
- Establish clear communication methods with ground personnel and other operators working nearby, such as hand signals or two-way radios.
- Ensure all safety devices, such as backup alarms, warning lights, and mirrors, are functional and used correctly.
- Always remain in the cab during operation and operate with the doors closed.
- Utilize walkways and handrails to access equipment. Never climb on equipment.
- If available, equipment operators must wear seat belts when operating.
- Never approach or allow personnel to approach operating equipment.
- Remain focused on operating the equipment and be aware of blind spots. Utilize a spotter if necessary.
- Always check weather forecast for the area prior to planning trip.
- Never attempt to operate heavy equipment in hazardous weather conditions (lightning, tornado, heavy storm, flooding, etc.)
- Turn off the equipment and allow it to cool before refueling. Handle fuel with care and avoid smoking near the refueling area.
- Conduct regular inspections of the site to identify any changes in ground conditions and stability.
- Do not attempt to perform service on the machinery. Only minor service can be performed such as fluid additions, filter changes, etc.)

Seeding and Strawing

Description:
Applying seed and straw material for erosion protection.

Hazards (How can I get hurt?)

- Strains/Sprains from Lifting
- Strains/Sprains from Stooping/Bending
- Respiratory Irritation and Allergies from Straw and Dust
- Contact with Stinging/Biting Insects, Poisonous Plants, Wild Animals, and Other Pests
- Weather Concerns / Heat and Cold Stress
- Sunburn and Natural UV Exposure
- Slip, Trip, Fall from Varied Terrain
- Contact/Crush by Heavy Equipment

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Safety toe boots
  - High visibility vest (class 3)
  - Cut-resistant gloves (ANSI A4 or greater)
- Never attempt to lift greater than 40lbs.
- Utilize an ergonomic stance and avoid lifting with the back.
- If item weight is greater than 40lbs use mechanical means to lift and move.
- Know the weight of items being lifted prior to attempting a lift.
- Always pre-plan route and remove obstructions in the walkway to reduce the likelihood of tripping.
- Avoid prolonged stooping and bending. Rotate personnel and take regular breaks to avoid fatigue.
- Avoid breathing dust and hay when possible. Personnel can voluntarily wear a dust mask.
  - TDOT GUIDANCE FOR VOLUNTARY RESPIRATOR USE
- Wear insect repellent and avoid contact with poisonous insects when possible.
- Always check weather forecast for the area prior to planning trip.
- Tailor clothing choices to anticipated weather conditions.
- Always pack hydration supplements and regularly intake water.
- Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress.
- Always inspect travel path and select the terrain with least obstacles and elevation change. Avoid slopes and loose soil/rock.
- If heavy equipment is operating in the area ensure personnel maintain an adequate distance from the equipment at all times.
- Never approach equipment while in operation.
- Establish a demarcation zone to prevent the interaction of personnel and equipment during operation.
- Only proper trained and certified personnel should operate heavy equipment.

TN TDOT Department of Transportation

work 4 us

JOB SAFETY ASSESSMENTS

HIGHWAY BEAUTIFICATION

SUMMARY OF HIGHWAY BEAUTIFICATION

TDOT's Highway Beautification Office oversees a varied group of programs intended to preserve and sustain the natural scenic beauty of the Tennessee landscape. These programs include those regulatory in nature: Outdoor Advertising, Junkyard Control, and Vegetation Control, and those that are focused on public outreach, which include: Adopt-A-Highway, litter prevention, Pollinator Habitat, Landscaping, the Nobody Trashes Tennessee campaign and Scenic Roadways.

TOP 5 HAZARDS

1. Contact with Vehicle / Traffic Hazards
2. Soft Tissue Injury from Bending/Stooping
3. Interactions with Hostile Persons
4. Walking / Working Surfaces – Slips, trips, falls
5. Contact with Biting/Stinging Insects or Plants

OHS SHAREPOINT

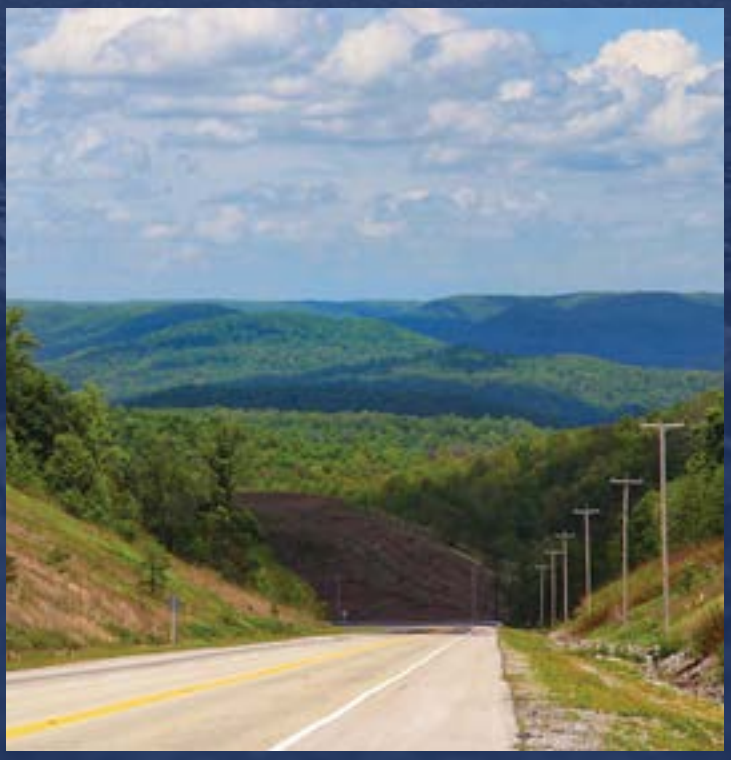
STANDARD PPE FOR GENERAL HIGHWAY BEAUTIFICATION

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)
- Memorandum - Lane Crossing

RELATED PROGRAMS AND REFERENCES

- OSHA Safety and Health Topics



Print Section

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Strain, Sprain, or Bone Fracture While Exiting Vehicle

Controls (How I keep from getting hurt?)

- If entering or working in a TDOT WORK ZONE refer to the JSA:
  - VEHICLE OPERATIONS – WORK ZONE VISITS
- If possible, perform survey or job from within vehicle. Only exit if necessary.
- Avoid pulling off of the roadway in low-light conditions.
- Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder.
- Avoid pulling into an unprotected median or on the left side shoulder.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off.
- Communicate pull-off maneuver with turn signals well in advance of move.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards.
- Avoid jumping down from high ground clearance vehicles.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

Outdoor Advertising Permit Inspections (Signage, Vegetation, etc.)

Description:
Site visits for proposed sign locations, vegetation permits, compliance, and other similar field activities with varied terrain.

Hazards (How can I get hurt?)

- Contact with Stinging/Biting Insects, Poisonous Plants, Wild Animals, and Other Pests
- Weather Concerns / Heat and Cold Stress

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Hiking or treaded boot with ankle support
  - High visibility vest
- When applicable, wear rubber (muck) boots or snake boots
- Wear insect repellent and avoid contact with poisonous vectors when possible.
- Always check weather forecast for the area prior to planning trip.

- Sunburn and Natural UV Exposure
- Slip, Trip, Fall from Varied Terrain
- Lacerations from Brush Clearing Tools
- Falls from Height (>4')
- Contact with Vehicles and Other Traffic
- Encounters with Public Persons
- Loss of Orientation

- Tailor clothing choices to anticipated weather conditions.
- Always pack hydration supplements and regularly intake water.
- Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress.
- Always inspect travel path and select the terrain with least obstacles and elevation change. Avoid slopes and loose substrates.
- Only use machetes and other brush clearing tools when necessary.
- Always swing away from body parts arcing away from body.
- When machete is not in use always secure in a sheath.
- Always wear cut-resistant gloves (ANSI A4 or greater) when operating machetes or other brush clearing tools.
- Never attempt to climb, use a ladder, or otherwise access outdoor advertising.
- Never approach cliffs, holes, culverts, or other drop offs.
- Be aware of traffic patterns and avoid working near roadways when possible.
- Be aware of public persons and always assume a neutral, non-engaging demeanor. If confrontation occurs or is suspected evacuate the area and contact local authorities if warranted.
- When possible, avoid working alone and communicate travel plans with a supervisor. Stick to planned travel route at all times.
- Always carry maps, GPS, radio, cell phones and other tools to prevent getting lost.

Junkyard Inspections

Description:
Site visits to potential junkyard locations to evaluate compliance.

Hazards (How can I get hurt?)

- Encounters with Public Persons Slip, Trip, Fall from Varied Terrain
- Lacerations from Debris on Property
- Falls from Height (>4')
- Contact with Vehicles and Other Traffic

Controls (How I keep from getting hurt?)

- Always attempt to contact the property owner prior to visit.
- Be aware of public persons and always assume a neutral, non-engaging demeanor. If confrontation occurs or is suspected evacuate the area and contact local authorities if warranted.
- Always announce your presence, park vehicle, and walk in a way that is visible to property owner. Avoid Surprising homeowner or acting suspicious.
- Always wear proper PPE:
  - ANSI Z87.1 rated safety glasses
  - Hard-toe shoes
  - High visibility vest
- When possible, avoid working alone and communicate travel plans with a supervisor. Stick to planned travel route at all times.
- Perform a visual inspection of travel path prior to travel to identify debris or other hazards.
- Avoid walking in tall grass or other areas where the ground terrain is obstructed from view.
- Never attempt to climb a fence, tree, ladder, or debris pile.
- Be aware of traffic patterns and avoid working near roadways when possible.

Outdoor Advertising Sign Removal

Description:
Removal of outdoor advertising displays.

Hazards (How can I get hurt?)

- Laceration/Amputation from Chainsaw
- High Noise from Chainsaw
- Crush/Contact with Falling Objects
- Contact with Stinging/Biting Insects, Poisonous Plants, Wild Animals, and Other Pests
- Weather Concerns / Heat and Cold Stress
- Sunburn and Natural UV Exposure
- Slip, Trip, Fall from Varied Terrain
- Lacerations from Brush Clearing Tools
- Contact with Vehicles and Other Traffic
- Encounters with Public Persons
- Loss of Orientation

Controls (How I keep from getting hurt?)

- TDOT personnel should avoid manually removing signage and instead contract signage removal to specialist firms.
- When operating a chainsaw, ensure the chainsaw is properly inspected and blades sharpened.
- When operating a chainsaw, avoid contacting objects or cutting with the tip of the chainsaw to avoid kickback. Never rotate the blade side-to-side during cut.
- When operating a chainsaw, wear proper PPE:
  - ANSI Z87.1 rated safety glasses
  - Chainsaw cut-resistant chaps
  - Cut-resistant gloves (ANSI A6 or higher)
  - Hard Hat
  - Debris face shield
  - Hearing protection
  - Hard toe boots
- Only trained and authorized persons should operate a chainsaw.
- Never stand in the shadow of the drop zone and preplan all cutting activities.
- Evacuate non-essential personnel from the area and demarcate area.
- Wear proper PPE when walking in wooded environments:
  - Hiking or treaded boot with ankle support
  - High visibility vest
- When applicable, wear rubber (muck) boots or snake boots
- Wear insect repellent and avoid contact with poisonous vectors when possible.
- Always check weather forecast for the area prior to planning trip.
- Tailor clothing choices to anticipated weather conditions.
- Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress.
- Always inspect travel path and select the terrain with least obstacles and elevation change. Avoid slopes and loose substrates.
- Only use machetes and other brush clearing tools when necessary.
- Always swing away from body parts arcing away from body.
- When machete is not in use always secure in a sheath.
- Always wear cut-resistant gloves (ANSI A4 or greater) when operating machetes or other brush clearing tools.
- Never attempt to climb, use a ladder, or otherwise access outdoor advertising.
- Never approach cliffs, holes, culverts, or other drop offs.
- Be aware of traffic patterns and avoid working near roadways when possible.
- Be aware of public persons and always assume a neutral, non-engaging demeanor. If confrontation occurs or is suspected evacuate the area and contact local authorities if warranted.
- When possible, avoid working alone and communicate travel plans with a supervisor. Stick to planned travel route at all times.

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• Always ensure that proper vehicle operation documents are current and available If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available).

- Call the TN Auto Accident Call Center at (855)-253-0629.
- Notify direct supervision of incident and initiate an incident report.
- Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Strain, Sprain, or Bone Fracture While Exiting Vehicle

Controls (How I keep from getting hurt?)

- If entering or working in a TDOT WORK ZONE refer to the JSA:
  - VEHICLE OPERATIONS – WORK ZONE VISITS
- If possible, perform survey or job from within vehicle. Only exit if necessary.
- Avoid pulling off of the roadway in low-light conditions.
- Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder.
- Avoid pulling into an unprotected median or on the left side shoulder.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off.
- Communicate pull-off maneuver with turn signals well in advance of move.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

Public Outreach Presentations and Public Events

Description:
Transportation, loading/unloading, setup, and presentation of public outreach events.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Ergonomic / Soft-Tissue Injuries from Lifting, Loading, and Unloading Equipment • Strain from Overhead Work • Slips, Trips, and Falls from Floor Obstructions • Lacerations from Use of Box Cutter/Razor Knife • Falls from Step Ladders	• Use proper lifting technique when lifting, loading, unloading, and transferring equipment. • Never attempt to lift items greater than 40 pounds (this may decrease depending on your physical abilities- get help from a co-worker). • Limit the amount of time spent performing overhead work. • When using a step ladder, maintain a proper grip and solid stance. • Ensure step ladders are on a solid, stable surface during use. • Perform regular housekeeping and avoid storing items on the ground which may create a trip hazard. • Inspect the travel path prior to travel. Remove and avoid obstructions in walkway. • Use mechanical lifting devices or team lifts when possible to move material. • Wear proper PPE when using a box cutter/razor knife: – Cut-resistant gloves (ANSI A5 or higher) • When operating a box cutter/razor knife, always cut away from the body. • Maintain a sharp blade on box cutter/razor knives.

Litter Cleanup Activities – Land Based

Description:
Organizing, setting up, and coordinating land-based litter cleanup activities for volunteers and TDOT employees.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Lacerations from Sharp Roadway Debris (Glass, Metal, Other Sharp Debris) • Contact with Illicit Materials (Drug Paraphernalia, Meth Labs Materials, Firearms, etc.) • Contact with Hazardous Waste (Roadside Dumping, Spills, etc.) • Contact with Biological Hazards (Body Fluids, Animal Carcasses, etc.) • Ergonomic / Soft-Tissue Injuries from Litter Cleanup, Bag Carrying, etc. • Slips, Trips, Falls from Slopes and Loose Gravel	• Wear proper PPE: – High visibility vest (class 3) – Cut resistant gloves (ANSI A4 or greater) – Hard-toe boots or hiking-type boots with ankle support • Always inspect debris material prior to collection to identify sharps, biological, or other potential hazards. • Avoid direct handling of sharp debris. • Do not attempt to collect, handle, or clean up hazardous or biological wastes. • Do not attempt to handle illicit materials. • If unsure if waste is hazardous, biological, or illicit, do not attempt to handle and notify local authorities. • Do not overfill bag. Ensure debris collection bag is no greater than 40 pounds. • Avoid filling bag with sharps or other debris which may rip bag or cut personnel through bag. • When possible, use remote debris grabber to avoid direct handling and avoid bending/stooping. • Do not attempt to lift items greater than 40 pounds. • Avoid walking on steep slopes or slopes with gravel.

Litter Cleanup Activities – Water Based

Description:
Organizing, setting up, and coordinating water-based litter cleanup activities for volunteers and TDOT employees.

Hazards (How can I get hurt?)

- Lacerations from Sharp Debris (Glass, Metal, Other Sharp Debris)
- Contact with Illicit Materials (Drug Paraphernalia, Meth Labs Materials, Firearms, etc.)
- Contact with Hazardous Waste (Illegal Dumping, Spills, etc.)
- Drowning
- Biological Exposure (Waterborne Pathogens, Viruses, Bacteria, etc.)
- Contact with Boats and Other Watercraft
- Laceration from Outboard Motor
- Slips, Trips, Falls from Slopes and Loose Gravel

Controls (How I keep from getting hurt?)

- When working within 6' of waterways, rivers, lakes, streams, ponds, or other body of water ensure proper PPE is worn:
  - Personal flotation device (PFD)
- Working on a bridge or crossing with unprotected edges is considered working within 6' of a waterway.
- If wearing waders, ensure that PFD does not interfere with the removal of waders in the event of an emergency.
- When working around waterways never work alone. Drowning may occur in as little as 6" of water.
- Always survey work site to look for waterway obstructions, slick embankments, and other hazards which may cause persons to become fully submerged.
- Do not expose open cuts, wounds, or sores to untreated water.
- If on a boat or dock a PFD must be worn.
- If operating or riding on a watercraft ensure all boating navigation and safety laws are followed.
- Always yield to other watercraft and operate the watercraft defensively.
- Utilize a spotter to watch for other watercraft when operating in a stationary position.
- Ensure the outboard operator wears a kill-switch device during boat operation.
- Always inspect the kill-switch device to ensure proper operation prior to use.
- Do not approach or exit a boat while the outboard motor is operating.
- Do not allow personnel in the water while the outboard motor is in operation.

TN TDOT Department of Transportation

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JOB SAFETY ASSESSMENTS

HIGHWAY MAINTENANCE REPAIR

SUMMARY OF HIGHWAY MAINTENANCE ROADWAY REPAIR

The Highway Maintenance Division consists of various maintenance activities on Tennessee State roadways. Roadway repair activities can include pothole patching, crack sealing, pavement resurfacing or overlay, road milling, roadway construction, shoulder repair, culvert repair, guardrail and barrier repair, and roadway marking. Roadway repair activities are an ongoing process throughout the state to ensure the longevity and functionality of the State's transportation infrastructure. The maintenance of State routes is integral to the safe transportation and commerce throughout the state and nation.

TOP 5 HAZARDS

1. Contact with Vehicles / Traffic
2. Contact/Crush by Construction Equipment
3. Ergonomic / Soft Tissue Injury
4. Lacerations
5. Weather Exposure and contact with biting insects, animals and poisonous plants

OHS SHAREPOINT

STANDARD PPE FOR GENERAL HIGHWAY MAINTENANCE ROADWAY REPAIR

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-003 Facility Lockout Tagout Program
- OHS-006 Personal Fall Protection Systems
- OHS-007 Powered Industrial Truck Operation Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- OHS-010 Hot Work Program
- OHS-012 Confined Space Entry Program
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- TDOT PIT Daily Pre-Op Checklist
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)
- Memorandum - Lane Crossing
- 4-Us Checklists
- TTC Inside Shoulder
- Winter Equipment
- Tailgate Procedures
- TMA Operator Reference Guide
- Truck and Trailer Mounted Attenuator Manual
- Chainsaw Checklists

RELATED PROGRAMS AND REFERENCES

- TDOT Work Zone Field Manual
- Winter Equipment Operations SOG
- TDOT Fleet Vehicle Conspicuity
- Standard Specs for Road and Bridge Construction

Print Section

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629 • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

- Notify direct supervision of incident and initiate an incident report.
- Never turn your back to traffic.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If entering or working in a TDOT WORK ZONE refer to the JSA: – VEHICLE OPERATIONS – WORK ZONE VISITS • If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway in low-light conditions. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • If parked within a work zone, position vehicle in front of vehicle(s) equipped with a standard lighting package. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off. • Communicate pull-off maneuver with turn signals well in advance of move. • Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot. • Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle. • Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards. • Avoid jumping down from high ground clearance vehicles. • Wear proper PPE: – High visibility vest (class 3) • Once out of the vehicle, remain away from the road or behind solid obstructions. • Do not attempt to cross lanes of an active roadway. • Plan an escape route

Debris Removal Operating Heavy Equipment

Description:
Roadway repair personnel may operate an excavator or other heavy equipment for debris removal.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Heavy Equipment Falls/Ejections • Contact with Underground or Overhead Utilities • Injury or Death from Contact with Motor Vehicle • Crushing or Caught-Between Equipment and Fixed Objects, Trees, or other Immovable Objects. • Stored Energy Within Standing or Fallen Trees, Limbs, etc. • Contact with Hazardous or Flammable Material Waste	• Wear proper PPE: – Safety toe boots – High visibility vest/shirt (class 3) – ANSI Z87.1 rated safety glasses • Utilize equipment step bars and handrails when entering and exiting equipment. • Always perform a pre-use inspection of equipment prior to each use. Note any damage or deficiencies. • Do not operate equipment is key safety features are damaged or disabled. • Establish exclusion zones and warning systems around applicable equipment to prevent unauthorized access to danger areas (e.g. swing radius of excavator). • Establish traffic control plan as necessary to reduce likelihood of vehicle strike to heavy equipment. • Only properly trained and certified personnel may operate specialized or heavy equipment. • If needed, employ a spotter. Spotter and equipment operator must maintain contact at all times via radio, phone, or equivalent method. • Understand operator and machine capabilities and operating conditions (i.e., slope angles, terrain types) • Always survey work area for overhead utilities prior to beginning work. Isolate or mark overhead obstructions to notify operators. • Always survey for underground utilities if performing digging or excavating operations to remove debris. • Avoid exiting the cab with other equipment in operation in the area. • Ensure no pedestrians are in the work area during heavy equipment operations. • When removing or handling trees or limbs be aware of sudden breaking or failure of the tree. Evacuate the shadow of the load and anticipate the potential failure path. • Avoid contact with fuel tanks, drums, or other unknown objects which may contain hazardous or flammable materials.

Roadkill Debris Removal

Description:
Roadway repair personnel may encounter roadkill during debris removal

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Slips, Trips, and Falls Due to Unstable Terrain • Exposure to Roadkill Pathogens Can Lead to Transmission of Diseases • Wildlife May Not Be Dead and	• Avoid steep slopes, uneven terrain, gravel, and other hazardous terrain. • Avoid direct contact with roadkill, animal body fluids, animal parts, feathers, fur, or other dead animal remains. • When possible, use a remote handling tool such as a shovel, grabber tool, or other similar device to move dead animal remains. • If an animal is too large or heavy to remove (>40lbs) then use a team lift, tarp, or other means to move animal while reducing body strain.

Only Injured or Distressed and Can React Aggressively.
- Strains/Sprains from Awkward Posture Lifting Roadkill Debris
- Roadkill Disposal Can Attract Scavengers and Potentially Spread Disease to Other Wildlife

- Wear proper PPE:
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
  - Cut-resistant gloves (ANSI A4 or greater)
  - Nitrile, vinyl, or equivalent exam gloves
- Approach roadside animals with caution to ensure they are dead and are not able to regain consciousness and cause harm.
- Do not attempt to move or assist animals who are injured or distressed. Contact local animal control of TWRA.
- Beware of scavengers, predators, or other hazards which may be attracted to the animal carcass.

Disasters and Severe Storm Debris Removal

Description:
Roadway repair personnel may remove disasters and severe storms debris

Hazards (How can I get hurt?)

- Injury or Death from Contact with Motor Vehicle
- Exposure to Unstable Structures, Downed Power Lines
- Lacerations / Punctures from Sharp Objects, Broken Glass, Metal, and Similar Debris
- Stored Energy Within Standing or Fallen Trees, Limbs, etc.
- Biological and Chemical Exposure Potential
- Contact with Hazardous or Flammable Material Waste
- Strains/Sprains from Awkward Posture Lifting Debris
- Crushing or Caught-Between Equipment and Fixed Objects, Trees, or Other Immovable Objects

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
  - Cut-resistant gloves (ANSI A4 or greater)
  - Nitrile, vinyl, or equivalent exam gloves (if handling biological debris)
- Establish traffic control plan as necessary to reduce likelihood of vehicle strike.
- Always check weather forecast for the area prior to planning trip.
- Do not attempt to enter damaged vehicles or structures.
- Survey work area for electrical and other utility exposure prior to beginning work. If a power line or other utility is identified suspend work until the utility can be confirmed as not active.
- Do not reach into or grab unknown items as they may contact sharps, or other hazardous materials.
- When possible, use remote handling tools to move debris.
- Do not attempt to lift large or heavy items (>40lbs) by hand.
- Do not attempt to move or pick up trees or large limbs as they may be >40lbs or have stored energy which may cause the tree to break or spring causing contact.
- Survey debris area for hazardous or flammable materials. Do not attempt to handle hazardous materials. If hazardous or flammable materials are identified notify authorities and evacuate the area.
- Use the proper lifting technique when lifting items and avoid carrying items long distance.
- When cleaning debris avoid positioning body between two or more objects to reduce the likelihood or crushing or caught-between injuries.
- Do not operate on foot while heavy equipment operations are in progress. Always work outside the equipment exclusion zone.

Pavement Milling

Description:
Pavement milling (cold planing, asphalt milling, or profiling) is the process of removing at least part of the surface of a paved area such as a road, bridge, or parking lot. Milling removes anywhere from just enough thickness to level and smooth the surface to a full depth removal. The milling machine's drum rotates cutting heads across the surface, chewing up the existing asphalt to the depth of the cutting heads. The vacuum sucks up the milled material and deposits it where the conveyance system can then move it to a dump truck. The dump truck and the milling machine move together so the material is collected as it is removed from the surface.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Personnel
- Crush or Contact from Milling Equipment
- Pinch Points and Crush Hazards During Machine Set-Up and Adjustments
- Entanglement and Caught-In Hazards from the Cutting Drum and Conveyor
- Struck By Pavement Debris During Transfer into Dump Truck.
- Outside Equipment Weather Concerns / Heat and Cold Stress
- Sunburn and Natural UV Exposure
- Noise Exposure from Milling Operations
- Inhalation of Dust and Asphalt Fumes
- Burns from Hot Asphalt

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Hard Hat
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
  - Cut-resistant gloves (ANSI A4 or greater)
  - Hearing protection during milling operations
- Implement traffic control to separate public traffic from work area.
- Maintain compliance with traffic control system at all times.
- Always perform a pre-use inspection on milling equipment prior to use.
- Maintain all guards and safety features on milling equipment. Do not operate equipment if safety systems are damaged or missing.
- Do not attempt to perform any servicing or maintenance task (to include unjamming) during machine operation.
- Ensure long handled tools e.g., shovels, rake do not enter traffic.
- Assign spotters for milling activities and ensure communication is maintained at all times. Spotters should ensure no personnel or obstructions are in the travel path.
- Never allow personnel to travel or work within 30' of the milling machine travel path.
- Always check weather forecast for the area prior to planning trip.
- Tailor clothing choices to anticipated weather conditions e.g., high visibility shirts vs vest for hot temperatures.
- Always pack hydration supplements and regularly intake water.
- Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress.
- Ensure wet methods are used on milling conveyor to keep dust and heat of asphalt at a minimum. Voluntary respirator use (dust masks) may be used during milling.
  - TDOT VOLUNTARY RESPIRATOR USE GUIDELINES
- Ensure personnel do not stand or work near the drum area of the milling machine to reduce the likelihood of contact by flying debris.
- Do not attempt to contact freshly milled asphalt or milling equipment as it may be hot.
- Dump truck operators must stay in cab at all times while in the work zone.
- Dump truck operators should always use a spotter when backing up.
- Dump truck operators must always maintain communication with the spotter while in the workzone.

Grading and Sloping

Description:
When grading a new road, TDOT must slope the shoulders away from the crowned surface to facilitate proper drainage. Once the roadway is graded, a water truck is used to wet the roadway followed by a Roller to compact.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Personnel
- Slips, Trips, and Falls from Uneven Ground or Debris
- Pinch Points and Crush Hazards during Heavy Equipment Set-Up, Adjustments, and Operation
- Struck by Equipment
- Inhalation of Respirable Dust from Gravel, Roadway Repair Components, etc.
- Crush from Equipment Rollover
- Elevated Noise from Heavy Equipment

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
- Maintain all guards and safety features on equipment.
- Ensure long handled tools e.g., shovels, rake do not enter traffic.
- Follow traffic control plan.
- Demarcate heavy equipment operation area to ensure personnel are not working or traveling in equipment travel areas.
- Maintain communication with pedestrians and other equipment operators at all times.
- When possible, stay in the equipment cab and avoid walking the work area on foot.
- Operate heavy equipment with the doors and windows closed to reduce the amount of debris, dust, and noise in the cab.
- Personnel may voluntarily use dust masks in dusty environments.
- TDOT VOLUNTARY RESPIRATOR USE GUIDELINES
- Ensure equipment is in the off and secured position prior to attempting any basic service (checking filters, fluid levels, etc.).
- Always perform a pre-use inspection before operating heavy equipment.
- Do not operate equipment with defective or damaged safety systems.
- Avoid operating equipment on steep slopes of over 20% without evaluating the soil quality, travel path, etc. to reduce the likelihood of equipment rollover.

Subgrade Preparation

Description:
The subgrade of a road is the foundation which includes compacted soil/aggregate at the appropriate slope and size. Some material addition and removal is required.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Personnel
- Slips, Trips, and Falls from Uneven Ground or Debris
- Struck by Equipment
- Inhalation of Respirable Dust from Gravel, Roadway Repair Components, etc.

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
- Maintain all guards and safety features on equipment.
- Follow traffic control plan.
- Demarcate heavy equipment operation area to ensure personnel are not working or traveling in equipment travel areas.

- Contact from Flying Debris
- Contact with Underground Utilities
- Contact with Overhead Utilities

- Maintain communication with pedestrians and other equipment operators at all times.
- When possible, stay in the equipment cab and avoid walking the work area on foot.
- Operate heavy equipment with the doors and windows closed to reduce the amount of debris, dust, and noise in the cab.
- Personnel may voluntarily use dust masks in dusty environments.
- TDOT VOLUNTARY RESPIRATOR USE GUIDELINES
- Ensure utilities have been surveyed and marked for the planned work area prior to performing any excavation activities.
- Ensure equipment is in the off and secured position prior to attempting any basic service (checking filters, fluid levels, etc.).
- Always perform a pre-use inspection before operating heavy equipment.
- Do not operate equipment with defective or damaged safety systems.
- Survey work area for overhead utilities. Do not operate heavy equipment near overhead utilities.

Applying Tack Coats or Bond Coats

Description:
Asphalt emulsion bond coats glue layers of pavement together, give pavements durability by helping them resist shear forces. This can be done by via Tack truck or asphalt distributors with a spray bar or manually with a hand wand.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Personnel
- Slips, Trips, and Falls from Uneven Ground or Debris
- Personnel Contact with Heavy Equipment
- Inhalation of Harmful Fumes, Vapors, with Tack Coat Materials
- Dermal Hazards via Skin Contact with Tack Coat Materials
- Burns from High Temperature of Tack Coating Materials

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Hard Hat
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
  - Heat resistant gloves
  - Rubber gloves when using hand wand
  - Tyvek suit when using hand wand
- Maintain all guards and safety features on tack truck and hand application equipment.
- Follow traffic control plan.
- Demarcate equipment travel path area to ensure personnel are not working or traveling in equipment travel areas.
- Always maintain communication with equipment operator and personnel.
- Never attempt to walk in front of or behind equipment while in operation.
- Avoid direct contact with tack coat or bond coat. Any material on skin should be removed immediately.
- When possible, avoid breathing vapors from tack coat or bond coat during application.
- Hand wand application should be as far away from the body as possible during application.
- Do not touch hot parts of equipment or wand at any time.

Asphalt Paving Operation

Description:
Asphalt is fed into an asphalt paver from dump truck and applied with to roadway with an Asphalt Paver. The asphalt is then compacted utilizing a Roller.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Personnel
- Slips, Trips, and Falls from Uneven Ground or Debris
- Pinch Points and Crush Hazards During Machine Set-Up and Adjustments
- Struck by Asphalt Debris When Unloading Asphalt from Dump Truck to Asphalt Paver or Roller
- Burns from Hot Asphalt (220-290 degrees Fahrenheit)
- Noise Exposure from Asphalt Paver
- Inhalation of Asphalt Dust and Fumes
- Entanglement or Crush from Paver Power Transmission Equipment (Augers, Conveyors, etc.)

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Hard Hat
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
  - Hearing protection
- Implement third party traffic control if possible.
- Maintain all guards and safety features on asphalt paving and support equipment.
- Follow traffic control plan.
- Demarcate equipment travel path area to ensure personnel are not working or traveling in equipment travel areas.
- Always maintain communication with equipment operator and personnel.
- Never attempt to walk in front of or behind equipment while in operation.
- Do not attempt to touch any hot parts of the paving operation or paving equipment while energized.
- Always ensure support personnel (dump truck operators, etc.) operating in front of paver remain in the cab at all times.
- Personnel may voluntarily use dust masks in dusty environments.
- TDOT VOLUNTARY RESPIRATOR USE GUIDELINES
- When necessary, utilize a spotter to ensure personnel do not operating in the equipment blind spots.
- When collecting temperature of asphalt, always maintain a distance of 3’ from the asphalt.
- Utilize a remote temperature collecting unit (infrared) when possible. If a manual temperature unit is used ensure proper footing and grip on temperature lance to prevent contact with hot asphalt.
- Dump truck operators must stay in cab at all times while in the work zone.
- Dump truck operators should always use a spotter when backing up.

POTHOLE REPAIR

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 7/13/2023 | Last Revision: 9/21/2023

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629. • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle when repairing pothole

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Strain, Sprain, or Bone Fracture While Exiting Vehicle

Controls (How I keep from getting hurt?)

- If entering or working in a TDOT WORK ZONE refer to the JSA:
  - VEHICLE OPERATIONS – WORK ZONE VISITS
- If possible, perform survey or job from within vehicle. Only exit if necessary.
- Avoid pulling off of the roadway in low-light conditions.
- Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder.
- Avoid pulling into an unprotected median or on the left side shoulder.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off.
- Communicate pull-off maneuver with turn signals well in advance of move.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

Pothole Repair

Description:
Shovel asphalt repair mix from bed of truck into pothole

Hazards (How can I get hurt?)

- Slips, trips, and falls due to lips, Trips, and Falls Due to Uneven Terrain
- Injury or Death from Vehicle Striking Personnel Outside Vehicle

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
  - Leather work gloves or equivalent
- Ensure long handled tools e.g., shovels, rake do not enter traffic and creating a

- Strains/Sprains from Awkward Posture from Shovels, Rakes, and Tamps
- Lifting Heavy Bags of Patch if Not Using Mix from Truck
- Exposure to Chemicals (Asphalt/Patch Mix)
- Burns from Hot Asphalt Mix, Hot Box Heater Unit, and Propane Torches
- Contact with Debris from Pothole Cleaning (Small Rocks, Dust, Or Dirt)

flying debris hazard.
- Perform regular housekeeping to keep tools, roadway debris, and other items from causing a trip hazard in the work area.
- Take regular breaks and rotate tasks regularly to reduce strain.
- Do not apply too much pressure to tamp or attempt to lift a large amount of hot asphalt on shovel.
- Use proper lifting procedures for lifting and carrying pavement patch and other heavy objects.
- Use mechanical lifting devices or two people for objects over 40lbs.
- Review SDS of asphalt or pavement patching compound prior to use.
- Avoid contact with hot asphalt as temperatures can be as high as 350 degrees F. Hot asphalt will stick to surfaces causing prolonged burns.
- Ensure boots are tied securely at the top and pants cover the boots to avoid hot asphalt dropping into inside of boots.
- Avoid standing near hot asphalt or breathing fumes when possible.

VEGETATION TRIMMING

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 7/13/2023 | Last Revision: 7/13/2023

Trimming Vegetation with Articulating Arm/Mowing Deck

Description:
Vegetation control tree trimming involves cutting, maintaining trees to manage vegetation growth and ensure safety near power lines and roads The task includes using various tools such as articulating arm with mowing deck (25'-25').

Hazards (How can I get hurt?)

- Injury or Death from Vehicle/ Tractor Strike
- Weather Concerns / Heat and Cold Stress
- Sunburn and Natural UV Exposure
- Struck by Flying Vegetation/ Debris
- Exposure to High Noise (>85dBA)
- Roll Over Tractor on Unstable Terrain
- Electrocution from Overhead Power Lines
- Biological (Plants/Inspects)
- Fire Hazards Inside and Outside Cab
- Falling Debris (Vegetation, Limbs, etc.)
- Striking Fixed Objects (e.g. Fire Hydrant, Telephone Pedestals, Mail Boxes, Culvert/Headwalls, Signs, Guardrail, etc.
- Exposure to live traffic

Controls (How I keep from getting hurt?)

- Wear proper PPE:
- Safety toe boots
- High visibility vest/shirt (class 3)
- ANSI Z87.1 rated safety glasses
- Hearing protection
- Wear seat belt.
- No passengers allowed in cab during operation.
- Follow traffic control plan.
- Avoid distractions.
- Avoid crossing live lanes of traffic.
- Initiate emergency lighting, signage or other available vehicle safety devices.
- Stay in one lane or shoulder and be aware of on-coming traffic
- Always check weather forecast for the area prior to planning trip.
- Tailor clothing choices to anticipated weather conditions.
- Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress.
- Ensure cab windows or doors are closed and secure to keep debris from striking operator.
- Workers outside the tractor during mowing should maintain a minimum of 100 feet from mower.
- Only allow qualified and trained workers to trim trees near power lines.
- Contact the utility company to de-energize power lines if cutting within the prohibited distance of power lines.

• Roadway transport and maneuvers	• Maintain a safe distance from power lines and follow the required clearance distances. • Carry and use insect repellent and protective clothing to prevent insect bites. Stay in cab with doors closed to prevent exposure. • Ensure fire extinguishers are in good operating condition and secured inside cab.

STEP Slope Mowing

Description:
Slope mowing involves cutting grass, weeds, or vegetation on slopes and inclines using mowing equipment. Slopes can present specific challenges due to the uneven terrain and potential for equipment rollover or loss of control.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle/ Tractor Strike • Struck by Flying Vegetation/ Debris • Exposure to High Noise • Roll Over on Unstable or Steep Terrain • Fire Hazard	• Wear proper PPE: – Safety toe boots – High visibility vest/shirt (class 3) – ANSI Z87.1 rated safety glasses – Hearing protection • Ensure no part of the tractor is in the roadway during mowing without proper traffic control plan. • Follow traffic control plan. • Wear seat belt. • No passengers allowed in cab during operation. • Use equipment with low center of gravity and wide wheelbases to improve stability. • Equip mowers with roll bars or rollover protection structures (ROPS). • Avoid mowing on excessively steep slopes or consider alternative methods for such areas. • Avoid operating parallel or perpendicular to the slope to minimize rollover risk. • Workers outside the tractor during mowing should maintain a minimum of 100 feet from mower. • Ensure the area is clear of people and obstacles before starting mowing. • Use deflectors and guards on mowers to minimize the projection of debris. • Ensure fire extinguishers are in good operating condition and are available for quick use. • Always have an escape route in the even of emergency or rollover.

STEP Weed Eating

Description:
Weed eating, also known as string trimming or weed whacking, involves using a motorized string trimmer to cut down weeds, grass, and vegetation in areas that cannot be easily reached with a lawn mower. The task typically takes place around obstacles such as signage, trees, and guard railing.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Personnel while in tractor • Struck by flying vegetation/ debris	• Wear proper PPE: – Safety toe boots – High visibility vest/shirt (class 3) – ANSI Z87.1 rated safety glasses

- Slips/Trips/Falls
- Cuts and abrasions
- Exposure to high noise and vibration
- Exhaust Fumes (Gasoline Models)
- Weather Concerns / Heat and Cold Stress
- Sunburn and Natural UV Exposure
- Biological (plants/inspects)

  - Cut-resistant gloves (ANSI A4 or greater)
  - Impact-resistant gaiters/chaps
  - Hard hat
  - Hearing protection
  - Long sleeve shirt and pants
- Do not attempt to enter the roadway.
- Use a deflector on the weed eater to minimize the projection of debris.
- Clear the work area of debris and obstacles before weed eating to ensure a good visual identification of walking area.
- Be cautious when transitioning between different surfaces (e.g., from lawn to pavement).
- Ensure the weed eater is in good working condition, with no exposed sharp edges.
- Operate gas-powered weed eaters in well-ventilated areas or in the open air.
- Follow the manufacturer's instructions for mixing fuel and ensure proper fueling practices.
- Always check weather forecast for the area prior to planning trip.
- Tailor clothing choices to anticipated weather conditions.
- Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress.
- Wear insect repellent and watch for bees, snakes, etc.

Operating a Chipper

Description:
Using a chipper involves feeding branches, limbs, and other organic materials into the chipper to convert them into wood chips or mulch.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Struck by Flying Vegetation/ Debris during Chipping
• Wood Dust Exposure
• Slips/Trips/Falls for Work Area Obstructions
• Cuts and Abrasions from Tree Limbs
• Exhaust Fume Exposure
• Noise Exposure >85dBA
• Machine Hazards from Machine Grabbing Clothing, Glove, or Otherwise Pulling Person into Machine
	• Wear proper PPE:
	  – Safety toe boots
	  – High visibility vest/shirt (class 3)
	  – Safety glasses
	  – Cut-resistant gloves (ANSI A4 or greater)
	  – Hearing protection
	  – Hard hat
	• Ensure wood chipper is secured to a truck hitch at all times and truck is in Park with parking brake set.
	• Workers should wear appropriate attire, including close-fitting clothing and hair tied back to reduce entanglement hazards.
	• Always use safe wood chipper feeding techniques, using a push paddle or stick to feed materials into the chipper. Push paddle should be wood and NOT metal.
	• Never attempt to put hands or feet into wood chipper under any circumstance.
	• Position the chipper's discharge chute away from workers and bystanders.
	• Know where emergency shutoff for machine is located.
	• Perform regular housekeeping to keep work area debris well organized and away from travel paths.
	• Operate gas-powered chipper in well-ventilated areas or in the open air. Avoid exhaust area.
	• Place the chipper on a level, stable, and dry surface.
	• Machine area should contain a clear area for stable footing of operators.
	• Ensure machine is off and all other workers clear before attempting to dislodge materials or make repairs.

Operating a Chainsaw

Description:
Using a chainsaw involves cutting, felling, and trimming trees or wood materials with a motorized chainsaw. The task requires proper handling of the chainsaw and adherence to safety protocols to prevent accidents and injuries.

Hazards (How can I get hurt?)

- Cuts, Lacerations, and Amputations
- Chainsaw Kickback
- Struck by Flying Vegetation/ Debris
- Falling Objects (Limbs)
- Slips/Trips/Falls
- Exposure to High Noise and Vibration
- Exhaust Fume Exposure
- Weather Concerns / Heat and Cold Stress
- Sunburn and Natural UV Exposure
- Biological (Plants/Inspects)
- Stored Energy in Trees, Limbs, or Tree Entanglements
- Exposure to Power, Communication, or Other Service Utility Lines
- Foreign Objects in Trees Causing Damage or Chainsaw Kickback

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Safety toe boots
  - ANSI Z87.1 rated safety glasses
  - Anti-vibration/cut resistant gloves (ANSI A4 or greater)
  - Chainsaw chaps
  - Hearing protection
  - Hard hat
  - Impact resistant/mesh face shield
- Assess and plan each cut with intention and prediction of reactions of trees, limbs, and vegetation.
- Establish a clear work zone with barriers or signs to prevent unauthorized access.
- Only personnel trained in the safe handling and operation of chainsaws, including proper cutting techniques, may operate a chainsaw.
- Perform pre-use inspection on chainsaw before use.
- Use a chainsaw with a chain brake or anti-kickback features.
- Hold the chainsaw with both hands, maintain a firm grip, and use proper cutting techniques to reduce the risk of kickback.
- Stand to the side of the chainsaw while cutting and avoid cutting with the tip of the bar.
- Be cautious when transitioning between different surfaces (e.g., from lawn to pavement).
- Disable chainsaw engine when not in use to limit exhaust emissions.
- Follow the manufacturer's instructions for mixing fuel and ensure proper fueling practices.
- Tailor clothing choices to anticipated weather conditions.
- Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure.
- Carry and use insect repellent and protective clothing to prevent insect bites.
- Tailor clothing choices to anticipated weather conditions.
- Always pack hydration supplements and regularly intake water.
- Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress.
- Train workers to identify and avoid contact with poisonous plants.
- Provide workers with insect repellent and protective clothing to prevent insect bites.

Application of Herbicides

Description:
Application of various herbicides along state routes to control vegetation growth. Herbicides may be applied from vehicles or manually using spray wands.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle or Personnel Strike
- Struck by Flying Roadway Debris
- Crush from Vehicle Rollover
- Skin, Mouth, or Eye Contact with Herbicide
- Inhalation of Herbicide Mist
- Ergonomic Strain for Holding Application Wand
- Injury or Death from Confined Space Entry

Controls (How I keep from getting hurt?)

- Only certified herbicide applicators may apply herbicides.
- Wear seat belt when operating or riding in vehicle.
- Herbicide wand applicator should never be the vehicle operator. Always have a minimum of two persons when performing wand spray application.
- Follow all chemical manufacturer instructions/labels when handling materials per SDS.
- Follow traffic control plan if in use.
- Only exit vehicle cab if absolutely necessary.
- Avoid crossing live lanes of traffic.
- Initiate vehicle lighting package when performing spray application.
- Wear proper PPE for herbicide application:
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
  - Nitrile chemical gauntlet gloves (NOT nitrile exam gloves)
- Ensure no part of the tractor or truck is in the roadway during spray application without proper traffic control plan.
- Always have an escape route in the even of emergency or rollover.
- Avoid driving on steep inclines.
- Wear proper PPE for herbicide mixing and handling:
  - ANSI Z87.1 rated safety glasses
  - Face shield
  - Chemical apron
  - Nitrile chemical gauntlet gloves (NOT nitrile exam gloves)
- An N95 respirator may be worn if desired (voluntary use).
- Always avoid bodily contact with herbicides. If contact is made wash area thoroughly with soap and water immediately.
- Inspect application wands for leaks and repair or replace promptly.
- Reduce time spent in proximity to herbicide application areas, mixing areas, and storage areas.
- Promptly cleanup spills.
- Avoid hand-mixing herbicides when possible. Pump herbicides into mix tanks.
- Do not enter herbicide truck tanks under any circumstances.

Anti-Icing and De-Icing Mixing Process Prior to Application

Description:
Highway Maintenance Workers perform mixing of salt brine, salt, and water for anti-icing and calcium chloride for de-icing prior to applying agents to roadway.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Weather Concerns/Cold Stress • Slips, Trips and Falls Due to Clutter or Spills In The Work Area. • Ergonomic Hazard – Heavy Lifting of Bags of Chemicals e.g. Salt • Chemical Exposure with Salt Brine or Saltwater Solutions May Cause Skin Irritation or Eye Irritations. • Inhalation Hazards from Calcium Chloride • Crush from Dropped Load • Struck by Heavy Equipment	• Wear proper PPE: – Safety toe boots – ANSI Z87.1 rated safety glasses – Cut-resistant gloves (ANSI A4 or greater) • Tailor clothing choices to anticipated weather conditions such as insulated clothing for cold weather. • Clear the work area of debris, obstacles, and spills before mixing materials to ensure a good visual identification of walking area. • Review SDS of chemicals prior to beginning work. • Utilize proper lifting techniques or assisted lifting techniques/equipment. • Consider the buddy system to lift materials over 40 pounds. • Ensure proper ventilation to minimize airborne contaminants. • Only properly trained personnel may operate heavy equipment. Always perform a pre-use inspection before operating heavy equipment. • Do not operate equipment with defective or damaged safety systems. • Demarcate heavy equipment operation area to ensure personnel are not working or traveling in equipment travel areas. • Maintain communication with pedestrians and other equipment operators at all times. • When possible, stay in the equipment cab and avoid walking the work area on foot. • Operate heavy equipment with the doors and windows closed to reduce the amount of debris, dust, and noise in the cab.

Application of Anti-Icing Agent to Roadway and Performing De-Icing of Roadway

Description:
Applying anti-icing agent is performed prior to winter conditions on roadways by TDOT Highway Maintenance Travel lanes may be pretreated with salt brine while de-icing is performed during/after the snow event to aid in removal of ice and snow from the roadway.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage Due to Inclement Weather	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Never attempt to operate a motor vehicle while tired or drowsy.

- Weather Concerns /Cold Stress
- Overhead Strike with Bridge or Other Overhead Hazard
- Vehicle Instability from Hauling Liquid Loads

- When performing shift work, allow adequate time for shift acclimation and ensure drivers receive plenty of sleep prior to shift.
- Familiarize yourself with vehicle system operation prior to entering traffic.
- Ensure PPE is available for all personnel if intending to exit vehicle.
- Adjust the seat, mirrors, and steering wheel to driver.
- Always wear a seat belt when operating or riding in a vehicle.
- Follow all traffic laws while operating vehicle.
- Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist.
- Do not use electronic devices while operating motor vehicles unless in a hands-free mode.
- Tailor clothing choices to anticipated weather conditions such as insulated clothing for cold weather.
- Always ensure that if truck bed is raised adequate clearance is maintained between overhead bridges, highway signage, power lines, and other obstructions. Avoid operating with truck bed raised when possible.
- Allow for additional stopping distance and turning radius when operating with liquid in tank to compensate for sloshing. Operate vehicle at lower speeds.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)

- Injury or Death from Motor Vehicle Accident
- Contact with Pedestrian
- Vehicle or Object Damage
- Medical Emergency

Controls (How I keep from getting hurt?)

- If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed.
- OHS-009 Injury and Property Damage Reporting
- If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail).
- Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.).
- If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable.
- Notify direct supervision of incident and initiate an incident report.
- Never turn your back to traffic.
- Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available).
- Call the TN Auto Accident Call Center at (855)-253-0629.
- Notify direct supervision of incident and initiate an incident report.
- Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Installation of Plow on Vehicle

Description:
TDOT personnel install plow on front of vehicle for removal of ice and snow from the roadway.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Pinch/Crush from Jack Usage • Crush from Installing Plow • Unintended Vehicle Movement • Pinch/Crush from Truck Lift Components • Ergonomic Hazard – Heavy Lifting of Plow • Slips, Trips, Falls from Water, Ice, and Work Area Obstructions	• Wear proper PPE: – Safety toe boots – ANSI Z87.1 rated safety glasses – Cut-resistant gloves (ANSI A4 or greater) • Utilize proper lifting techniques or assisted lifting techniques/equipment. • Never attempt to manually lift a plow into place or manipulate plow position by hand. • Always ensure vehicle is in Park with parking brake set prior to attempting to connect plow. • Utilize a jack to position plow in place for attachment. • Always perform a pre-use inspection of the jack equipment and ensure weight rating is adequate for the plow. • Never place any part of the body between two solid surfaces where a pinch or crush may occur. • When placing securement pins, do not force pins or attempt to place fingers in the pin hole. • Perform regular housekeeping in the work area to remove liquids, ice, snow, and other work area obstructions.

Plowing Snow

Description:
TDOT worker plowing snow off roadways with accumulation of snow >1/4".

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage from Strike in Inclement Weather Conditions • Equipment Damage from Plow Contact with Roadway • Overhead Strike with Bridge or Other Overhead Hazard • Weather Concerns /Cold Stress	• Always operate vehicles in a defensive manner yielding to other vehicles. • Always activate light package during vehicle operations to alert other motorist of presence and reduced speed. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode. • Increase following distance from vehicles in inclement weather. • Decrease speed in inclement weather. • Be aware of roadway obstructions and changes in roadway elevation when performing plowing tasks. • Be aware of stranded motorists or accident debris during plowing tasks. • Never operate vehicle if roadway cannot be observed due to excessive snowfall or extremely reduced visibility. • Always ensure that if truck bed is raised adequate clearance is maintained between overhead bridges, highway signage, power lines, and other obstructions. Avoid operating with truck bed raised when possible. • Tailor clothing choices to anticipated weather conditions such as insulated clothing for cold weather.

CULVERT/DRAINAGE REPAIR

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 7/25/2023 | Last Revision: 7/25/2023

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic.

- Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available).
- Call the TN Auto Accident Call Center at (855)-253-0629
- Notify direct supervision of incident and initiate an incident report.
- Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Strain, Sprain, or Bone Fracture While Exiting Vehicle

Controls (How I keep from getting hurt?)

- If possible, perform survey or job from within vehicle. Only exit if necessary.
- Avoid pulling off of the roadway or exiting the vehicle in low-light conditions.
- Contact the work zone supervisor prior to the visit to establish communication.
- Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder.
- Avoid pulling into an unprotected median or on the left side shoulder unless there is no other option.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off.
- Communicate pull-off maneuver with turn signals well in advance of move.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. Never leave the vehicle running when not attended.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards.
- Avoid jumping down from high ground clearance vehicles.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

Culvert repair within Culvert

Description:
Roadway repair personnel may be required to work inside of culvert for repairs

Hazards (How can I get hurt?)

- Asphyxiation from Hazardous Gases inside Culvert (if Confined Space)
- Entrapment or Engulfment inside Culvert (if Confined Space)
- Crush from Collapse due to Structural Instability
- Slips, Trips, and Falls Due to Unstable Terrain or Low Light Conditions
- Falling Objects Such as Tools or Construction Materials
- Strains/Sprains from Awkward Posture.
- Restricted movement and Poor Visibility Challenges Access to Exit in Case of an Emergency
- Exposure to Hazardous Substances/ Chemicals from Illegal Dumping or Industrial Sources
- Sharp Edges, Protruding Objects, or Debris Can Lead to Cuts, Bruises, or Other Injuries
- Sting or Bite from Insect or Animal
- Hazardous Exposure to Grout, Cementitious Materials, Geotextiles, etc.

Controls (How I keep from getting hurt?)

- Any confined space entry must comply requires adherence to the confined space program and along with training prior to entry.
- OHS-012 Confined Space Entry Program
- Wear proper PPE:
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
  - Cut-resistant gloves (ANSI A4 or greater)
  - Hard Hat
- Never attempt to enter a drainage pipe of 5 feet or less in diameter.
- Never attempt to weld, torch cut, or perform other hot work inside a restricted culvert.
- Always perform a visual inspection of culvert prior to entry to inspect for standing water, major culvert damage, obstructions which may shift, large areas of mud, or other potential entrapment or engulfment hazards.
  - OHS-004 Trenching and Excavation Program
- Always take a flashlight or other external lighting when entering culverts with limited lighting.
- Ensure all overhead objects such as debris and tools are removed to prevent the potential of overhead falling objects.
- Conduct a site assessment to evaluate soil/rock stability in the area.
- Always plan an escape route and have an emergency plan.
- Reduce time spent bending/stooping.
- Inspect culvert for hazardous materials or other substances which could cause harm.
- Avoid any metal debris, protruding rebar, or other sharp objects.
- Inspect area for stinging or biting insects/animals prior to entry. Avoid contacting insects/animals.
- Always review the applicable chemical SDS and application method prior to working with a product.
- Avoid mixing or unnecessary handling of material inside a culvert.
- Only mix the proper amount and reduce quantity of material stored in culvert.
- Any flammable material use in a culvert requires a fire extinguisher.
- Follow all applicable confined space program/permit processes.

Removal and Placement of Culvert Pipe and Materials

Description:
Removal of damaged culvert pipe and materials along with placement of new culvert material.

Hazards (How can I get hurt?)

- Slips, Trips, and Falls from Uneven Ground or Debris
- Crush from Dropped Load
- Struck by Heavy Equipment
- Pinch by Rigging/Material
- Lacerations from Sharp Objects
- Falls from Height (>4')
- Contact from Flying Debris
- Contact with Underground Utilities
- Contact with Overhead Utilities

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
  - Cut-resistant gloves (ANSI A4 or greater)
  - Hard hat
- Only properly trained personnel may operate heavy equipment.
- Only properly trained and qualified personnel may perform hoisting and rigging operations.
- Maintain all guards and safety features on equipment.
- Always perform a pre-use inspection before operating heavy equipment.
- Do not operate equipment with defective or damaged safety systems.
- Demarcate heavy equipment operation area to ensure personnel are not working or traveling in equipment travel areas.
- Maintain communication with pedestrians and other equipment operators at all times.
- When possible, stay in the equipment cab and avoid walking the work area on foot.
- Operate heavy equipment with the doors and windows closed to reduce the amount of debris, dust, and noise in the cab.
- Personnel may voluntarily use dust masks in dusty environments.
  - TDOT VOLUNTARY RESPIRATOR USE GUIDELINES
- Ensure hoisting and rigging materials are properly rated for the object, configured properly to maintain a stable load, and not damaged.
- Never approach a suspended load, place hands on the load to guide, or walk underneath load.
- Avoid the travel path of suspended loads to ensure the line of fire is avoided.
- Never attempt to touch the rigging or load during the initial lift of material as the tightening of the rigging material may pinch or crush hands/feet.
- Ensure utilities have been surveyed and marked for the planned work area prior to performing any excavation activities.
- Ensure equipment is in the off and secured position prior to attempting any basic service (checking filters, fluid levels, etc.).
- Survey work area for overhead utilities. Do not operate heavy equipment near overhead utilities.
- Locate utilities (Tennessee 811) prior to any excavation.

Installation of Filler Material and Final Site Preparation

Description:
Use of heavy equipment to install filler material to allow for proper sloping, paving, etc.

Hazards (How can I get hurt?)

- Contact with Underground Utilities
- Contact with Overhead Utilities
- Struck by Heavy Equipment
- Slips, Trips, and Falls from Uneven Ground or Debris
- Inhalation of Respirable Dust from Gravel, Roadway Repair Components, etc.
- Contact from Flying Debris
- Potential asphyxiation from Hazardous Gases inside Culvert (if Confined Space) - Vibratory Plate Compactor

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Safety toe boots
  - High visibility vest/shirt (class 3)
  - ANSI Z87.1 rated safety glasses
  - Cut-resistant gloves (ANSI A4 or greater)
  - Hard hat
- Ensure utilities have been surveyed and marked for the planned work area prior to performing any excavation activities.
- Ensure equipment is in the off and secured position prior to attempting any basic service (checking filters, fluid levels, etc.).
- Always perform a pre-use inspection before operating heavy equipment.
- Do not operate equipment with defective or damaged safety systems.
- Survey work area for overhead utilities. Do not operate heavy equipment near overhead utilities.
- Only properly trained personnel may operate heavy equipment.
- Maintain all guards and safety features on equipment.
- Always perform a pre-use inspection before operating heavy equipment.
- Do not operate equipment with defective or damaged safety systems.
- Demarcate heavy equipment operation area to ensure personnel are not working or traveling in equipment travel areas.
- Ensure all support drivers and personnel remain at a safe distance and in a protected cab at all times during heavy equipment operations.
- Maintain communication with pedestrians and other equipment operators at all times.
- When possible, stay in the equipment cab and avoid walking the work area on foot.
- Operate heavy equipment with the doors and windows closed to reduce the amount of debris, dust, and noise in the cab.
- Do not operate trucks, generators, plate compactors, or other fuel-driven motors during confined space operations as carbon monoxide may build up in culvert.
- Personnel may voluntarily use dust masks in dusty environments.
  - TDOT VOLUNTARY RESPIRATOR USE GUIDELINES

JOB SAFETY ASSESSMENTS

HIGHWAY MARKING

SUMMARY OF HIGHWAY MARKING

The TDOT Highway Marking Group is responsible for various tasks related to the installation, maintenance, and management of highway markings on roadways within the state of Tennessee. Highway markings include lines, symbols, arrows, and other visual cues painted on the road surface to guide and inform drivers, improve traffic flow, and enhance road safety. The key responsibilities and activities that the TDOT Highway Marking Group include painting road markings, installing reflective markings, installing roadway signs, removing damaged roadway signs, performing maintenance on roadway signs, and fabricating roadway signs.

TOP 5 HAZARDS

1. Contact with Vehicles / Traffic
2. Dropped Loads
3. Laceration from Sharp Edges
4. Pinch / Crush from Hand Tool
5. Soft Tissue Injury from Lifting

OHS SHAREPOINT

STANDARD PPE FOR GENERAL HIGHWAY MARKING

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-003 Facility Lockout Tagout Program
- OHS-006 Personal Fall Protection Systems
- OHS-007 Powered Industrial Truck Operation Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- OHS-010 Hot Work Program
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)
- Memorandum - Lane Crossing
- TTC Inside Shoulder

RELATED PROGRAMS AND REFERENCES

- TDOT Work Zone Field Manual

Print Section

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629 • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Entering Active Work Zone, Parking Vehicle, and Exiting Vehicle

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, work zone, or other TDOT worksite.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway or exiting the vehicle in low-light conditions. • Contact the work zone supervisor prior to the visit to establish communication. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder unless there is no other option. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off. • Communicate pull-off maneuver with turn signals well in advance of move. • Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • Never leave the vehicle running when not attended. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot. • Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle. • Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards. • Avoid jumping down from high ground clearance vehicles. • Wear proper PPE: – High visibility vest (class 3) • Once out of the vehicle, remain away from the road or behind solid obstructions. • Do not attempt to cross lanes of an active roadway.

Operating Paint Trucks for Highway Marking

Description:
Operation of paint trucks for applying highway marking paint to state routes.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Falls from Height (>4’)	• Always wear proper vehicle safety equipment when operating paint truck. • Never attempt to stand or walk on equipment while moving. • Do not attempt to exit or enter vehicle while moving. • Ensure that personnel are in contact and the vehicle is in park with the park brake set prior to entering/exiting vehicle operating positions. • Maintain constant communication with other members of highway marking crew.

- Heat and Cold Stress
- UV Radiation Exposure

- Ensure traffic protection systems are in place during highway marking activities.
- Always use vehicle access ladders and other approved access point to enter/exit vehicle work positions.
- Wear proper clothing for the weather conditions.
- Utilize sunscreen and shade to avoid exposure to direct sunlight during work operations.

STEP Performing Basic, Regular Paint Truck Maintenance

Description:
Performing basic maintenance on paint trucks including material refill, cleaning, consumable service, and basic repair.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Chemical Exposure to Marking Paint
• Ergonomic Strain from Lifting Heavy Items
• Dropped Objects
• Falls from Height (>4')
• Exposure to Pressurized Hoses/Fittings
• Contact/Puncture/Laceration from Slipped or Broken Tool
• Awkward Posture – Soft-Tissue Injury
• Crush from Unintended Vehicle Movement
	• Review SDS for marking paint prior to handling.
	• Avoid contact with skin, eyes, and/or mouth.
	• Avoid inhalation of marking paint fumes and only clean equipment or load paint tanks in a well-ventilated area.
	• When not in use, marking paint should be secured in the closed position away from ignition sources.
	• Always select the proper tool for the job.
	• Always ensure that the tool is properly seated and adequate leverage is applied to tool.
	• Ensure all hand and power tools are inspected prior to use.
	• Always review and reference the operator's manual prior to use.
	• Wear proper PPE:
	  – Safety glasses
	  – Safety toe boots
	  – Face shield
	  – Cut-resistant gloves (ANSI A4 or higher)
	• Anticipate the potential failure path of the tool and position the body outside of the potential failure path (stay out of the line of fire).
	• Know the weight of parts prior to attempting a lift.
	• Utilize proper lifting techniques or assisted lifting techniques/equipment.
	• Ensure vehicle is in Park with parking brake secured prior to beginning any service.
	• Avoid contact with hydraulic oils and other chemicals.
	• Ensure hydraulic systems are without pressure prior to beginning service. Confirm on gauge and ensure no check or accumulator valves are in use.
	• Review the SDS for the hydraulic oil chemical prior to interaction.

STEP Performing Hand-Marking and Preformed Materials Application

Description:
Custom and complex road marking application using thermoplastic sign templates and propane torch.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Burns from Operating Propane Torch and Hot Materials	• Only authorized personnel may operate propane torch. • Always read manufacturer's instructions prior to operating torch. • Wear proper PPE:

- Explosion from Propane Torch
- Chemical Exposure from Propane Torch and Thermoplastic Marking Material

  - ANSI Z87.1 rated safety glasses
  - Safety toe boots
  - Heat resistant gloves
- Perform a pre-use inspection of torch connections, cylinder, and nozzle prior to each use.
- Always ensure that propane cylinder is in the off position when not in use.
- Keep connections, nozzle, and other portions of the torch free of dirt, debris, and other foreign objects at all times.
- If damage is identified or suspected to equipment do not use.
- Always store propane cylinder in a cool area free of high heat, direct sunlight, and ignition sources.
- Torch surfaces are hot during and after use. Never contact equipment until cooled to 140 degrees F or lower.
- Keep combustibles away from torch during operation.
  - OHS-010 Hot Work Program
- Never point torch at body or another person.
- Ensure all connections are tight and no leaks are present.
- Only operate propane torch in a well ventilated area to avoid propane, carbon monoxide, and other potentially hazardous gases.

SIGN FABRICATION

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 8/29/2023 | Last Revision: 8/29/2023

STEP Operation of Sign Printer and Laminator

Description:
Operation of reflective sign material printer and accompanying laminator to create roadways signs of various size and complexity.

Hazards (How can I get hurt?)

- Ergonomic – Repetitive Motion Injuries, Muscle Strain, Soft-Tissue Injuries from manual lifting
- Physical hazards from the printing and laminating machine and equipment (e.g., pinch points, moving parts, sharp edges)
- Slips, Trips, and Falls
- Exposure to harmful chemical (toner/ink)
- Thermal hazards
- Fire Hazards due to flammable materials (e.g., inks, paper)
- Noise exposure from printing machinery
- Indoor Air Quality Hazards

Controls (How I keep from getting hurt?)

- Use ergonomic aids mechanical lifting devices such as pallet jacks.
- Never attempt to lift items greater than 40 pounds.
- Ensure the printing machine has safety guards and interlocks in place.
- Never attempt to put hands near rollers or other moving equipment during operation.
- Never attempt to bypass or modify equipment safety systems.
- Use personal protective equipment (PPE) such as cut resistant gloves and safety glasses.
- Keep work areas clear of debris.
- Perform regular housekeeping and avoid storing items on the ground which may create a trip hazard.
- Store chemicals properly in labeled containers and well-ventilated areas.
- Use less toxic or environmentally friendly inks when possible.
- Clean up spills immediately.
- Never attempt to operate faulty electrical equipment or overload circuits.
- Use heat-resistant gloves when handling hot equipment or materials or allow equipment to cool sufficiently prior to handling (<120F).
- Provide adequate ventilation to dissipate heat.
- Be familiar with the facility evacuation route, fire extinguisher locations, and alarm sounds.
- Wear hearing protection during sign prints while near machinery.

- Implement engineering controls to reduce noise levels.
- Ensure proper ventilation in the sign shop to minimize airborne contaminants.
- Use low-VOC (volatile organic compound) inks and cleaning agents.

Fabrication or Modification of Sign Blanks

Description:
Modification of metal sheeting to create sign blanks for rigidity and mounting of printed sign material.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Laceration/Crush from Shear • Entanglement from Drill Press • Crush Hazard from Jaws or Clamps • Dropped Objects • Laceration from Sharp Edges • Part Ejection	• Wear proper PPE: – ANSI Z87.1 rated safety glasses – Safety toe boots – Cut resistant gloves (ANSI A4 or greater) when handling sharp objects • Only qualified persons may operate machine shop equipment. • Review the equipment operating manual and accompanying literature prior to initial use. Literature should be accessible to all operators. • Always ensure machinery is used as intended. Never attempt to perform a task for which the machine was not designed for. • Do not attempt to perform maintenance on equipment other than routine part changes, oiling, belt changes, etc. • Ensure that all machine guards are in place during operation and being properly used. If guarding is removed machine should be under LOTO. • Always keep hands are other parts of the body out of the line of fire and/or point of operation. • Secure loose clothing and long hair prior to machine operation. • Ensure all parts are secured to avoid part ejection. • Treat all sign blanks as sharp and handle with cut-resistant gloves on.

SIGN INSTALLATION AND REMOVAL

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 8/29/2023 | Last Revision: 9/5/2023

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver.

- Always wear a seat belt when operating or riding in a vehicle.
- Follow all traffic laws while operating vehicle.
- Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist.
- Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629. • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If entering or working in a TDOT WORK ZONE refer to the JSA: – VEHICLE OPERATIONS – WORK ZONE VISITS • If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway in low-light conditions. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off.

- Communicate pull-off maneuver with turn signals well in advance of move.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

Sign Removal, Cleanup, and Demolition

Description:
Removal of road signs, cleanup after accidents or natural disasters, and demolition of damaged sign components.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Lacerations from Sharp Sign or Metal Edges
- Slip, Trip, Fall Hazards from Uneven Terrain
- Dropped Loads for Hoisting / Rigging
- Contact / Crush from Mobile Equipment
- Flying Objects

Controls (How I keep from getting hurt?)

- Always follow traffic control plan.
- Ensure a crash truck is in use for roadways with speeds >40mph.
- Wear proper PPE:
  - ANSI Z87.1 rated safety glasses
  - Safety toe boots
  - High visibility vest (class 3)
  - Cut-resistant gloves (ANSI A4 or greater)
- Clear work area of debris and avoid working on steep slopes when possible.
- Never work within 10’ of a fall from height (>4’) without proper fall protection systems.
- Only qualified and trained operators should attempt hoisting and rigging operations.
- Always clear the drop zone or shadow of the load when hoisting materials.
- Always use properly inspected and equipment in good condition for rigging.
- Evacuate non-essential personnel from work area during mobile equipment and hoisting operations.
- Never attempt to approach or touch mobile equipment or materials being hoisted. If materials being hoisted must be guided use a tagline.

Installation of Flat Sheet Signs and Support

Description:
Installation of small roadside flat sheet signs and accompanying support systems.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Lacerations from Sharp Sign or Metal Edges
- Slip, Trip, Fall Hazards from Uneven Terrain
- Pinch/Crush from Operating Hydraulic Driver
- Contact from Kickback or Recoil from Hydraulic Driver
- Pressurized Hydraulic Systems
- High Noise (>85dBA)
- Contact with Underground Utilities

Controls (How I keep from getting hurt?)

- Always follow traffic control plan.
- Ensure a crash truck is in use for roadways with speeds >40mph.
- Wear proper PPE:
  - ANSI Z87.1 rated safety glasses
  - Safety toe boots
  - High visibility vest (class 3)
  - Cut-resistant gloves (ANSI A4 or greater)
- Never attempt to use a truck bed as an elevated work surface. Do not attempt to place a ladder on the truck bed for working at height.
- Clear work area of debris and avoid working on steep slopes when possible.
- Never work within 10’ of a fall from height (>4’) without proper fall protection systems.
- When using a ladder, ensure proper footing and flat, stable ground.
- Always select the proper ladder for the job and never work on the top step.
- Maintain 3 points of contact when on a ladder.
- Always read operator manual prior to operating hydraulic post driver.
- Always perform a pre-use inspection on hydraulic post driver components prior to each use.
- Wear additional PPE when operating hydraulic post driver:
- Hearing protection
- Maintain a firm grip on the hydraulic post driver while in use.
- Keep hands and fingers out of the line of fire while operating hydraulic post driver.
- Remove debris such as rocks and other foreign objects to reduce the likelihood of debris ejection.
- Always survey area new areas prior to driving signage supports into ground to prevent contact with underground utilities.

Installation of Panel Signs and Supports

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Lacerations from Sharp Sign or Metal Edges
- Slip, Trip, Fall Hazards from Uneven Terrain
- High Noise (>85dBA)

Controls (How I keep from getting hurt?)

- Always follow traffic control plan.
- Ensure a crash truck is in use for roadways with speeds >40mph.
- Wear proper PPE:
  - ANSI Z87.1 rated safety glasses
  - Safety toe boots
  - High visibility vest (class 3)
  - Cut-resistant gloves (ANSI A4 or greater)

- Contact with Underground Utilities
- Flying Debris
- Prolonged Vibration from Jackhammer Use
- Respirable Dust / Silica Exposure
- Ergonomic Strain
- Pinch / Crush Hazard from Jackhammer
- Dropped Loads for Hoisting / Rigging
- Contact / Crush from Mobile Equipment
- Entanglement in Mobile Equipment Auger Attachment

- Only properly trained personnel may operate specialized equipment such as bucket trucks, etc. Always utilize fall arrest system in a bucket truck.
- Clear work area of debris and avoid working on steep slopes when possible.
- Never work within 10' of a fall from height (>4') without proper fall protection systems.
- Always read operator manual prior to operating jackhammer.
- Wear additional PPE when operating jackhammer:
  - Anti-vibration gloves
  - Hearing protection
- Always perform a pre-use inspection on jackhammer prior to each use.
- Maintain a firm grip on the jackhammer while in use.
- Take breaks and switch operators when jackhammering to reduce hand-arm vibration symptoms.
- Remove debris such as rocks and other foreign objects to reduce the likelihood of debris ejection. Regularly clean area being jackhammered to have a clean work surface.
- When jackhammering concrete or silica-containing materials always use wet methods to reduce airborne dust.
- Regularly reposition and rotate operators to reduce ergonomic strain when operating jackhammer.
- Always survey area new areas prior to breaching ground with auger or jackhammer to prevent contact with underground utilities.
- Never attempt to place any part of the body between the jackhammer components and a solid surface.
- Only qualified and trained operators should attempt hoisting and rigging operations.
- Always clear the drop zone or shadow of the load when hoisting materials.
- Always use properly inspected and equipment in good condition for rigging.
- Evacuate non-essential personnel from work area during mobile equipment and hoisting operations.
- Never attempt to approach or touch mobile equipment or materials being hoisted. If materials being hoisted must be guided use a tagline.

TN TDOT Department of Transportation

work 4 us

JOB SAFETY ASSESSMENTS

INCIDENT MANAGEMENT

SUMMARY OF INCIDENT MANAGEMENT

The goal of the Office of Incident Management is to maintain a strategy and provide a foundation for a cost-effective, statewide program to ensure incident responders in Tennessee have been trained in the 'best practices' of traffic incident management and emergency transportation operations. "Quick Clearance" is a phrase used by TDOT to express the objective of traffic incident management. The costs of traffic incidents (e.g., secondary crashes, wasted time and fuel, hazards for responders) are directly related to the time required to manage the incident and return the roadway to normal conditions. Keeping a roadway closed for an additional 15 minutes can easily cause the congestion and backup, and any related problems, to last for another hour or more. While quick clearance is a important to TDOT, it is not more important than safety for responders or motorists or more important than a thorough investigation (if necessary). Through incident management, TDOT looks for opportunities to restore as much of the capacity of the roadway as possible as soon as possible in order to reduce delay costs for highway users, improve responder safety, and reduce the number of secondary crashes due to a traffic queue or rubbernecking at the scene. For traffic incident management to be effective, TDOT must rely on partnerships with local agencies and personnel including troopers, police officers, sheriffs' deputies, firefighters, rescue squad members, EMTs, towing and recovery operators, public works and highway officials. This partnership is largely dependent on education, as discussed at the Tennessee Highway Safety & Operations Conference and as is currently available through the Tennessee Traffic Incident Management Training Facility.

TOP 5 HAZARDS

1. Contact with Vehicles / Traffic
2. Lacerations from Roadway Incident Debris
3. Contact with Hostile/Injured Public Members
4. Chemical Exposure from Roadway Spills
5. Walking / Working Surfaces – Slips, trips, falls

OHS SHAREPOINT

STANDARD PPE FOR GENERAL INCIDENT MANAGEMENT

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- OHS-010 Hot Work Program
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)

RELATED PROGRAMS AND REFERENCES

- Work Zone Field Manual (Incident Management Section)
- Manual on Uniform Traffic Control Devices (MUTCD)

OPERATING HELP TRUCK

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 7/19/2023 | Last Revision: 9/19/2023

Print Section

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. • OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629. • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway or ROW to perform various tasks including traffic control.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle • Slips, Trips, or Falls Due to Uneven Terrain or Slippery Surfaces	• If entering or working in a TDOT WORK ZONE refer to the JSA: – VEHICLE OPERATIONS – WORK ZONE VISITS • If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway in low-light conditions. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • Initiate light package and signal board upon initiating stop. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot. • Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle. • Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls. • Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting. • Wear proper PPE: – High visibility vest (class 3) • Once out of the vehicle, remain away from the road or behind solid obstructions. • Do not attempt to cross lanes of an active roadway.

Assisting Disabled Vehicles with Tire Repairs, Adding Fluids, and Other Minor Vehicle Maintenance

Description:
TDOT HELP operators may encounter stranded motorists requiring minor maintenance. HELP operators are not to attempt major vehicle maintenance or towing.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Unstable Ground Surface Increases the Risk of The Vehicle Falling Off the Jack	• Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • Initiate light package and signal board upon initiating stop. • Wear proper PPE: – High visibility vest (class 3) – Safety toe boots – ANSI Z87.1 rated safety glasses

- Injury or Death from Vehicle Crushing Due to Jack Failure
- Reduced Visibility During Low Light Conditions Increases Chance of Accidents
- Overinflating Tires Causing Tire Explosion
- Electric Shock or Fire from Mishandling Battery
- Exposure to Vehicle Fluid Chemicals
- Burns from Hot Parts
- Confrontation with Public Persons

- Always maintain an active view of oncoming traffic.
- Never attempt to jack or raise a vehicle without proper jack support (i.e. solid ground or outrigger/jack pad.
- Never attempt to jack or raise a vehicle on a slope.
- Ensure that the vehicle being jacked or raised is in Park/gear with the parking brake set.
- Always use a jack stand when using a jack as a backup precaution in case of jack failure.
- When operating at night, engage vehicle light package to illuminate work area.
- Always inspect tires before attempting inflation for damage. Do not attempt to inflate damaged tires.
- When inflating, stand to the side of the tire in case of explosion.
- Never fill a tire past the recommended inflation rating for that specific tire.
- When performing vehicle battery jump, only use approved battery jump starter.
- Inspect vehicle battery prior to attempting jump for damage or heavy corrosion. Do not attempt jump if battery is damaged.
- Always read instruction manual and confirm battery jump system is connected correctly.
- Never store equipment or tools near battery which may cause a connection between the battery terminal posts.
- Only use TDOT-approved vehicle fluids.
- Avoid contact with eyes, skin, and mouth during vehicle fluid addition.
- If fluid gets on skin wash affected area with soap and water immediately.
- Avoid touching exposed engine or exhaust parts as they may be hot.
- Assume a neutral disposition with public persons.
- Always avoid confrontation with the public and always maintain a distance of 6’ or greater from unknown persons.
- If a confrontation or argument occurs exit the area immediately without turning your back on the person and notify the authorities.

Crash and Highway Incident Support to Include Highway Spills

Description:
TDOT HELP personnel may provide support to local emergency response services for highway incidents including crashes, spills, and other incidents.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury from Fuel Leaks, Vehicle Chemicals, and/or Vehicle Explosions
- Health and Environmental Risks from Leaks or Spills from Vehicles Transporting Hazardous Materials
- Unstable Vehicles Rolling or Collapsing Causing Harm to Responders
- Laceration from Crash Debris

Controls (How I keep from getting hurt?)

- Initiate light package and signal board upon initiating stop.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Wear proper PPE:
  - Safety toe boots
  - ANSI Z87.1 rated safety glasses
  - High visibility vest (class 3)
  - Cut resistant gloves (ANSI A6 or greater) if handling crash debris
- Never operate a crash scene alone. Always ensure first responders and other qualified personnel are onsite to manage the emergency.

- Unpredictable Behavior from Injured Individuals Involved in the Crash if Disoriented, Confused, or in Shock Can Pose Risks to Responders
- Exposure to Bloodborne Pathogens During Material and Debris Handling Increases Risk to Transmit Disease
- Confrontation with Public Persons

- Avoid handling crash debris by hand and use a broom, shovel, or other similar tool to move debris.
- Control vehicle fluid leak ONLY if possible to be performed in a safe manner.
- If fuel leak, fire, or hazardous material condition exists evacuate the area to a safe distance.
- Never stand downwind from a suspected hazardous materials spill.
- Never attempt to approach unstable vehicles or crash debris.
- Always assume a calm, but defensive manner with public persons. If confrontation arises contact Highway Patrol and exit the danger area.
- Never attempt to handle or clean blood or other body fluids from a crash scene.
- Do not touch or contact persons with bodily fluids exposed.
- Evaluate a crash scene with first responders to determine if the vehicles are potentially unstable and may shift causing a crush or pin situation.
- Never approach a vehicle or accident that has the potential to shift or move unexpectedly.

Torch Cutting Vehicle Extrication Support

Description:
Select TDOT HELP personnel may provide vehicle extrication support to local emergency services.

Hazards (How can I get hurt?)

- Burns from Torch Tip and Hot Parts
- Burns from Torch Flashback
- Ultraviolet Radiation Exposure to Skin and Eyes
- Explosions From Gas Cylinder Damage/Tip Over
- Explosions from Vehicle Fuel Ignition
- Air Contaminants – Metal Fume
- Air Contaminants – Carbon Monoxide
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris

Controls (How I keep from getting hurt?)

- If entering or working in a TDOT WORK ZONE refer to the JSA:
- VEHICLE OPERATIONS – WORK ZONE VISITS
- Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- If parked within a work zone, position vehicle in front of vehicle(s) equipped with a standard lighting package.
- Initiate light package and signal board upon initiating stop.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Wear proper PPE.
  - ANSI Z87.1 rated safety glasses
  - Safety toe boots
  - Flame retardant jacket
  - Welding gloves
  - Shaded face shield (shade 5 minimum)
  - Long sleeve shirt and paints (FR or 100% cotton)
  - High visibility vest (class 3)
- Only experienced operators should perform torch cutting activities.
- Ensure a 20lb fire extinguisher is in good working order and available in the immediate vicinity at all times.
- Ensure a fire watch is present during and after all torch cutting activities. Fire watch should remain and watch area for 30 minutes after cutting.
- Inspect the vehicle for leaking fuels or other flammable materials that may cause further harm or explosion.
- Remove all combustible materials (including exposed fuels) within 35’ of torch cutting activities.

- Always ensure that compressed gas cylinders are properly secured.
- Ensure that gas connections are compatible and in good working order.
- Perform a pre-use inspection of all equipment prior to use.
- Assume all torch tip parts and materials being cut are hot. Do not touch without welding gloves on.
- Prior to the cut, evaluate the cut plan to ensure material will fall away from operator when cut free.
- Ensure torch tip is free of debris and obstructions. Clean before each use.
- Ensure a flashback arrestor is equipped on the torch.
- Evaluate where slag and sparks will travel during cutting operations. Avoid contact with personnel, fuels, or combustibles during cutting.

Winch Operation and Vehicle Repositioning with TDOT HELP Truck

Description:
TDOT HELP trucks may operate a truck-mounted winch to position vehicles involved in a motor vehicle accident.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Slips, trips, or Falls Due to Uneven Terrain or Slippery Surfaces
- Injury or Death from Motor Vehicle Accident.
- Cuts from sharps and broken glass
- Excessive Tension to the Winch Cables or Straps Can Lead to Cable Snapping Causing Severe Injury
- Hand Injuries or Pinches When Handling Winch Cables or Straps
- Vehicle Instability Due to Unsecure Anchor Points for the Winch Cable or Strap That May Detach During the Tow
- Potential Collisions or Injuries from Unexpected Vehicle Movement Due Winching Process Control Failure

Controls (How I keep from getting hurt?)

- Avoid pulling into an unprotected median or on the left side shoulder.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- If parked within a work zone, position vehicle in front of vehicle(s) equipped with a standard lighting package.
- Initiate light package and signal board upon initiating stop.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Wear proper PPE:
  - High visibility vest (class 3)
  - Cut-resistant gloves (ANSI A4 or greater)
- Clear work area of crash debris, glass, etc. prior to beginning work.
- Avoid handling crash debris and use a broom, shovel, or similar tool to handle crash debris.
- Be familiar with the winch operation and limitations prior to operating.
- Know the capacity of the winch and the weight of the object being winched.
- Entanglement, slopes, mud, and other obstructions will create increased strain on the winch cable increasing the chance of familiar.
- Select a solid winch point for the vehicle or object (frame, etc.) attachment point.
- Never attempt to winch an object down a hill. Always lower an object to reduce the chance of runaway.
- Always predict the path of the object during winching to ensure control is maintained at all times.
- Never attempt to maneuver or touch a winch cable during winching or while taught.

Lane Blade Operation for Debris Removal

Description:
The lane blade is a lane clearing device used to remove material from roadways without exiting the vehicle.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident	• Always inspect lane blade prior to each use to ensure correct operation. • Never attempt to stop in the roadway when removing roadway debris using the lane blade. • Always utilize a follow vehicle to provide additional traffic control while debris clearing at a reduced speed. • Initiate light package and signal board when performing lane clearing. • Survey road debris prior to removal to ensure that material is compatible with the lane blade.

Providing Emergency Medical Services

Description:
TDOT HELP truck operators are first aid/CPR trained to provide emergency medical services if needed.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Unpredictable Behavior from Injured Individuals Involved in the Crash if Disoriented, Confused, or In Shock Can Pose Risks to Responders
• Exposure to Bloodborne Pathogens During Material and Debris Handling Increases Risk to Transmit Disease
• Pinch or Crush from Vehicle Instability
• Exposure to Illicit Substances
• Confrontation with Public Persons
	• Wear proper PPE:
	  – High visibility vest (class 3)
	  – Nitrile exam gloves
	• Never attempt to approach unstable vehicles or crash debris.
	• Always assume a calm, but defensive manner with public persons. If confrontation arises contact Highway Patrol and exit the danger area.
	• Never attempt to handle or clean blood or other body fluids from a crash scene.
	• Do not touch or contact persons with bodily fluids exposed without proper barrier protection.
	• Evaluate a crash scene with first responders to determine if the vehicles are potentially unstable and may shift causing a crush or pin situation.
	• Never approach a vehicle or accident that has the potential to shift or move unexpectedly.
	• Know the limitations of your medical training and never attempt to perform medical services outside current training level.
	• Be familiar with TDOT Incident Management medical protocols.
	• Always yield to emergency medical service personnel.
	• Assume a neutral disposition with public persons.
	• Always avoid confrontation with the public and always maintain a distance of 6′ or greater from unknown persons.
	• If a confrontation or argument occurs exit the area immediately without turning your back on the person and notify the authorities.

JOB SAFETY ASSESSMENTS

HEADQUARTERS PRINT SHOP

SUMMARY OF HEADQUARTERS PRINT SHOP

The Tennessee Department of Transportation (TDOT) Print Shop is responsible for providing printing and duplicating services for various materials, documents, and publications used by the department. These services are essential for facilitating the department's internal operations, communications, and the fulfillment of its public responsibilities. The Print Shop is also responsible for document management services for TDOT. A wide variety of industrial print, scanning, and publication equipment is available to the Print Shop.

TOP 5 HAZARDS

1. Ergonomic Hazards from Lifting Materials
2. Ergonomic Hazards from Bending/Stooping
3. Slip, Trip, Falls
4. Exposure to Hazardous Machine Components
5. Exposure to Print Inks and Other Chemicals

OHS SHAREPOINT

STANDARD PPE FOR GENERAL JAMES K. POLK BUILDING (JKP) PRINT SHOP

APPLICABLE TDOT OHS PROGRAMS

- OHS-002 Hazard Communication Program
- OHS-007 Powered Industrial Trucks
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- 305-01 PPE Policy
- Emergency Action Plans (EAPs)

RELATED PROGRAMS AND REFERENCES

- Computer Workstation Ergo Self Assessment Checklist

Print Section

Equipment Receiving, Loading, Unloading, and Shipping

Description:
Equipment receiving and shipping operations to include operation of an electric pallet jack and unpacking boxes.

Hazards (How can I get hurt?)

- Ergonomic – Repetitive Motion Injuries, Muscle Strain, Soft-Tissue Injuries
- Slips, Trips, and Falls from Poor Housekeeping or Cluttered Work Areas
- Lacerations from Use of Box Cutter/Razor Knife
- Crush from Electric Pallet Jack
- Crush from Adjustable Height Loading Dock

Controls (How I keep from getting hurt?)

- Use proper lifting technique when lifting, loading, unloading, and transferring equipment.
- Never attempt to lift items greater than 40 pounds (this may decrease depending on your physical abilities- get help from a co-worker).
- Any large, awkward, or heavy items should be moved using mechanical means (e.g. large curve monitors, UPS, etc.).
- Perform regular housekeeping and avoid storing items on the ground which may create a trip hazard.
- Inspect the travel path prior to travel. Remove and avoid obstructions in walkway.
- Use mechanical lifting devices or team lifts when possible to move material.
- When possible, use an alternative box opening tool to the box cutter/razor knife.
- Wear proper PPE when using a box cutter/razor knife:
  - Cut-resistant gloves (ANSI A5 or higher)
- When operating a box cutter/razor knife, always cut away from the body.
- Maintain a sharp blade on box cutter/razor knives.
- Read instruction manual for electric pallet jack prior to use.
- When operating a pallet jack, wear proper PPE:
  - Safety toe boots
- Always keep feet away from pallet jack wheels and forks.
- Always secure pallet jack when not in use to prevent runaway.
- Never attempt to take a pallet jack up or down a slope of greater than 5 degrees.
- Prior to using adjustable height loading dock ensure owner's manual, training, or orientation has been performed.
- Never place any part of the body between the loading dock and a solid surface to prevent a crush hazard.
- Know the capacity limits of the adjustable height loading dock and do not exceed.
- Always perform a pre-use inspection on adjustable height loading dock device prior to each use.

Local Deliveries of Shipped Materials

Description:
Local building deliveries of paper and other similar office supplies.

Hazards (How can I get hurt?)

- Slips, Trips, and Falls – Floor Obstructions, Boxes, Packaging, etc.

Controls (How I keep from getting hurt?)

- Always remove non-essential equipment and materials from the work area prior to beginning work loading, unloading, or delivering materials.
- Perform regular housekeeping to remove obstructions, debris, packaging, etc.

• Ergonomic Strain – Awkward Positions • Dropped Objects • Ergonomic Strain – Lifting and Positioning Boxes • Lacerations from Use of Box Cutter/Razor Knife	• When possible, reposition body and/or equipment to reduce the ergonomic strain. • Always maintain an ergonomic lifting stance and proper lifting technique. • Never attempt to lift items greater than 40 pounds (this may decrease depending on your physical abilities- get help from a co-worker). • When possible, use an alternative box opening tool to the box cutter/razor knife. • Wear proper PPE when using a box cutter/razor knife: – Cut-resistant gloves (ANSI A5 or higher) • When operating a box cutter/razor knife, always cut away from the body. • Maintain a sharp blade on box cutter/razor knives.

PRINT PRODUCTION AND SCANNING

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 7/21/2023 | Last Revision: 9/5/2023

General Work Area Hazards

Description:
General office and administrative tasks.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Ergonomic – Repetitive Motion Injuries, Muscle Strain, Soft-Tissue Injuries • Slips, Trips, and Falls • Eye Strain • Electrical Shock • Fire Hazards • Indoor Air Quality Hazards	• Ensure work station is properly adjusted to reduce body strain. • Ensure adequate lighting in work area to reduce eye fatigue. • Wear blue-light glasses or other vision correction to reduce eye fatigue. • Take regular breaks which should include walking, stretching, or otherwise moving to promote circulation and reduce strain injury potential. • Use ergonomic aids such as wrist support, ergonomic chairs, foot support, etc. to reduce ergonomic strain and repetitive motion injuries. • Never attempt to lift items greater than 40 pounds. • Keep office and work areas clear of debris. • Perform regular housekeeping and avoid storing items on the ground which may create a trip hazard. • Clean up spills immediately. • Regularly remove dust and other contaminants which may irritate allergies. • Always inspect electrical cords for damage or fraying prior to use. • Never attempt to operate faulty electrical equipment or overload circuits. • If a space heater is used, ensure a timer is used in series with the space heater to prevent prolonged operation. • The use of space heaters is prohibited. • Never burn open candles or similar products. • Be familiar with the facility evacuation route, fire extinguisher locations, and alarm sounds.

Operating Production Printers

Description:
Operation of large industrial printer for professional production of printed materials.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Ergonomic – Repetitive Motion Injuries, Muscle Strain, Soft-Tissue Injuries from manual lifting • Physical hazards from the printing machine and equipment (e.g., pinch points, moving parts, sharp edges) • Slips, Trips, and Falls • Exposure to harmful chemical (toner/ink) • Electrical Shock • Thermal hazards • Fire Hazards due to flammable materials (e.g., inks, paper) • Noise exposure from printing machinery • Indoor Air Quality Hazards	• Use ergonomic aids mechanical lifting devices such as pallet jacks. • Never attempt to lift items greater than 40 pounds. • Ensure the printing machine has safety guards and interlocks in place. • Never attempt to bypass or modify equipment safety systems. • Use personal protective equipment (PPE) such as cut resistant gloves and safety glasses. • Keep office and work areas clear of debris. • Perform regular housekeeping and avoid storing items on the ground which may create a trip hazard. • Store chemicals properly in labeled containers and well-ventilated areas. • Use less toxic or environmentally friendly inks when possible. • Clean up spills immediately. • Always inspect electrical cords for damage or fraying prior to use. • Never attempt to operate faulty electrical equipment or overload circuits. • Use heat-resistant gloves when handling hot equipment or materials or allow equipment to cool sufficiently prior to handling (<120F). • Provide adequate ventilation to dissipate heat. • Never burn open candles or similar products. • Be familiar with the facility evacuation route, fire extinguisher locations, and alarm sounds. • Wear hearing protection during production prints while near machinery. • Implement engineering controls to reduce noise levels. • Ensure proper ventilation in the print shop to minimize airborne contaminants. • Use low-VOC (volatile organic compound) inks and cleaning agents.

Removing Jams and Other Minor Printer Service

Description:
Performing minor equipment maintenance or servicing. Operators may remove jams, replace consumables, and other basic service.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Ergonomic – Repetitive Motion Injuries, Muscle Strain, Soft-Tissue Injuries • Electrical shock • Risk of burn without allowing the printer to cool down • Chemical hazards from printer toner and ink • Risk of injury from moving parts	• Assume a neutral stance when servicing equipment. • Avoid overreaching, awkward postures, or maintaining the same position for long periods of time. • Never force or jerk at a jammed paper or part. • Always inspect electrical equipment for damage, fraying, etc. and replace when necessary. • Never access electrical installations, circuit boards, or internal power supply. • Note thermal hazard signage on equipment. Do not access hot equipment until sufficiently cool (<120F). • When handling toner/ink wear proper PPE:

  - Nitrile exam gloves
  - Safety glasses
  - Voluntary respirator use (N95) if toner dust irritates respiratory system.
- Avoid contact with toner/ink.
- Never attempt to perform service for which training or competence has not been established.
- Ensure two or more safety interlock switches are opened (printer doors opens) when removing jams.
- If complex service, electrical work, major part replacement, etc. is required ensure an LOTO Authorized Employee performs the service.

Operation of Laminator

Description:
Operation of manual laminator machine.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Electrical Shock • Fire Hazards • Risk Of Injury from Moving Parts • Risk of Burn • Toxic/Irritant Fume Exposure	• Prior to use, inspect the equipment and electrical cords for damage. • Never attempt to operate faulty electrical equipment or overload circuits. • Ensure the laminator is placed in a well-ventilated area. • Ensure the laminator is on a stable and level surface. • Ensure the correct size laminating film is being used to prevent jam ups. • Never leave the laminator unattended. • Avoid overloading the laminator beyond manufacturer's specifications. • Remove flammable/combustible items from the immediate area during laminator use. • Never attempt to disassemble and poke fingers into the feeding port. • Assume all parts of the laminator are hot during operation and avoid contact. • Clean excess material or debris from the laminator to reduce fire and jam potential.

Operation of Industrial Paper Cutter

Description:
Performing minor equipment maintenance or servicing. Operators may remove jams, replace consumables, and other basic service.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Laceration from Blade • Injury And Danger to Nearby Workers from Paper Kickbacks • Electrical Shock • Risk Of Injury from Moving Parts • Paper Dust Exposure	• Perform a pre-use inspection of machinery prior to use. • Ensure all guards and safety systems are in place, undamaged, and fully functional. Do not use equipment without safety guards in place. • Never attempt to modify safety guarding systems or attempt to place any part of the body in the machine point of operation. • Always inspect electrical cords for damage or fraying prior to use. • Never attempt to operate faulty electrical equipment or overload circuits. • If a jam or miscut occurs fully disconnect the electrical power source to the machine before attempting to correct the jam or miscut. Do not place any part of the body inside the machine.

- If the jam or miscut cannot be cleared from the outside of the machine contact maintenance or service group for assistance.

Operating Large Paper Hole Drill

Description:
Paper hole drill operation.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Pinch/Crush Hazards from Paper Clamp
• Entanglement from Drill Bit/ Chuck
• Part Ejection
• Laceration from Drill Bit
	• Wear PPE:
	  – ANSI Z87.1 rated safety glasses
	• Perform a pre-use inspection of machinery prior to use.
	• Ensure all guards and safety systems are in place, undamaged, and fully functional. Do not use equipment without safety guards in place.
	• Never attempt to modify safety guarding systems or attempt to place any part of the body in the machine point of operation.
	• Keep all loose clothing, hair, etc. away from drill components during operation.
	• Do not handle the drill bit without proper PPE:
	  – Cut resistant gloves (ANSI A4 or greater)
	• Keep hands free of paper clamp to avoid pinch/crush of hand.
	• Ensure paper is fully secured and paper clamp engaged during drilling operations.
	• Machine starts automatically when the pedal is engaged. Only operate the pedal when ready to drill. Keep foot away from pedal.
	• Read all operator instruction manuals prior to use.

JOB SAFETY ASSESSMENTS

PAVEMENT FIELD EVALUATION

SUMMARY OF PAVEMENT FIELD EVALUATION

The TDOT Pavement Field Evaluation Group may involve assessing and evaluating the condition of pavement and road surfaces across the state of Tennessee. Their work contributes to the maintenance, repair, and improvement of roadways to ensure safe and efficient transportation for the public. The evaluation process includes a pavement condition assessment, core drilling for data collection, core evaluation, and various other pavement condition assessments.

TOP 5 HAZARDS

1. Contact with Vehicles / Traffic
2. Crush / Entanglement in Core Drill Rig
3. Contact with Hand Tool
4. Ergonomic / Soft Tissue Injury
5. Laser Exposure

OHS SHAREPOINT

STANDARD PPE FOR GENERAL PAVEMENT FIELD EVALUATION

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)
- Memorandum - Lane Crossing

RELATED PROGRAMS AND REFERENCES

- TDOT Work Zone Field Manual

ROAD SURFACE PROFILER & LASER CRACK MEASUREMENT OPERATION

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 8/16/2023 | Last Revision: 9/5/2023

Print Section

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629. • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Sensor Calibration, Troubleshooting, and Basic Instrument Maintenance

Description:
Performing regular instrument maintenance, troubleshooting, and calibration on laser crack measuring equipment.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Eye and Skin Damage from Laser Exposure • Contact from Hand Tools • Ergonomic Hazards – Awkward Positions/Strain • Lacerations, Cuts, Scrapes, from Tools and Equipment Contact	• Know the laser classification, power, and wavelength of lasers in use. • Wear proper PPE: – Laser safety glasses – Cut-resistant gloves (ANSI A4 or greater) • Never look directly into a laser beam even with safety glasses. • Always disconnect power source from lasers when performing service or replacement. • Ensure all safety systems are in place when lasers are in operation. • Be cautious of reflective surfaces around lasers. • Ensure laser safety training has been completed by all personnel working on or near laser systems. • Regularly adjust position and posture to avoid ergonomic strain. • Use kneeling pads, chairs, and other devices to maintain a proper ergonomic position. • Always select the proper tool for the job. Never attempt to use a tool for a task in which it was not designed (e.g. screwdriver as a chisel or pry bar). • When using a wrench or similar to apply force, ensure release point of tool is away from the body and hands are protected from crush. • Avoid sharp points, damaged metal, and other laceration and abrasion hazards on equipment.

SKID TRAILER OPERATION

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 8/16/2023 | Last Revision: 8/16/2023

Operating State-Owned Skid Trailer Vehicle

Description:
Operation of skid trailer vehicle and attachment to perform roadway testing.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Perform a pre-use inspection of the skid trailer equipment, computer, and software systems prior to operation. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver.

- Always wear a seat belt when operating or riding in a vehicle.
- Follow all traffic laws while operating vehicle.
- Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist.
- Do not use electronic devices while operating motor vehicles unless in a hands-free mode.
- Do not operate skid trailer computer during vehicle operation. Bring the vehicle to a complete stop and put the vehicle in PARK prior to performing computer work in the vehicle.
- When operating at a reduce speed below the posted highway speed limits (40mph and up) ensure vehicle light package system is engaged to alert traffic.
- If operating at speeds below 40mph on highway roads posted at 55mph or greater utilize a traffic control plan with traffic controls in place.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)

- Injury or Death from Motor Vehicle Accident
- Contact with Pedestrian
- Vehicle or Object Damage
- Medical Emergency

Controls (How I keep from getting hurt?)

- If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed.
  - OHS-009 Injury and Property Damage Reporting
- If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail).
- Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.).
- If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable.
- Notify direct supervision of incident and initiate an incident report.
- Never turn your back to traffic.
- Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available).
- Call the TN Auto Accident Call Center at (855)-253-0629.
- Notify direct supervision of incident and initiate an incident report.
- Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Hand & Power Tool Usage

Description:
Various hand and portable power tool usage for the fabrication and finishing of parts made or modified in-house.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Contact/Puncture/Laceration from Slipped or Broken Tool • Awkward Posture – Soft-Tissue Injury • Tool Break Apart • Entanglement in Tool Fixture • Laceration or Puncture from Tool Attachment	• Always select the proper tool for the job. • Always ensure that the tool is properly seated and adequate leverage is applied to tool. • Ensure all hand and power tools are inspected prior to use. • Always review and reference the operator's manual prior to use. • Wear proper PPE: – ANSI Z87.1 rated safety glasses – Face shield – Cut-resistant gloves (ANSI A4 or higher) – Hearing protection • When operating a grinder, ensure that the wheel speed rating matches or exceeds the grinder speed rating. • When operating a grinder, ensure that the wheel is compatible with the grinder size, type, and material application. • Never attempt to grind non-ferrous metals • Keep hands and body parts away from power tools during use. • Anticipate the potential failure path of the tool and position the body outside of the potential failure path. • When replacing a tool fixture, disconnect the tool from the power source.

Work on Electrical Systems

Description:
Performing work on electrical systems (live or dead) or in the vicinity of live electrical systems.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Shock from contact with AC power • Shock from contact with DC power • Arc flash or blast • Shock from stored electrical energy (capacitors)	• Only qualified electricians may perform work on electrical systems. • Inspect electrical installations for electrical and arc flash information prior opening panel. • Always assume electrical equipment is energized until proven otherwise. • Do not work beyond your abilities. Know your limits and consult additional resources when needed. • Always use rated, insulated, and properly inspected electrical testing equipment and tools. • Utilize the LIVE, DEAD, LIVE method to ensure electrical test equipment is operating correctly during use.

- Wear proper electrical PPE:
  - Always refer to the latest version of NFPA 70E for proper electrical PPE based upon incident energy
  - Safety glasses
  - Hard hat (Class E) with face shield
  - Hearing protection
  - Electrical-rated gloves (insulated inner/outer work gloves)
  - 100% cotton or FR long-sleeve shirt and pants
  - Electrically-rated hard toe boots
- Ensure all electrical PPE is within date and inspected before use.
- Always use LOTO on electrical systems and only perform work live as a last resort.
- OHS-003 Facility Lockout Tagout Program
- Do not work on high voltage electrical systems (>600v) without proper training.
- Work on low voltage systems or control power should still require electrical safety controls.

Performing Soldering and Wire Repair

Description:
Performing soldering and wire repair activities on various sensors and test equipment.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Shock from Electrical Equipment.
• Exposure to Air Contaminants During Soldering Activities
• Thermal Burns from Soldering Activities
	• Ensure sensor and equipment is disconnected from batteries or electric source and secured using lockout/tagout.
	  – OHS-003 Facility Lockout Tagout Program
	• When soldering, ensure adequate air flow is present in work area.
	• Avoid solder fumes in the breathing zone.
	• Wear proper PPE when soldering:
	  – ANSI Z87.1 rated safety glasses
	  – Heat-resistant gloves
	• Always treat the solder iron as hot and store only on a heat sink cradle.
	• Do not solder in the presence of flammable or combustible products.
	• Clear work area prior to starting solder task.
	• When finished, always turn the soldering iron off.
	• Avoid flicking solder, instead use a sponge or similar product to remove excess solder from iron.
	• Use remote handling devices to support work to avoid burns or unexpected shifting of work piece.

STEP Mobilization and Setup of Drill Truck

Description:
Setup of drill/core truck at the core site along a Tennessee State highway.

Hazards (How can I get hurt?)

- Contact with Overhead Power Lines, Obstructions, etc.
- Damage to Equipment or Public Property from Unsecured Equipment
- Pinch/Crush from Drill Equipment
- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Strain, Sprain, or Bone Fracture While Exiting Vehicle

Controls (How I keep from getting hurt?)

- Always ensure drill rig components are stowed and secured during transport.
- Perform a regular inspection of rig during transit to ensure all equipment is secured and has not shifted.
- Be aware of overhead obstructions such as bridges, power lines, etc. and know vehicle height.
- When securing or deploying drill rig components always keep hands and away from pinch/crush points.
- Ensure all personnel are away from truck and rig prior to manipulating drill mast.
- If entering or working in a TDOT WORK ZONE refer to the JSA:
  - VEHICLE OPERATIONS – WORK ZONE VISITS
- Avoid pulling off of the roadway in low-light conditions.
- Avoid pulling into an unprotected median or on the left side shoulder.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- Communicate pull-off maneuver with turn signals well in advance of move.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- Wear proper PPE:
  - High visibility vest (class 3)
  - Safety toe boot
  - Cut resistant gloves (ANSI A4 or higher)
  - ANSI Z87.1 rated safety glasses
- Hearing protection
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

Drilling/Coring Operations

Description:
Operating drill/core rig to collect a core sample.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Lacerations from Sharp/ Jagged Edges on Drill Rig • Lacerations from Core Bit • Contact with Underground Utilities • Slips, Trips, and Falls from Roadway or Rig Obstructions • Entanglement in Core Shaft • Elevated Noise Exposure (>85dBA) • Burn from Hot Parts • Respirable Dust/Silica Exposure • Contact with Flying Debris	• Always wear proper PPE: – High visibility vest (class 3) – Safety toe boot – Cut resistant gloves (ANSI A4 or higher) – ANSI Z87.1 rated safety glasses – Hearing protection • Ensure all personnel operating or near the drill rig wear hearing protection. • Do not directly handle the cutting portion of the core drill bit. • Always ensure that underground utilities have been surveyed and marked within 30 days of drilling. • Do not attempt to drill near marked utilities. • Always perform regular housekeeping to remove debris, tools, and other materials which may present a slip, trip, or fall hazard. • Do not approach the core drill during operation. • Never attempt to guide, touch, or nudge core drill bit during operation. • Avoid contacting core drill bit directly after operation as bit may be hot. • Avoid airborne dust during drilling on concrete or other silica containing materials. • Use wet methods when possible to reduce airborne dust during drilling. • Remove unnecessary personnel from the area to reduce contact with potential flying debris.

Basic Drill Rig Maintenance

Description:
Performing basic maintenance on the drill truck and rig.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Contact/Puncture/Laceration from Slipped or Broken Tool • Awkward Posture – Soft-Tissue Injury • Laceration from Core Drill Cutting Edge • Entanglement in Tool Fixture • Exposure to Hydraulic Oils/ Chemicals • Exposure to Pressurized Hydraulic Systems	• Always select the proper tool for the job. • Always ensure that the tool is properly seated and adequate leverage is applied to tool. • Ensure all hand and power tools are inspected prior to use. • Always review and reference the operator's manual prior to use. • Wear proper PPE: • Safety glasses • Safety toe boots • Cut-resistant gloves (ANSI A4 or higher) • Anticipate the potential failure path of the tool and position body outside of the potential failure path. • Know the weight of material being lifted and use proper lifting technique. • Always ensure drill components are powered off and truck is secured with parking brake.

- Avoid contact with hydraulic oils and other chemicals.
- Ensure hydraulic systems are without pressure prior to beginning service. Confirm on gauge and ensure no check or accumulator valves are in use.
- Review the SDS for the chemical prior to interaction.

STEP Evaluation of Sample Core

Description:
Field evaluation of the sample core

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Ergonomic – Lifting >40lbs • Heavy/Awkward Items • Crush from Dropped Item • Abrasion from Core Material	• Know the approximate core weight prior to lifting. • Avoid lifting items greater than 40lbs. • For larger cores, use mechanical means or a team lift (can be 60lbs cores). • Wear proper PPE when handling cores: • Safety glasses • Safety toe boots • Cut-resistant gloves (ANSI A4 or higher) • Always store cores on a stable and secure surface to prevent falling or rolling.

TN TDOT Department of Transportation

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JOB SAFETY ASSESSMENTS

RAIL INSPECTION

SUMMARY OF RAIL INSPECTION

The goal of the Rail Safety and Inspection Office is to reduce and eliminate dangerous/hazardous conditions for railroad employees and the public. TDOT inspectors are certified by the FRA and are authorized to issue notices of violations to railroads when necessary. The department's railroad inspectors are also charged with enforcing Tennessee state laws pertaining to railroads. According to state law, railroads are responsible for maintaining at-grade rail-highway crossings in good condition. Tennessee law requires railroads to maintain the crossing surfaces where roads and rails intersect at-grade, and overseeing freight and commuter rail. TDOT State Safety Oversight (SSO) program has been assigned to be the overseer for Rail Fixed Guideway Systems (RFGS). The States SSO program is required by the Federal Trans Administration (FTA) and applies to rail transit agencies (RTAs) not regulated by the Federal Railroad Administration (FRA) in the State of Tennessee (Memphis Vintage Trolleys & Chattanooga Incline Railroad).

TOP 5 HAZARDS

1. Contact with Vehicles / Traffic / Rail Equipment
2. Ergonomic / Soft Tissue Injury
3. Slip, Trip, Fall from Varied Terrain
4. Falls from Height (>4')
5. Exposure to Hazardous Substances/Waste

OHS SHAREPOINT

STANDARD PPE FOR GENERAL RAIL INSPECTION

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)

RELATED PROGRAMS AND REFERENCES

- Rail Inspection Manual

Print Section

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If entering or working in a TDOT WORK ZONE refer to the JSA: – VEHICLE OPERATIONS – WORK ZONE VISITS • If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway in low-light conditions. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off. • Communicate pull-off maneuver with turn signals well in advance of move. • Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot. • Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle. • Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls. • Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting. • Wear proper PPE: – High visibility vest (class 3) • Once out of the vehicle, remain away from the road or behind solid obstructions. • Do not attempt to cross lanes of an active roadway.

Rail and Rail Yard inspections

Description:
TDOT Rail Inspectors scope may visit a variety of track locations, both public and private, and during pre/post track installations.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Low Visibility • Slips, Trips, and Falls • Steep Slopes • Loose Debris or Ballast	• Wear appropriate PPE: – Safety toe boots – ANSI Z87.1 rated safety glasses – High visibility vest (class 3)

- Struck By Moving Object or Rail Equipment

  - If on private property, follow PPE requirements of the operating company if PPE requirements include additional PPE items
- Communicate with property owner prior to entering rail yard or property.
- Do not walk on the track, maintain 3' of clearance at all times.
- Avoid inspecting during early morning or evening/night.
- Communicate travel path and anticipated time with a coworker, supervisor, or site contact.
- Always carry a means of communication (phone, radio, etc.).
- Do not cross a bridge or other similar structure on foot.

Operating High Rail Vehicle (Track Inspection Vehicle)

Description:
TDOT Rail Inspectors may operate high rail vehicles to travel the rail network performing inspections and other vital functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Contact with Moving Objects – Other Vehicles, Trains, or Track Equipment • Contact with Overhead Obstructions • Contact with Personnel on Track • Contact with Vehicles at Rail Crossings • Loss of Control • Rollover from Poor Track Conditions	• Always coordinate with the railroad operators to ensure no active trains or equipment are on the track to be inspected. • Know the height of the vehicle in relation to bridges and other overhead hazards along the route. Stow all cranes or other retractable equipment. • Be aware at all times to debris, personnel, or poor track conditions. • Always perform a thorough pre-use inspection of the high rail vehicle to ensure proper function or key safety devices. Ensure hydraulic system reaches appropriate pressure. • Determine a location to access the rail with no motor vehicle traffic. • When exiting the vehicle put the vehicle in park and secure the parking brake. • Remove the rail wheel securement pins prior to lowering the rail wheels to avoid jamming. • Exit the vehicle and align the rail wheels with the track. Begin lowering the rear and front rail wheels ensuring no obstructions are in the way. • Slow at all track crossings to yield to motor vehicles. • Maintain a speed of 10-25mph or lower in urban areas or rail yards. • Do not exceed 40mph on tracks.

Inspection and Testing of Public and Train Signal Equipment

Description:
Signal equipment is the system of visible, audible, and electronic devices that provide information to train operators and the public. TDOT rail inspectors ensure these systems are functioning properly along the track routes and at roadway crossings.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Contact with live electrical during signal equipment testing
• Shock from contact with AC/DC power
• Struck by a moving vehicle or train
	• Wear appropriate PPE:
	  – Safety toe boots
	  – ANSI Z87.1 rated safety glasses
	  – High visibility vest (class 3)
	  – If on private property, follow PPE requirements of the operating company if PPE requirements include additional PPE items
	• Unless qualified, do not exposure energized electrical components.

- Entanglement with moving parts

- Never blindly reach into equipment cabinets.
- Inspect electrical installations for electrical and arc flash information prior opening panel.
- Always assume electrical equipment is energized until proven otherwise.
- Do not work beyond your abilities. Know your limits and consult additional resources when needed.
  - Always use rated, insulated, and properly inspected electrical testing equipment and tools.
  - Utilize the LIVE, DEAD, LIVE method to ensure electrical test equipment is operating correctly during use.
  - Wear proper electrical PPE:
  - Always refer to the latest version of NFPA 70E for proper electrical PPE based upon incident energy
  - Safety glasses
  - Hard hat (Class E) with face shield
  - Hearing protection
  - Electrical-rated gloves (insulated inner/outer work gloves)
- 100% cotton or FR long-sleeve shirt and pants
- Electrically-rated hard toe boots
- Ensure all electrical PPE is within date and inspected before use.
- Follow all manufacturing guidelines and procedures.
- Be aware of train signal and control systems.

Traveling and Working in Wooded Areas and Along Train Tracks on Foot

Description:
Rail inspector personnel may travel in a variety of terrains from roadside to wooded environments when performing job functions.

Hazards (How can I get hurt?)

- Contact with Stinging/Biting Insects, Poisonous Plants, Wild Animals, and Other Pests
- Weather Concerns / Heat and Cold Stress
- Sunburn and Natural UV Exposure
- Slip, Trip, Fall from Varied Terrain
- Falls from Height (>4')
- Encounters with Public Persons
- Loss of Orientation
- Injury or Death from Contact with Train/Railcar
- Degraded/Damaged Railroad Tracks

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Hiking or treaded boot with ankle support
  - High visibility vest (class 3)
  - When applicable, wear rubber (muck) boots or snake boots
- Wear insect repellent and avoid contact with poisonous insects/snakes when possible.
- Always check weather forecast for the area prior to planning trip.
- Tailor clothing choices to anticipated weather conditions such as cool clothing in summer and layered, warm clothing in winter.
- Always pack hydration supplements and regularly intake water.
- Never attempt to drink from untreated, natural sources.
- Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress.
- Always inspect travel path and select the terrain with least obstacles and elevation change. Avoid slopes and loose gravel/rock.
- Do not attempt to clear brush or use machetes.
- Never approach cliffs, holes, culverts, or other drop offs.
- Be aware of public persons and always assume a neutral, non-engaging demeanor. If confrontation occurs or is suspected evacuate the area and contact local authorities if warranted.
- Never work alone and communicate travel plans with a supervisor. Stick to planned travel route at all times.
- Always carry maps, GPS, radio, cell phones and other tools to prevent getting lost.

- Contact rail scheduler prior to work at/around railroad.
- Do not walk within 3’ of an active rail.
- Be aware of uneven footing, missing railroad track footers or ballasts, loose ties, or loose/exposed spikes.
- When operating a vehicle, inspect track and surrounding area to make sure all crossings are marked, and any hazardous conditions identified. If needed, consider installation of warning labeling, reflective safety tape, mounted safety lights, or other visual indicators of traffic flow, crossings, or hazards.
- Utilize adequate lighting when working in low light conditions (dawn/dusk/night) or in the case of heavy fog. Utilize warning lights when working within 25 feet of railroad track to signify proximity to track.

Exposure to Hazardous Materials

Description:
Exposure to hazardous materials can occur when investigating incidents or performing routine rail inspections

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Exposure to Hazardous Substances from Spills or Discarded Waste • Inhalation of Toxic or Harmful Fumes • Fire and Explosion Risks	• Be vigilant about looking for signs of leaking rail cars or other abnormal conditions. • If a leaking railcar or abandoned waste, such as drums, are identified do not approach the leak. Contact local authorities immediately. • If no labeling is present on the abandoned waste assume the waste to be hazardous. • When possible, carry an Emergency Response Guide (ERG) book or the corresponding phone application to identify DOT placards. • If a leak or spill is detected position yourself upwind from the spill and maintain an adequate distance. • Do not attempt to patch or stop the spill unless the substance has been confirmed as non-hazardous and it is safe to do so. • Always carry a method of communication (cell phone, radio, etc.).

Performing Engineer Observations

Description:
TDOT Rail Inspectors will observe train operators (Engineers) during their normal tasks which requires riding trains and observing.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Falls from height • Slips, Trips, and Falls • Ergonomic Strain	• Always inspect walking path prior to travel. • When climbing ladders or stairs ensure a proper handhold is maintained during the process. • Avoid wet, slippery, or damaged handrails and stairs. • When traveling in the engineer’s cab, always assume a steady standing or sitting position to prevent falling or stumbling during movement. • Always sit when starting travel, coming to a stop, slowing, or connecting to rail cars. • Regularly reposition body during travel and assume a neutral stance to avoid ergonomic strain on the body. • Secure all items during travel to prevent movement or falling objects during travel. • Inspection personnel should always be in the cab of the locomotive when traversing road crossings.

JOB SAFETY ASSESSMENTS

MATERIALS & TESTS LABS OPERATIONS AND RESEARCH AND PRODUCT EVALUATION

SUMMARY OF MATERIALS & TESTS LABS OPERATIONS AND RESEARCH AND PRODUCT EVALUATION

Headquarters Division of Materials and Tests is responsible for ensuring that all materials used in the construction and maintenance of Tennessee's highways meet the appropriate ASTM, AASHTO, and Departmental specifications. This division monitors the quality and performance of TDOT's highway network by performing field evaluations, conducting production facility reviews, performing laboratory tests, and analyzing a variety of data. The TDOT Materials and Test Laboratories are involved in testing the quality of a variety of materials including, but not limited to the following: hot mix asphalt, asphalt cement and emulsified asphalt, hydraulic cement, Portland cement concrete, aggregates, metal, and soils.

TOP 5 HAZARDS

1. Contact with Vehicle / Traffic Hazards
2. Contact with Worksite Equipment
3. Laceration / Crush from Hand Tool
4. Chemical Exposure from Lab Equipment
5. Burns or Contact with Hot Asphalt Products

OHS SHAREPOINT

STANDARD PPE FOR GENERAL RESEARCH AND PRODUCT

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-003 Facility Lockout Tagout Program
- OHS-007 Powered Industrial Truck Operation Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- OHS-011 Materials and Tests Lab Safety Manual
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Guidance for Voluntary Respirator Use- General

RELATED PROGRAMS AND REFERENCES

- M&T Lab Operations Manual

SUMMARY OF RESEARCH AND PRODUCT EVALUATION

The Research and Product Evaluation Section is responsible for the testing and evaluation of all new products proposed for use in Tennessee's highway program. In addition, this section also distributes information gained from testing and evaluating these products and maintains the Department's Qualified Products List. All in-house research projects are either conducted by or coordinated by the Research and Product Evaluation Section. This section also participates in the National Transportation Product Evaluation Program (NTPEP) coordinated by AASHTO. Tennessee is the lead test state for the testing of High Friction Surface Treatments (HFST) and flexible drums for NTPEP.

TOP 5 HAZARDS

1. Contact with Vehicle / Traffic Hazards
2. Contact with Worksite Equipment
3. Laceration / Crush from Hand Tool
4. Chemical Exposure from Lab Equipment
5. Walking / Working Surfaces – Slips, trips, falls

OHS SHAREPOINT

STANDARD PPE FOR GENERAL RESEARCH AND PRODUCT

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- OHS-011 Materials and Tests Lab Safety Manual
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)
- Memorandum - Lane Crossing

RELATED PROGRAMS AND REFERENCES

- Nuclear Radiation Safety Standard

Print Section

Operating Laboratory Analytical Equipment

Description:
Various analytical lab equipment may be operating in the process of evaluating products to include mass spectrometers, X-ray diffraction equipment, etc.

Hazards (How can I get hurt?)

- Exposure to Hazardous Chemicals
- Contact/Entanglement in Exposure Machinery Parts
- Burns from Hot Equipment
- Explosion from Flammable Gases
- Strains and Sprains from Performing Equipment Setup/Service
- Exposure to Ionizing and Non-Ionizing Radiation Sources

Controls (How I keep from getting hurt?)

- All laboratory personnel must be trained on analytical equipment prior to attempting operation, setup, or service.
- Proper PPE must be worn in the laboratory:
  - ANSI Z87.1 rated safety glasses
  - Laboratory apron, coat, or comparable splash protection
- Always store chemicals properly and handle per manufacturer's specifications.
- Review the chemical's safety data sheet (SDS) prior to handling.
- Only transfer chemicals in a laboratory hood.
- Any spills or leaks should be cleaned up and disposed of in the proper manner.
- Ensure all eyewash and safety shower stations are in good working order and inspected/serviced on a regular basis.
- Do not attempt to touch or handle hot parts during operation. Allow equipment to cool before contacting.
- Ensure all compressed gases are properly handed, stored upright, and secured from tip-over.
- Ensure all flammable gas connections are tight and a leak test is performed after each gas cylinder change.
- Never attempt to lift greater than 40lbs.
- Always reposition equipment, body, or material to reduce ergonomic strain on body when performing lab tasks.
- When operating equipment with ionizing or non-ionizing radiation sources always ensure proper radiation safety training has been completed.
- Review the operations manual for ionizing or non-ionizing radiation equipment and never attempt to perform service on equipment.
- Always ensure safety systems are in place and functioning correctly on ionizing or non-ionizing radiation equipment.

Performing Benchtop Testing

Description:
Various analytical lab equipment may be operating in the process of evaluating products to include mass spectrometers, X-ray diffraction equipment, etc.

Hazards (How can I get hurt?)

- Exposure to Hazardous Chemicals
- Lacerations from Sharp Objects, Glassware, etc.

Controls (How I keep from getting hurt?)

- All laboratory personnel must be trained on analytical equipment prior to attempting operation, setup, or service.
- Proper PPE must be worn in the laboratory:
  - ANSI Z87.1 rated safety glasses

- Burns from Hot Equipment

  - Laboratory apron, coat, or comparable splash protection
- Always store chemicals properly and handle per manufacturer's specifications.
- Avoid carrying glassware or chemical bottles across floor. Utilize cart or other device to minimize drop potential.
- Review the chemical's safety data sheet (SDS) prior to handling.
- Only transfer chemicals in a laboratory hood.
- Any spills or leaks should be cleaned up and disposed of in the proper manner.
- Ensure all eyewash and safety shower stations are in good working order and inspected/serviced on a regular basis.
- Do not attempt to touch or handle hot parts during operation. Allow equipment to cool before contacting.

Operating Physical Testing Machines

Description:
Operating mechanical testing machines such as mixers, etc.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Entanglement/Pinch from Mechanical Equipment Operation • Contact with Flying Debris • Exposure to Dust • Strains/Sprains from Lifting Heavy Equipment	• Always wear proper PPE in laboratory: – ANSI Z87.1 rated safety glasses • All laboratory personnel must be trained on testing equipment prior to attempting operation, setup, or service. • Read the operator's manual and applicable method prior to performing test. • Always perform pre-use inspection on equipment to ensure proper function and intact safety systems. • Never operate mechanical equipment alone. • Always ensure safety guards and systems are in place and operational. • When performing failure tests be aware of flying debris potential. • Use wet methods when possible to reduce dust exposure. • Do not attempt to lift material greater than 40lbs.

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)

- Injury or Death from Motor Vehicle Accident
- Contact with Pedestrian
- Vehicle or Object Damage

Controls (How I keep from getting hurt?)

- Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle.
  - 303-05 Motor Vehicle Utilization Policy
- Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended.
- Familiarize yourself with vehicle system operation prior to entering traffic.
- Ensure PPE is available for all personnel if intending to exit vehicle.
- Adjust the seat, mirrors, and steering wheel to driver.
- Always wear a seat belt when operating or riding in a vehicle.
- Follow all traffic laws while operating vehicle.
- Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist.
- Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)

- Injury or Death from Motor Vehicle Accident
- Contact with Pedestrian
- Vehicle or Object Damage
- Medical Emergency

Controls (How I keep from getting hurt?)

- If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed.
  - OHS-009 Injury and Property Damage Reporting
- If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail).
- Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.).
- If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable.
- Notify direct supervision of incident and initiate an incident report.
- Never turn your back to traffic.
- Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available).
- Call the TN Auto Accident Call Center at (855)-253-0629

- Notify direct supervision of incident and initiate an incident report.
- Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Entering Active Work Zone, Parking Vehicle, and Exiting Vehicle

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, work zone, or other TDOT worksite.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Strain, Sprain, or Bone Fracture While Exiting Vehicle

Controls (How I keep from getting hurt?)

- If possible, perform survey or job from within vehicle. Only exit if necessary.
- Avoid pulling off of the roadway or exiting the vehicle in low-light conditions.
- Contact the work zone supervisor prior to the visit to establish communication.
- Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder.
- Avoid pulling into an unprotected median or on the left side shoulder unless there is no other option.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off.
- Communicate pull-off maneuver with turn signals well in advance of move.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- Never leave the vehicle running when not attended.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards.
- Avoid jumping down from high ground clearance vehicles.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

Pedestrian Safety in Active Work Zone

Description:
General pedestrian considerations when working in a TDOT work zone.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Slip, Trip, Fall

Controls (How I keep from getting hurt?)

- Always have an escape route when outside of a vehicle in a work zone. The escape route should be a clear path available at all times to escape an errant motorist. The escape route should include:
  - A clear path away from danger
  - Level ground free of obstructions
  - Avoid being on the danger side of stationary objects (vehicles, heavy equipment, guardrails, etc. which may block exit.
- NEVER turn your back to traffic.
- Upon exiting the vehicle, don the proper work zone PPE:
  - Safety toe boots
  - Hard hat (class G or equivalent)
  - High visibility vest (class 3)
  - ANSI Z87.1 rated safety glasses
- Avoid walking on steep slopes, areas with disturbed soil, or areas with loose debris.
- Always plan walking route and maintain eyes on path.
- Do not operate a cell phone or similar electronic device while walking.

Working Around Equipment in Active Work Zone

Description:
Pedestrian considerations when in an active TDOT work zone with heavy equipment operations.

Hazards (How can I get hurt?)

- Injury or Death from Contact with Heavy Equipment
- Injury or Death from Ejection of Debris from Heavy Equipment Operations
- Equipment of Load Instability
- Contact with Heavy Equipment Counterweight
- Dropped Load

Controls (How I keep from getting hurt?)

- When possible, avoid approaching heavy equipment (within 20').
- Do not enter demarcated areas without authorization and always communicate intentions to include travel path and duration of stay.
- Always establish communication with heavy equipment operator (radio, visual, verbal) if transitioning within 20' of vehicle (in front or immediately behind).
- Do not approach heavy equipment unless equipment is in a safe condition (bucket lowered, parking brake set, blade down, etc.).
- Anticipate the fall path for any object being carried or moved and avoid the "shadow of the load".
- Never stand under or near a suspended load.

Performing Product Research and Evaluations

Description:
Performing various worksite product research and evaluations for TDOT projects.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Ergonomic Strain from Awkward Positions
- Exposure to Hazardous Chemicals
- Fire/Explosion from Mixing Incompatible Chemicals
- Injury from Catastrophic Failure of Product

Controls (How I keep from getting hurt?)

- Avoid pulling off of the roadway in low-light conditions.
- Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder.
- Avoid pulling into an unprotected median or on the left side shoulder.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- When possible, use restricted areas of highway with no active traffic for testing activities.
- Always use any tools or measuring equipment in as intended by the manufacturer.
- Any specialized equipment should require specialized training along with a thorough review of the manufacturer's specifications.
- Always assume a neutral position to reduce ergonomic strain on the body.
- Rotate personnel when possible to provide regular breaks.
- Always review the appropriate SDS before attempting handle any chemical or product.
- Avoid chemical incompatibilities listed on the SDS.
- Always have a fire extinguisher available when working with flammable or combustible products.
- Avoid the line of fire when performing failure analysis testing to ensure no contact with personnel occurs.

Operating Handheld Measuring/ Monitoring Equipment

Description:
Performing various worksite product research and evaluations for TDOT projects.

Hazards (How can I get hurt?)

- Exposure to Radiation Sources (UV, Laser, IR, X-Ray)
- Pinch or Crush from Dropping Object
- Ergonomic Concerns from Handling Heavy Equipment
- Exposure to Hazardous Calibration Gases
- Fire/Explosion from Calibration Gases
- Asphyxiation from Calibration Gases

Controls (How I keep from getting hurt?)

- Only properly trained personnel may operate handheld analytical equipment.
- Always read the manufacturer's instructions and instrument manual prior to use.
- Only operate the instrument in a method approved by the manufacturer.
- Review all SDSs for chemicals prior to chemical or gas use.
- Always maintain a firm grip on equipment and store in a secure location when not in use.
- Never attempt to lift items greater than 40lbs.
- Reduce the time spent handling heavy items to reduce ergonomic strain.
- Always store gas cylinders in the upright and secured position.
- Never expose hazardous gas cylinders to elevated temperatures or attempt to modify cylinder regulators.
- Never attempt to use flammable gases in the presence of an ignition source.
- Never attempt to use hazardous gases in an enclosed area.

Performing Vendor Site Visits

Description:
Performing site visits to vendor locations to review product information, inspect facility, and view product development process.

Hazards (How can I get hurt?)

- Industrial Equipment & Machine Hazards
- Obstructions in Walking Surface
- Machinery Hazards
- Dropped Loads/Crush
- Contact with Mobile Equipment
- Poor Structural Integrity
- Chemical Exposure (Chemicals, Asbestos, etc.)
- Aggressive Persons
- Elevated Noise Exposure

Controls (How I keep from getting hurt?)

- Always attempt to contact the property owner and establish presence when entering private property.
- At a minimum, adhere to the facility's PPE requirements.
- Wear proper PPE:
  - Safety toe boots
  - ANSI Z87.1 rated safety glasses
  - High visibility vest
  - Hearing Protection (as needed)
  - Cut-resistant gloves (ANSI A4 or greater) (as needed)
- Perform a visual assessment of the property prior to entering to evaluate potential structural integrity hazards. If hazards are identified do not enter property.
- Report any hazards to the TDOT Right of Way Agent Senior for immediate steps for hazard removal.
- Always bring a flashlight when entering a building or structure.
- Do not touch any items or attempt to operate machinery.
- Keep distance from all machinery and mobile equipment to avoid contact.
- Never walk under a suspended load.
- Do not enter any confined spaces, tunnels, pits, or excavations.
- Prior to entering a new portion of the property (new room, new level, entering building) stop and scan the area for hazards and obstructions in the walkway.
- Any signs of open hazardous chemicals, unusual chemical smells, etc. which may cause harm should prompt an immediate evacuation of the dwelling.
- Assume a neutral disposition with property owners.
- Always avoid confrontation with property owners and always maintain a distance of 6' or greater from unknown persons.
- If a confrontation or argument occurs exit the property immediately without turning your back on the occupant and notify the authorities.
- Always communicate travel plans with a supervisor, check in regularly, and avoid working alone when possible.
- Determine an adequate evacuation route and assembly area in the event of an emergency.
- Any elevated noise areas (>85dBA) or areas where it is difficult to speak with another at an arm's length away requires ear plugs.

JOB SAFETY ASSESSMENTS

RIGHT-OF-WAY (ROW)

SUMMARY OF RIGHT-OF-WAY

The Tennessee Department of Transportation Right-of-Way (TDOT ROW) Division is responsible for acquiring and managing all right-of-way needed for the construction and maintenance of highways in the State of Tennessee. ROW personnel perform on-site inspections of land, residential, commercial, and industrial locations for acquisition. TDOT personnel encounter a variety of hazards when performing inspections from mold and asbestos to structural integrity issues when entering properties.

TOP 5 HAZARDS

1. Contact with Vehicles / Traffic
2. Walking / Working Surfaces – Slips, trips, falls
3. Chemical / Biological Exposure – Mold, etc.
4. Contact with Mobile Equipment / Machinery
5. Aggressive Persons

OHS SHAREPOINT

STANDARD PPE FOR GENERAL RIGHT-OF-WAY

APPLICABLE TDOT OHS PROGRAMS

- OHS-002 Hazard Communication Program
- OHS-005 Incident Analysis Reports IARs
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)
- Memorandum - Lane Crossing

RELATED PROGRAMS AND REFERENCES

- OSHA Safety and Health Topics

Print Section

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. – 303-05 Motor Vehicle Utilization Policy • Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available).

- Call the TN Auto Accident Call Center at (855)-253-0629.
- Notify direct supervision of incident and initiate an incident report.
- Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Strain, Sprain, or Bone Fracture While Exiting Vehicle

Controls (How I keep from getting hurt?)

- If possible, perform survey or job from within vehicle. Only exit if necessary.
- Avoid pulling off of the roadway or exiting the vehicle in low-light conditions.
- Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder.
- Avoid pulling into an unprotected median or on the left side shoulder.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off.
- Communicate pull-off maneuver with turn signals well in advance of move.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

Performing Property Inspections – Residential/Agricultural Locations

Description:
Description: ROW personnel may have to visit residential or agricultural locations to perform property appraisal on private property.

Hazards (How can I get hurt?)

- Uneven Surfaces/Changes in Floor Elevation
- Obstructions in Walking Surface
- Poor Structural Integrity
- Chemical Exposure (Chemicals, Asbestos, etc.)
- Biological Exposure (Body Fluids, Mold, etc.)
- Illicit Narcotics Exposure
- Aggressive Persons/Animals

Controls (How I keep from getting hurt?)

- Always attempt to contact the property owner and establish presence when entering private property.
- Wear proper PPE:
  - Steel toe boots
  - ANSI Z87.1 rated safety glasses
  - High visibility vest
  - Long sleeve shirt and pants
  - N95 Respirator (as needed for mold)
    - Guidance for Voluntary Respirator Use- General
- Perform a visual assessment of the property and each dwelling prior to entering to evaluate potential structural integrity hazards. If hazards are identified do not enter dwelling.
- Always bring a flashlight when entering a dwelling.
- When possible, avoid touching any items or structures in the dwelling.
- Prior to entering a new portion of the dwelling (new room, new level, entering building) stop and scan the area for hazards and obstructions in the walkway.
- Any signs of open hazardous chemicals, unusual chemical smells, narcotics paraphernalia, etc. should prompt an immediate evacuation of the dwelling.
- Avoid any unknown fluids, blood, other body fluids, medical devices, needles, and other potential items potential containing blood borne pathogens.
  - 305-02 Bloodborne Pathogens Program
- Avoid dwelling with visual mold contamination. Wear an N95 respirator (dust mask) as needed or evacuate the dwelling.
- Assume a neutral disposition with property owners.
- Always avoid confrontation with property owners and always maintain a distance of 6' or greater from unknown persons.
- If a confrontation or argument occurs exit the dwelling immediately without turning your back on the occupant and notify the authorities.
- Always communicate travel plans with a supervisor, check in regularly, and avoid working alone when possible.

Performing Property Inspections – Commercial/Industrial Locations

Description:
Description: ROW personnel may have to visit commercial or industrial locations to perform property appraisal on private property.

Hazards (How can I get hurt?)

- Industrial Equipment & Machine Hazards
- Obstructions in Walking Surface
- Machinery Hazards
- Dropped Loads/Crush

Controls (How I keep from getting hurt?)

- Always attempt to contact the property owner and establish presence when entering private property.
- At a minimum, adhere to the facility's PPE requirements.
- Wear proper PPE:
  - Safety toe boots
  - ANSI Z87.1 rated safety glasses

- Contact with Mobile Equipment
- Poor Structural Integrity
- Chemical Exposure (Chemicals, Asbestos, etc.)
- Aggressive Persons
- Elevated Noise Exposure

  - High visibility vest
  - Hearing Protection (as needed)
  - Cut-resistant gloves (ANSI A4 or greater) (as needed)
- Perform a visual assessment of the property prior to entering to evaluate potential structural integrity hazards. If hazards are identified do not enter property.
- Report any hazards to the TDOT Right of Way Agent Senior for immediate steps for hazard removal.
- Always bring a flashlight when entering a building or structure.
- Do not touch any items or attempt to operate machinery.
- Keep distance from all machinery and mobile equipment to avoid contact.
- Never walk under a suspended load.
- Do not enter any confined spaces, tunnels, pits, or excavations.
- Prior to entering a new portion of the property (new room, new level, entering building) stop and scan the area for hazards and obstructions in the walkway.
- Any signs of open hazardous chemicals, unusual chemical smells, etc. which may cause harm should prompt an immediate evacuation of the dwelling.
- Assume a neutral disposition with property owners.
- Always avoid confrontation with property owners and always maintain a distance of 6' or greater from unknown persons.
- If a confrontation or argument occurs exit the property immediately without turning your back on the occupant and notify the authorities.
- Always communicate travel plans with a supervisor, check in regularly, and avoid working alone when possible.
- Determine an adequate evacuation route and assembly area in the event of an emergency.
- Any elevated noise areas (>85dBA) or areas where it is difficult to speak with another at an arm's length away requires ear plugs.

Performing Property Inspections – Construction Site Locations

Description:
Description: ROW personnel may have to visit construction site locations to perform property appraisal and inspection on private property.

Hazards (How can I get hurt?)

- Industrial Equipment & Machine Hazards
- Obstructions in Walking Surface
- Poor Structural Integrity
- Machinery Hazards
- Dropped Loads/Crush
- Contact with Mobile Equipment
- Falls from Height
- Aggressive Persons
- Slips and Trips
- Uneven Terrain
- Fabrication and Formwork – Lacerations, Sharps, Impalement Hazards, etc.

Controls (How I keep from getting hurt?)

- Always attempt to contact the property owner and establish presence when entering private property.
- Wear or have on person, identification (badge, logo apparel, or business cards).
- Ensure that an escort is available to show restricted versus unrestricted access areas on the construction site.
- At a minimum, adhere to the site's PPE requirements.
- Wear proper PPE:
  - Safety toe boots
  - ANSI Z87.1 rated safety glasses
  - High visibility vest
  - Hard hat
- Inspect the walking surface for uneven surfaces, loose dirt/gravel/sand, pits, drop-offs, and trenches. Avoid these obstacles.
- Always maintain a minimum distance of 35' from operating machinery.
- Do not touch any items or attempt to operate machinery.
- Never walk under a suspended load.
- Do not enter any confined spaces, tunnels, pits, or excavations.
- Prior to entering a new portion of the property (new room, new level, entering building) stop and scan the area for hazards and obstructions in the walkway.

- Assume a neutral disposition with property owners.
- Always avoid confrontation with property owners and always maintain a distance of 6’ or greater from unknown persons.
- If a confrontation or argument occurs exit the property immediately without turning your back on the occupant and notify the authorities.
- Always communicate travel plans with a supervisor, check in regularly, and avoid working alone when possible.
- Determine an adequate evacuation route and assembly area in the event of an emergency.
- Avoid any active construction work.
- Do not approach any unprotected falls from height (greater than 4’). Maintain a distance of 15’ from unprotected edge.
- Do not access any roof, crawl space, basement, or attic space.
- Avoid edges near bodies of water, streams or holding ponds due to slip and entrapment potential.

UTILITIES

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 7/19/2023 | Last Revision: 9/25/2023

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)

- Injury or Death from Motor Vehicle Accident
- Contact with Pedestrian
- Vehicle or Object Damage

Controls (How I keep from getting hurt?)

- Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle.
- Perform a pre-use inspection of the vehicle to ensure that all vehicle and safety system are operating as intended.
- Familiarize yourself with vehicle system operation prior to entering traffic.
- Ensure PPE is available for all personnel if intending to exit vehicle.
- Adjust the seat, mirrors, and steering wheel to driver.
- Always wear a seat belt when operating or riding in a vehicle.
- Follow all traffic laws while operating vehicle.
- Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist.
- Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If entering or working in a TDOT WORK ZONE refer to the JSA: – VEHICLE OPERATIONS – WORK ZONE VISITS • If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off the roadway in low-light conditions. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder. • Pull as far off the roadway as possible and park behind a solid obstruction when possible. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off. • Communicate pull-off maneuver with turn signals well in advance of move. • Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot. • Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle. • Once door is open, visually inspect step-off area for uneven terrain, obstructions,

pests, and other hazards.
- Avoid jumping down from high ground clearance vehicles.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

STEP

Conducting A Site Visit in an Active Work Zone

Description:
Employee considerations when conducting a site visit to an active work zone with heavy equipment operations.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Contact with Heavy Equipment
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Excess noise
- Uneven terrain
- Unprotected trenches and excavations
- Dropped Load
- Dust and debris

Controls (How I keep from getting hurt?)

- Upon exiting the vehicle, don the proper work zone PPE:
  - Hard toe shoes
  - Hard hat (class G or equivalent)
  - High visibility vest (class 3)
  - Safety glasses (Z87.1)
  - Any elevated noise areas (>85dBA) or areas where it is difficult to speak with another at an arm's length away requires ear plugs.
- Dust mask (as needed)
- Always have an escape route when outside of a vehicle in a work zone. The escape route should be a clear path available at all times to escape an errant motorist. The escape route should include:
  - A clear path away from danger
  - Level ground free of obstructions
- Avoid being on the danger side of stationary objects (vehicles, heavy equipment, guardrails, etc. which may block exit.
- NEVER turn your back to traffic.
- Avoid walking on steep slopes, areas with disturbed soil, or areas with loose debris.
- Stay at least 6' away from excavation edge and any potential collapse zone.
- Do not operate a cell phone or similar electronic device while walking. Avoid all other distractions.
- When possible, avoid approaching heavy equipment (within 20').
- Do not enter demarcated areas without authorization and always communicate intentions to include travel path and duration of stay with the person in charge.
- Always establish communication with heavy equipment operator (radio, visual, verbal) if transitioning within 20' of vehicle (in front or immediately behind).
- Do not approach heavy equipment unless equipment is in a safe condition (bucket lowered, parking brake set, blade down, etc.).
- Anticipate the fall path for any object being carried or moved and avoid the "shadow of the load".
- Never stand or walk under or near a suspended load.

Traveling and Working in Wooded/Urban Areas

Description:
Environmental personnel may travel in a variety of terrains from urban environments to rural environments while performing job functions.

Hazards (How can I get hurt?)

- Contact with Stinging/Biting Insects, Poisonous Plants, Wild Animals, and Other Pests
- Weather Concerns / Heat and Cold Stress
- Sunburn and Natural UV Exposure
- Slip, Trip, Fall from Varied Terrain
- Lacerations from Brush Clearing Tools
- Falls from Height (>4')
- Contact with Vehicles and Other Traffic
- Encounters with Public Persons
- Loss of Orientation

Controls (How I keep from getting hurt?)

- Wear proper PPE:
  - Hiking or treaded boot with ankle support
  - High visibility vest
- When applicable, wear rubber (muck) boots or snake boots
- Wear insect repellent and avoid contact with poisonous vectors when possible.
- Always check weather forecast for the area prior to planning trip.
- Tailor clothing choices to anticipated weather conditions.
- Always pack hydration supplements and regularly intake water.
- Never attempt to drink from untreated, natural sources.
- Wear sunscreen, full brim hat, and other coverings to cover exposed body parts from sun exposure. Balance UV exposure and heat stress.
- Always inspect travel path and select the terrain with least obstacles and elevation change. Avoid slopes and loose substrates.
- Only use machetes and other brush clearing tools when necessary.
- Always swing away from body parts arcing away from body.
- Always wear cut-resistant gloves (ANSI A4 or greater) when operating machetes or other brush clearing tools.
- Never approach cliffs, holes, culverts, or other drop offs.
- Be aware of traffic patterns and avoid working near roadways when possible.
- Be aware of public persons and always assume a neutral, non-engaging demeanor. If confrontation occurs or is suspected evacuate the area and contact local authorities if warranted.
- When possible, avoid working alone and communicate travel plans with a supervisor. Stick to planned travel route at all times.
- Always carry maps, GPS, radio, cell phones and other tools to prevent getting lost.

TN TDOT Department of Transportation

work 4 us

JOB SAFETY ASSESSMENTS

TRAFFIC COUNTING

SUMMARY OF TRAFFIC COUNTING

TDOT continuously collects traffic information on Tennessee's roadways as part of the Department's responsibility to monitor, collect, analyze, manage, and disseminate transportation data. Traffic data includes volume counts, vehicle classification counts, and speed data. Annual Average Daily Traffic (AADT) volume is used throughout the Long-Range Planning process. TDOT collects Average Daily Traffic (ADT), which is based on a 24-hour count. This information is transformed in AADT by using the raw traffic data, which is statistically corrected by a seasonal variation factor that considers time of year and day of the week, as well as adjustments for vehicle type, determined by seasonal and axle correction factors.

TOP 5 HAZARDS

1. Contact with Vehicles / Traffic
2. Ergonomic / Soft Tissue Injury
3. Contact with Hand Tool
4. Laceration from Hand Tool
5. Chemical Exposure from Batteries

OHS SHAREPOINT

STANDARD PPE FOR GENERAL TRAFFIC COUNTING

APPLICABLE TDOT OHS PROGRAMS

- OHS-002 Hazard Communication Program
- OHS-008 Walking Working Surfaces
- OHS-009 Injury and Property Damage Reporting
- 305-01 PPE Policy
- 305-02 Bloodborne Pathogens Program
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Guidance for Voluntary Respirator Use- General
- Emergency Action Plans (EAPs)
- Memorandum - Lane Crossing

RELATED PROGRAMS AND REFERENCES

- OSHA Safety and Health Topics

Print Section

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

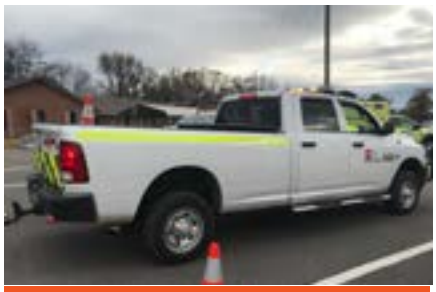
Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • Perform a pre trip inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. – 303-05 Motor Vehicle Utilization Policy • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – HS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available).

- Call the TN Auto Accident Call Center at (855)-253-0629.
- Notify direct supervision of incident and initiate an incident report.
- Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.



Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Strain, Sprain, or Bone Fracture While Exiting Vehicle

Controls (How I keep from getting hurt?)

- If entering or working in a TDOT WORK ZONE refer to the JSA:
  - VEHICLE OPERATIONS – WORK ZONE VISITS
- If possible, perform survey or job from within vehicle. Only exit if necessary.
- Avoid pulling off of the roadway in low-light conditions.
- Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder.
- Avoid pulling into an unprotected median or on the left side shoulder.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- If parked within a work zone, position vehicle in front of vehicle(s) equipped with a standard lighting package.
- Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off.
- Communicate pull-off maneuver with turn signals well in advance of move.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.
- Always plan an escape route when working near an active lane.

Maintenance of Automated Traffic Counters (ATR) / Embedded Detection Loops (EDL)

Description:
Maintenance of ATR and EDL systems used to remotely count traffic. Systems include electrical wiring, signage, and batteries.

Hazards (How can I get hurt?)

- Shock from contact with DC power
- Shock from stored electrical energy (batteries)
- Ergonomic/Soft Tissue Injuries from Handling Batteries
- Exposure to Battery Acid and Corrosion
- Ergonomic/Soft Tissues Injuries from Sign Post Installation
- Exposure to Air Contaminants During Soldering Activities
- Thermal Burns from Soldering Activities

Controls (How I keep from getting hurt?)

- Only qualified electricians may perform work on electrical systems.
- Always use rated, insulated, and properly inspected electrical testing equipment and tools.
- Wear proper electrical PPE:
  - Safety glasses
  - Electrical-rated gloves (insulated inner/outer work gloves)
- Ensure all electrical PPE is within date and inspected before use.
- Always disconnect the negative battery terminal on a battery bank prior to performing work.
- Use proper lifting technique and never lift >50lbs without assistance.
- Do not attempt to open or handle damaged batteries. Batteries with housing damage or bulging should be avoided.
- When removing or handling batteries with corrosion wear proper PPE:
  - Safety glasses
  - Chemical gloves (nitrile)
- Always wash hands after handling batteries with corrosion present. Never touch eyes or mouth with any corrosion residue.
- When installing sign posts, use post driver in an ergonomic stance.
- Do not rush or force the sign post driver, use gravity and inertia to drive the post.
- Take regular breaks and switch personnel performing task if available.
- When soldering, ensure adequate air flow is present in work area.
- Avoid solder fumes in the breathing zone.
- Wear proper PPE when soldering:
  - Safety glasses
  - Heat-resistant gloves
- Always treat the solder iron as hot and store only on a heat sink cradle.
- Do not solder in the presence of flammable or combustible products.
- Clear work area prior to starting solder task.
- When finished, always turn the soldering iron off.
- Avoid flicking solder, instead use a sponge or similar product to remove excess solder from iron.
- Use remote handling devices to support work to avoid burns or unexpected shifting of work piece.

Installation of Portable Traffic Counters

Description:
Various installation activities involving hand tool usage for installing roadside traffic counting equipment.

Hazards (How can I get hurt?)

- Contact/Puncture/Laceration from Slipped or Broken Tool
- Awkward Posture – Soft-Tissue Injury
- Repetitive Motion Injury
- Tool Break Apart or Flying Debris
- Contact or Glancing Blow from Hand Tool

Controls (How I keep from getting hurt?)

- Always select the proper tool for the job.
- Assume a neutral position prior to using tool.
- Always ensure that adequate leverage is applied to tool to ensure a positive grip and support.
- Ensure all hand tools are inspected prior to use.
- Wear proper PPE:
- Safety glasses
- Cut-resistant gloves (ANSI A4 or higher)
- Hearing protection
- Keep hands and body parts away from strike zone during use.
- Anticipate the potential failure path of the tool and position the body outside of the potential failure path.
- When cutting traffic tubes or other similar devices always cut away from the body.
- Ensure that a spotter is present prior to crossing roadway for traffic tube installation.
- Consider traffic control devices for high speed and high ADT roadways.

JOB SAFETY ASSESSMENTS

VEHICLE OPERATIONS

SUMMARY OF VEHICLE OPERATIONS

TDOT personnel may operate a state-owned motor vehicle for various official functions in performance of their duties. Motor vehicles can include various fleet and specialized vehicles throughout the state on more than 95,000 miles of public road. Vehicle serve various purposes of transporting personnel, transporting materials, performing construction activities, inspection, and various other applications. Vehicle operations are crucial to the efficient and safe completion of TDOT functions.

TOP 5 HAZARDS

1. Motor Vehicle Accidents
2. Struck by Vehicle
3. Contact with Flying Debris While in Vehicle
4. Slips, Trips, Falls while Entering/Exiting Vehicle
5. Ergonomic Strain from Operation Vehicle

OHS SHAREPOINT

STANDARD PPE FOR GENERAL VEHICLE OPERATIONS

APPLICABLE TDOT OHS PROGRAMS

- OHS-001 Vehicle and Mobile Equipment Securement LOTO Program
- OHS-002 Hazard Communication Program
- OHS-009 Injury and Property Damage Reporting
- 305-01 PPE Policy
- 305-03 Motor Vehicle Utilization
- Auto Accident Reporting Information
- Emergency Action Plans (EAPs)
- Memorandum - Lane Crossing

RELATED PROGRAMS AND REFERENCES

- TDOT Workzone Field Manual

Print Section

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • Perform a pre trip inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. – 303-05 Motor Vehicle Utilization Policy • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629.

- Notify direct supervision of incident and initiate an incident report.
- Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (On or Near Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)

- Injury or Death from Vehicle Striking Stopped Vehicle
- Injury or Death from Vehicle Striking Personnel Outside Vehicle
- Contact from Road Debris or Ejected Roadway Debris
- Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
- Strain, Sprain, or Bone Fracture While Exiting Vehicle

Controls (How I keep from getting hurt?)

- If entering or working in a TDOT WORK ZONE refer to the JSA:
  - VEHICLE OPERATIONS – WORK ZONE VISITS
- If possible, perform survey or job from within vehicle. Only exit if necessary.
- Avoid pulling off of the roadway in low-light conditions.
- Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder.
- Avoid pulling into an unprotected median or on the left side shoulder.
- Pull as far off of the roadway as possible and park behind a solid obstruction when possible.
- Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off.
- Communicate pull-off maneuver with turn signals well in advance of move.
- Never park on or near (within 3 feet) of a railway crossing or rail.
- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls.
- Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.
- Wear proper PPE:
  - High visibility vest (class 3)
- Once out of the vehicle, remain away from the road or behind solid obstructions.
- Do not attempt to cross lanes of an active roadway.

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • Perform a pre trip inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. – 303-05 Motor Vehicle Utilization Policy • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist. • Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available).

- Call the TN Auto Accident Call Center at (855)-253-0629.
- Notify direct supervision of incident and initiate an incident report.
- Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Parking and Exiting Vehicle (General, Non-Motorway)

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, or other TDOT worksite.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Strike • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• Never park on or near (within 3 feet) of a railway crossing or rail. • Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle. • When possible, park the vehicle on a flat surface free of obstructions. • When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot. • Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle. • Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards and keep your eyes on path when walking to other areas to prevent slips, trips and falls. • Avoid jumping down from high ground clearance vehicles using 3 points of contact (2 hands, 1 foot for climbing) facing the vehicle when exiting.

GENERAL NON-WORKSITE VISITS

JOB STEPS, HAZARDS AND CONTROLS

Date Prepared: 5/12/2023 | Last Revision: 8/10/2023

Operating State Fleet Vehicle

Description:
Driving or otherwise operating TN State-owned vehicle for official functions.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage	• Always ensure that proper vehicle operation documents are current and available while operating a motor vehicle. • Perform a pre trip inspection of the vehicle to ensure that all vehicle and safety system are operating as intended. – 303-05 Motor Vehicle Utilization Policy • Familiarize yourself with vehicle system operation prior to entering traffic. • Ensure PPE is available for all personnel if intending to exit vehicle. • Adjust the seat, mirrors, and steering wheel to driver. • Always wear a seat belt when operating or riding in a vehicle. • Follow all traffic laws while operating vehicle. • Always operate vehicles in a defensive manner yielding to other vehicles, bicyclists, and motorcyclist.

- Do not use electronic devices while operating motor vehicles unless in a hands-free mode.

Motor Vehicle Accidents (MVA), Traffic-Related Incidents, and Emergencies

Description:
In the event of a MVA or other traffic-related incident with or without injury.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Motor Vehicle Accident • Contact with Pedestrian • Vehicle or Object Damage • Medical Emergency	• If a MVA occurs, notify the authorities to initiate an investigation and summon emergency assistance as needed. – OHS-009 Injury and Property Damage Reporting • If possible, move the vehicle to a location off of the road protected from traffic interaction. Preferably, a physical barrier will separate vehicle from traffic (e.g. guardrail). • Do not attempt to exit the vehicle on the roadway unless a greater hazard exists (e.g. train, hazmat spill, vehicle fire, etc.). • If the incident scene is secure. Exit the vehicle, inspect damage, and exchange information with other driver(s) as applicable. • Notify direct supervision of incident and initiate an incident report. • Never turn your back to traffic. • Follow guidelines and procedures for incident reporting per TN Department of Treasury, Division of Claims and Risk Management (pdf available). • Call the TN Auto Accident Call Center at (855)-253-0629 • Notify direct supervision of incident and initiate an incident report. • Safety Sensitive Employees (CDL License holders) follow post-incident drug testing procedures and requirements.

Entering Active Work Zone, Parking Vehicle, and Exiting Vehicle

Description:
Stopping, parking, and/or exiting a State-owned vehicle on or near an active motorway, ROW, work zone, or other TDOT worksite.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)
• Injury or Death from Vehicle Striking Stopped Vehicle • Injury or Death from Vehicle Striking Personnel Outside Vehicle • Contact from Road Debris or Ejected Roadway Debris • Injury or Death from Runaway Vehicle or Unintended Vehicle Movement • Strain, Sprain, or Bone Fracture While Exiting Vehicle	• If possible, perform survey or job from within vehicle. Only exit if necessary. • Avoid pulling off of the roadway or exiting the vehicle in low-light conditions. • Contact the work zone supervisor prior to the visit to establish communication. • Pre-plan the pull-off area along the route when possible to select an optimal location. When possible, select areas with minimal traffic, straight road, no intersections/ramps, guardrail, and with adequate shoulder. • Avoid pulling into an unprotected median or on the left side shoulder unless there is no other option. • Pull as far off of the roadway as possible and park behind a solid obstruction when possible. • Initiate hazards, lights signals, signage or other available vehicle safety devices if so equipped prior to pull off. • Communicate pull-off maneuver with turn signals well in advance of move. • Never park on or near (within 3 feet) of a railway crossing or rail.

- Always bring the vehicle to a complete stop, put the vehicle in Park (or leave in gear, as applicable), and apply parking brake when parking vehicle.
- Never leave the vehicle running when not attended.
- When possible, park the vehicle on a flat surface free of obstructions.
- When possible, avoid slopes, mud, embankments, waterway banks, and areas with overhead hazards when selecting a parking spot.
- Always check for obstructions, pedestrians, moving vehicles and other hazards prior to exiting vehicle.
- Once door is open, visually inspect step-off area for uneven terrain, obstructions, pests, and other hazards.
- Avoid jumping down from high ground clearance vehicles.
- Wear proper PPE:
  - High visibility vest (class 3)

Pedestrian Safety in Active Work Zone

Description:
General pedestrian considerations when working in a TDOT work zone.

Hazards (How can I get hurt?)	Controls (How I keep from getting hurt?)

• Injury or Death from Vehicle Striking Stopped Vehicle
• Injury or Death from Vehicle Striking Personnel Outside Vehicle
• Contact from Road Debris or Ejected Roadway Debris
• Injury or Death from Runaway Vehicle or Unintended Vehicle Movement
• Slip, Trip, Fall
	• Always have an escape route when outside of a vehicle in a work zone. The escape route should be a clear path available at all times to escape an errant motorist. The escape route should include:
	  – A clear path away from danger
	  – Level ground free of obstructions
	  – Avoid being on the danger side of stationary objects (vehicles, heavy equipment, guardrails, etc. which may block exit.
	• NEVER turn your back to traffic.
	• Upon exiting the vehicle, don the proper work zone PPE:
	  – Safety toe boots
	  – Hard hat (class G or equivalent)
	  – High visibility vest (class 3)
	  – ANSI Z87.1 rated safety glasses
	• Avoid walking on steep slopes, areas with disturbed soil, or areas with loose debris.
	• Always plan walking route and maintain eyes on path.
	• Do not operate a cell phone or similar electronic device while walking.

Working Around Equipment in Active Work Zone

Description:
Pedestrian considerations when in an active TDOT work zone with heavy equipment operations.

Hazards (How can I get hurt?)

- Injury or Death from Contact with Heavy Equipment
- Injury or Death from Ejection of Debris from Heavy Equipment Operations
- Equipment of Load Instability
- Contact with Heavy Equipment Counterweight
- Dropped Load

Controls (How I keep from getting hurt?)

- When possible, avoid approaching heavy equipment (within 20').
- Do not enter demarcated areas without authorization and always communicate intentions to include travel path and duration of stay.
- Always establish communication with heavy equipment operator (radio, visual, verbal) if transitioning within 20' of vehicle (in front or immediately behind).
- Do not approach heavy equipment unless equipment is in a safe condition (bucket lowered, parking brake set, blade down, etc.).
- Anticipate the fall path for any object being carried or moved and avoid the "shadow of the load".
- Never stand under or near a suspended load.

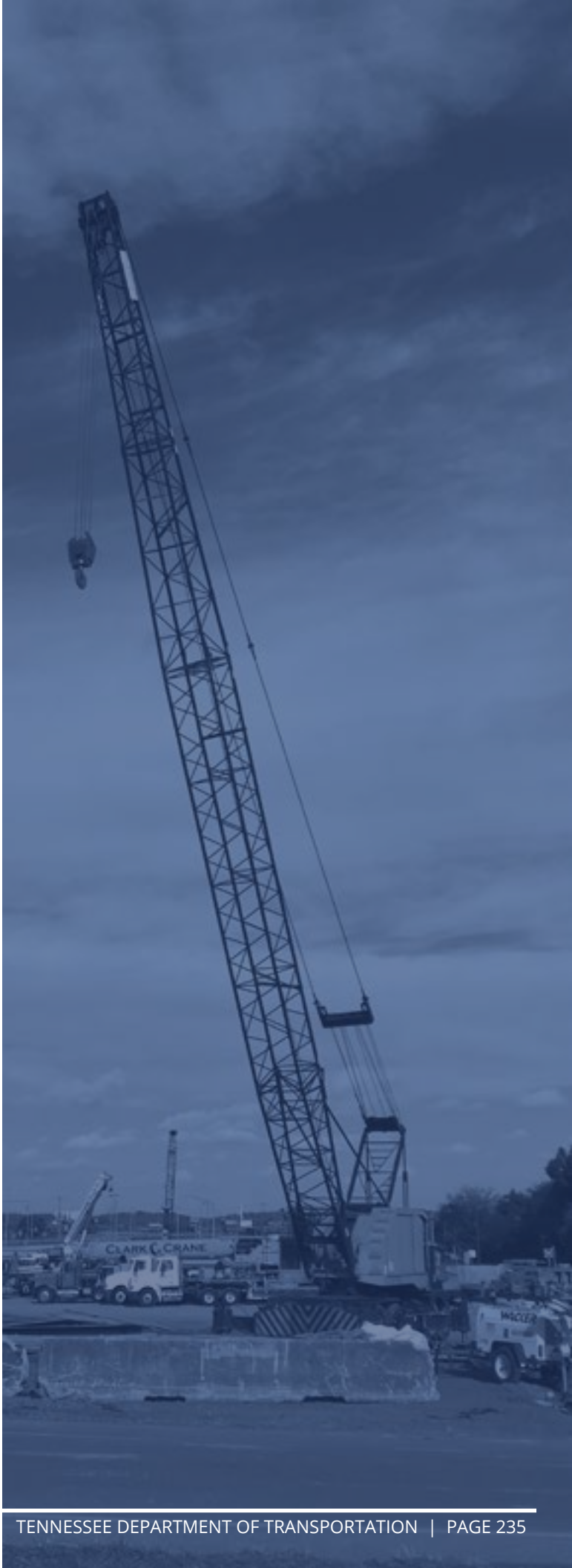
TDOT PROGRAMS

INTRODUCTION TO BEHAVIOR BASED SAFETY (BBS)

Behavior based safety (BBS) is a proactive approach on increasing safe behavior in an area by reducing unsafe acts. BBS focuses on identifying and correcting unsafe behaviors by observing the behavior of a person or group and determining consequences occur. To positively influence safety culture in the workplace all levels of the organization must embrace safety awareness, observation, and accountability.

BBS at TDOT includes:

- An established safety culture creates the perfect foundation to build a program element that addresses the “people side of safety”.
- Each person owns safety at work and outside of work. Safe behaviors are carried out daily.
- People go beyond the call of duty to identify unsafe conditions and at-risk behaviors, AND they intervene to correct them.
- We must treat each other with dignity and respect when it comes to safety. We care about one another and we speak up if we need to do so. “If we see something, we say something”.
- Safe work practices are supported intermittently with rewarding feedback from both peers and leaders. Simply put, we should recognize each other for doing the right thing.



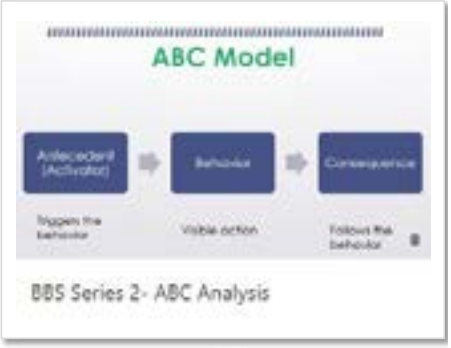
HELPFUL BBS LINKS

- Critical Behavior Checklist Guide and Generic Sample
- Approach, Introduce and Set Expectations Resource Guide
- Observe the Task Resource Guide
- Feedback Session Basics Resource Guide
- Barriers to Safe Behavior Guide

Behavior Based Safety

BBS VIDEOS

BBS Series 1- Culture is the Foundation



BBS Series 2- ABC Analysis

BBS Series 3- Barriers to Safe Behaviors

BBS Series 4- Steps to Conducting Observation

BBS Series 5- Giving Effective Feedback

BBS Series 6-Watch a Formal Observation

BBS Series 7- Watch Informal Observations

Occupational Health & Safety Division: Safety Written Program		
Vehicle and Mobile Equipment Securement (LOTO) Program OHS-001	**Issued: 7/1/2019**	**Revised:**

I. INTRODUCTION

The purpose of Vehicle and Mobile Securement LOTO is to protect employees from the release of stored or potential energy during maintenance operations and activities. Vehicles and mobile equipment have the potential to contain various types of hazardous energy. For purposes of vehicle servicing and maintenance, hazardous energy refers to mechanical motion; potential energy due to pressure, gravity, or springs; battery-generated electrical energy, which can cause injury to employees working in, on, or around machines or equipment. Any vehicle/equipment [e.g., internal combustion engines such as gasoline, natural gas and diesel powered vehicles; electric-powered vehicles; hybrid (gasoline/electric) vehicles] may contain the following types of hazardous energy, such as, but not limited to:

- Mechanical hazards associated with unexpected start-up
- Mechanical motions due to moving power transmission components
- Mechanical hazards with brake springs and tire components
- Hydraulic hazards associated with fluid pressure and loss
- Gravitational energy from elevated vehicles and lifts
- Gravitational energy from elevated truck-mounted equipment such as dump beds
- Air bag explosion
- Electric battery shock, arc or burns
- Fuel and fluid system fire or explosion
- Hot or cryogenic fluid and surface hazards
- Chemical energy (i.e. battery acid, coolants, lubricants, etc.)

II. Vehicle/Equipment Specific Procedures

A schedule shall be developed for each piece of machinery or equipment before lockout/tagout procedures are performed. This shall be developed using the LOTO Procedure Form template illustrated in Appendix A by the Safety Manager/Coordinator in consultation with the HQ OHS Division and HQ Maintenance which outlines the following:

- The energy sources
- Location of disconnects
- Type of disconnect
- Special hazards
- Special safety procedures

Equipment specific procedures must be developed, documented and communicated to control potentially hazardous energy when employees are servicing it.

III. GENERAL PROCEDURES TO SECURE (LOTO) VEHICLES AND MOBILE EQUIPMENT

The procedures listed below are meant to act as general guidance. Refer to specific vehicle/equipment LOTO securement procedures developed for each piece of equipment. Do not hesitate to contact the Regional Safety Staff, HQ OHS Division, or HQ Maintenance for any questions that may arise.

Locking Out Vehicle/Mobile Equipment and Removing Stored Energy Hazards or Unexpected Startup

Locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners or other hardware shall be used for isolating, securing or blocking of vehicles/mobile equipment from energy sources.

1. Disconnect Battery or Deactivate master battery disconnect switch

To prevent an engine from being accidentally started by the technician shorting out the ignition circuit or cooling fans automatically starting after the key is removed from the ignition, disconnect the battery cables. Allow the engine to cool down sufficiently, allowing heat and pressure to dissipate.

2. Remove and Secure Key

Secure key where other personnel cannot gain access to it during maintenance activities. When applicable, remove the ignition key from the ignition switch. The technician should maintain sole possession of that key, placing it in his or her pocket or a designated lock box. Doors to the vehicle could also be locked.

3. Lower or Block-up Components

Depending on the type of vehicle being worked on and service being performed, technicians may need to either lower or block-up components that are held up by hydraulic pressure, such as dump beds and aerial lifts.

- Chock or block wheels to prevent a vehicle from rolling

  Chocks or blocks are required when using four post lifts.

- Use manufacturer provided or manufacturer approved props/blocks/components

  To ensure proper securement, Technicians should not create their own support braces without manufacturer approval.

4. Release/Remove any stored energy in pressurized systems

5. Re-energizing during Troubleshooting

Refer to the procedure that defines the sequence of actions necessary to accomplish the task safely for each type of equipment such as for dump trucks, skid steers, backhoes, and loaders.

Visual Hazard Notification Vehicle/Mobile Equipment

1. Apply a steering wheel cover or door decal stating vehicle/equipment (or both) is out of service and cannot be operated.

2. Provide perimeter clearance of vehicle/mobile equipment during service through signs, cones, caution tape, safety chains, barricades, and/or coworkers verbally communicating the hazards.

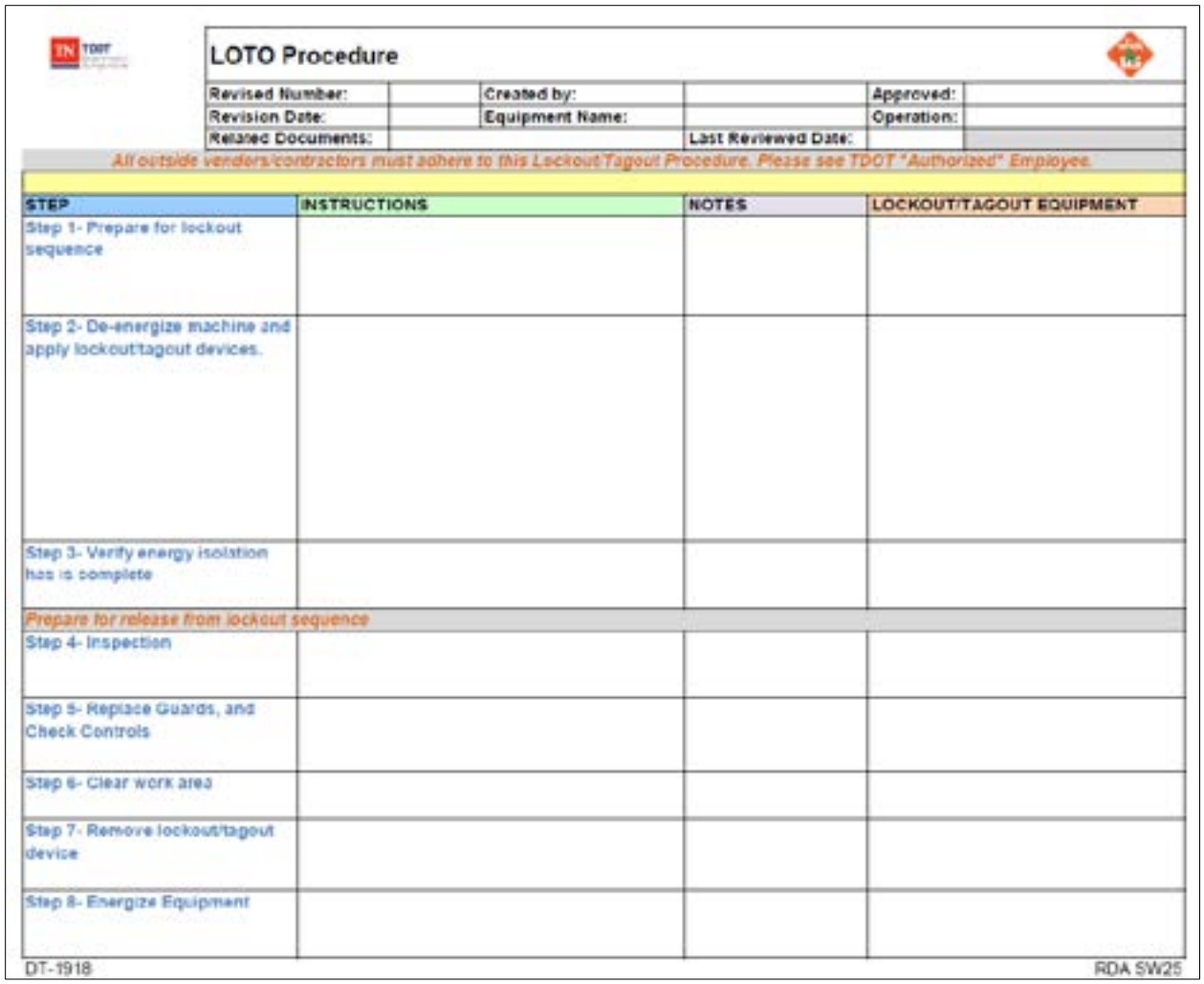
IV. Periodic Inspections

Conduct an annual inspection of the energy control procedures for vehicle/mobile equipment to ensure that the procedure and the requirements of this standard are being followed. See Appendix B for required inspection template.

V. Follow Manufacturer's Guidelines

Use the specific vehicle manufacturer on its service guidelines. (Those service guidelines can double as guidelines to help fleets develop energy control procedures in the shop.)

APPENDIX A



LOTO Procedure

Revised Number:		Created by:		Approved:	
Revision Date:		Equipment Name:		Operation:	
Related Documents:			Last Reviewed Date:		

All outside vendors/contractors must adhere to this Lockout/Tagout Procedure. Please see TDOT "Authorized" Employee.

STEP	INSTRUCTIONS	NOTES	LOCKOUT/TAGOUT EQUIPMENT
Step 1- Prepare for lockout sequence			
Step 2- De-energize machine and apply lockout/tagout devices.			
Step 3- Verify energy isolation has is complete			
Prepare for release from lockout sequence			
Step 4- Inspection			
Step 5- Replace Guards, and Check Controls			
Step 6- Clear work area			
Step 7- Remove lockout/tagout device			
Step 8- Energize Equipment			

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APPENDIX B

LOCKOUT/TAGOUT PERIODIC INSPECTION

Page ____ of ____

TDOT	Date
Location: / Building:	Dept.
Machine/Equipment Name	I.D. No.
Authorized Inspector (Print)	I.D. No.

The identified machine/equipment requires a periodic inspection of the energy control procedures according to §1910.147(c)(6) – The Control of Hazardous Energy (Lockout/Tagout). Check (✓) or complete all elements of this form that apply to the Periodic Inspection. [NOTE: This standard does not apply to construction, agriculture, or maritime industries.]

ENERGY SOURCES

☐ Electrical	☐ Hydraulic	☐ Chemical	☐ Other:
☐ Mechanical	☐ Pneumatic	☐ Thermal	

ENERGY ISOLATING DEVICES

☐ A manually operated electrical circuit breaker	☐ A similar device used to block or isolate energy
☐ A disconnect switch	☐ Other:
☐ A manually operated switch by which the circuit's conductors can be disconnected from all underground supply conductors (no pole can be operated independently)	
☐ A line valve ☐ A block	*NOTE: Push buttons, selector switches, and other circuit type devices are not energy-isolating devices.*
☐ The authorized employees understand the energy control procedures for this machine/equipment	☐ The lockout/tagout procedures are being followed
☐ The authorized employees understand how the requirements of the standard apply	☐ Employees understand their responsibilities in the energy control procedures
☐ The authorized employees understand which locks/tags are to be used on this machine/equipment	☐ Any identified deviations or inadequacies that require attention are listed on the following page
☐ Tagout procedures have been reviewed when tagout alone is the only means of energy isolation	☐ Tagout also uses valve handle removal
☐ Tagout also uses the removal of an isolating circuit element	☐ Tagout also uses the opening of an extra disconnect switch
☐ Tagout also uses blocking of a controlling switch	

THE ITEMS CHECKED ABOVE HAVE BEEN REVIEWED/EXPLAINED WITH THE AUTHORIZED EMPLOYEES AT THE TIME OF THE PERIODIC INSPECTION. (AFFECTED EMPLOYEES WERE INCLUDED IF TAGOUT ALONE IS USED.)

Employee (Signature)	Date	Employee (Signature)	Date

I hereby certify the periodic inspection for compliance with lockout/tagout standards on this machine/equipment as specified by OSHA §1910.147 has been satisfactorily completed with the employees identified above.

Authorized Inspector:			
	Signature	Title	Date

DT-1919 RDA SW25

LOCKOUT/TAGOUT PERIODIC INSPECTION SUMMARY SHEET

Page ____ of ____

Location	Date
Machine/Equipment Name	I.D. No.
Authorized Inspector (Print)	Title

Record any deviations or inadequacies that need attention:

Deviations or inadequacies to be corrected by (date)

Routed to	Date
Authorized Inspector (signature)	Date

Repairs/corrections have been completed:

Name (signature)	Title	Date

DT-1919 RDA SW25

Appendix C

Standardized Equipment

Contact the headquarters OHS Division for the standardized approved LOTO equipment vendor and ordering information.

Examples of Vehicle/Equipment LOTO Equipment

1. Tags, Hasps, Locks

2. Steering Wheel Cover

Occupational Health & Safety Division: Safety Written Program		
Hazard Communication (HAZCOM) Program OHS-002	**Issued: 7/1/2019**	**Revised:**

I. INTRODUCTION

TDOT is committed to preventing injuries and illnesses of all employees. This program complies with federal and state laws regarding Hazard Communication (HAZCOM): 29 CFR 1910.1200, Hazard Communication and Tennessee Hazardous Chemical Right-to-Know Law (TN Code Sec. 50-3-2001 et seq.). Through this program, employees are informed of the TOSHA Hazard Communications Standard, the properties and risks of chemicals they work with, procedures for safe handling, and safety measures. The chemicals employees handle may pose physical or health-related hazards, or even both. This written program is available to all employees upon request and in every TDOT facility and job site.

The Headquarters Occupational Health and Safety Division coordinates this program and is responsible for reviewing and updating the program, as necessary. Copies of the written program may be obtained from the Regional Safety Managers or the Headquarters Occupational Health and Safety Division.

II. DEFINITIONS

Chemical – any substance or mixture of substances.

Chemical Name – the scientific designation of a chemical.

Classification – identification of the relevant data regarding the hazards of a chemical, reviewing those data to ascertain the hazards associated with the chemical, and deciding whether the chemical will be classified as a hazardous chemical.

Product Identifier – any designation or identification such as code name, code number, trade name, brand name, or generic name as used to identify a chemical other than by its chemical name.

Container – any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank, or the like that contains a hazardous chemical or substance.

Hazard Category – the division of criteria within each hazard class.

Hazard class – the nature of the physical or health hazards posed by a chemical.

Hazard Statement – a statement assigned to a hazard class and category that describes the nature of the hazard(s) of a chemical, including, where appropriate, the degree of hazard.

Hazardous Chemical – any chemical which is classified as a physical or health hazard, a simple asphyxiant, combustible dust, pyrophoric gas, or hazard not otherwise classified.

Health Hazard – a chemical which is classified as posing one of the following hazardous effects: acute toxicity, skin corrosion or irritation, serious eye damage or irritation, respiratory or skin sensitization, germ cell mutagenicity, carcinogenicity, reproductive toxicity, specific target organ toxicity, or aspiration hazard.

Label – an appropriate group of written, printed, or graphic information elements concerning a hazardous chemical that is affixed to, printed on, or attached to the immediate container of a hazardous chemical, or to the outside packaging.

Physical Hazard – a chemical that is classified as posing one of the following hazardous effects: explosive, flammable, oxidizer, self-reactive, pyrophoric, self-heating, organic peroxide, corrosive to metal, gas under pressure, or in contact with water emits flammable gas.

Pictogram – a composition that may include a symbol plus other graphic elements, such as a border, background patter, or color, that is intended to convey specific information about the hazards of a chemical.

Precautionary Statement – a phrase that describes recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure to a hazardous chemical, or improper storage and handling.

Safety Data Sheet (SDS) – a written or printed material concerning a hazardous chemical.

Signal Word – a word used to indicate the relative level of severity of hazard and alert the reader to a potential hazard on the label.

Specific Chemical Identity – the chemical name, Chemical Abstracts Service (CAS) Registry Number, or any other information that reveals the precise chemical designation of the substance.

Substance – chemical elements and their compounds in the natural state or obtained by any production process.

III. WORKPLACE CHEMICAL LIST (WCL)

Each facility shall maintain a workplace chemical list WCL (chemical inventory) of all hazardous chemicals known to be in the work place. Detailed information about the physical, health, and other hazards of each chemical shall be maintained in the form of Safety Data Sheets (SDS's) that can easily be cross referenced with the workplace chemical list. The product identifier shall be used to cross-reference all labels, SDS's, and the workplace chemical list.

Per Chapter 0800-01-09 Hazardous Chemical Right to Know, the WCL will contain the following content:

a) Workplace/Department Location Name and Mailing address
b) Primary NAICS code- if applicable
c) Description of the workplace operation i.e. garage and county lots, on road, wash rack
d) Product Identifier referenced on the SDS
e) Work area or workplace in which the hazardous chemical is used, stored or generated

All locations will maintain copies of their WCL. Newly assigned employees shall be made aware of the chemicals before required to work in an area containing hazardous chemicals.

The chemical inventory list shall be updated as new chemicals are brought into the workplace. See Appendix A for the required WCL template for each location.

All WCL's shall be reviewed semi-annually, to identify all materials that pose chemical hazards and ensure that necessary information is provided regarding that hazard.

IV. LABELS, CONTAINERS AND OTHER FORMS OF WARNING

The labeling systems used by TDOT shall follow the requirements of the 2012 revision of the OSHA Hazard Communication Standard to be consistent with the United Nations **Globally Harmonized System (GHS) of Classification of Labeling Chemicals.** Labels are used to convey information about the hazards posed by a chemical through standardized label elements that include information such as symbols, signal words, and hazard statements. See Appendix B for an example of a GHS compliant label and Appendix C for GHS compliant hazard pictograms.

Labels on incoming containers of hazardous materials shall not be removed or defaced in any manner.

All containers containing hazardous chemicals shall be labeled with the following:

a) Product identifier
b) Signal Word
c) Hazard Statement(s)
d) Pictogram(s)
e) Precautionary statement(s)
f) The name, address, and telephone number of the responsible party.

The Regional Safety Managers and employee supervisors are responsible for ensuring that all hazardous chemicals in containers are properly labeled and updated, as necessary.

Containers

Primary Containers are containers used to ship hazardous chemicals from a manufacturer or facility;

Secondary Containers are containers, such as spray bottles, in which hazardous chemicals are put in for use;

Portable Containers or Pipes are containers in which an employee transfers chemicals from a labeled container solely for the immediate use of the employee who performs the transfer.

Primary containers shall be labeled with the contents and the manufacturer's name and address with appropriate hazard warnings.

Secondary Containers shall be labeled with the chemical identity and appropriate hazard warnings (i.e., “Flammable”, “May Cause Lung Damage”).

Signs or other written materials containing the same information as labels shall be posted for stationary process containers in close proximity to the container and work area.

Portable containers shall be labeled with chemical identity and appropriate warnings in case all of the transported hazardous materials are not removed from the container.

V. SAFETY DATA SHEETS (SDSs)

The manufacturer or importer of a chemical is required, by OSHA, to develop a Safety Data Sheet that contains specific, detailed information regarding the hazards associated with a chemical using a specified format. TDOT employees shall not develop their own SDS, they must use the SDS provided by the manufacturer.

Employees who purchase chemicals shall obtain the necessary SDSs for all new hazardous chemicals used or shipped by employees.

SDS’s are updated and managed by the facility supervisor and reviewed by the Regional Safety Manager and crossed referenced on the location’s workplace chemical list. Copies of the SDS’s shall be available to employees in either hard copy or electronic format at all times.

VI. TRAINING

Employees shall attend hazard communication training that covers the following topics before starting their assigned job duties or exposure to new hazardous chemicals and then on an annual basis:

a) An overview of the requirements found in the OSHA Hazard Communication Standard;
b) Hazardous chemicals present in their workplace;
c) Any operations in their work area in which hazardous chemicals are used;
d) The location of the written hazard communication plan;
e) How to understand and use the information found on SDSs;
f) How and where to access SDS documents;
g) Physical and health hazards associated with chemicals in the work area;
h) Steps taken to prevent or reduce exposure to chemicals;
i) Methods used to detect the presence or release of hazardous chemicals;

j) How employees can protect themselves against exposure;
k) Explanation of pictograms, signal words, hazard statements, and precautionary statements;
l) Emergency procedures to follow if exposed to a hazardous chemical.

Supervisors are responsible for ensuring that all their employees receive this training. After completing the training, employees shall sign a roster to verify the training provided, acknowledge employee responsibilities, and confirm an understanding of the material.

VII. NON-ROUTINE TASKS

Prior to performing special or non-routine tasks that may provide exposure to hazardous chemicals, employees shall be advised by their supervisor regarding the hazards. The supervisor shall also inform the employee on how to control exposure and emergency procedures. TDOT shall provide all necessary controls and PPE for these tasks and provide all necessary training.

VIII. MULTI-EMPLOYER FACILITIES

When contractors, visitors, or employees belonging to other departments are exposed to hazardous chemicals, they shall be informed of the chemicals, provided copies of the SDS's, and provided with all necessary label and/or emergency precautionary information.

APPENDIX A

Contact HQ OHS Division or logon to the OHS SharePoint Page for a copy of the required WCL template.

Workplace Chemical List(WCL)

Region #: _____ District # _____ Building Location _____

	Product Identifier	CAS#, If applicable	Hazardous Chemical Y/N?	Non-hazardous or consumer product	Work Area Used	Work Area Name	Current SDS on File? Y/N	Additional Comments
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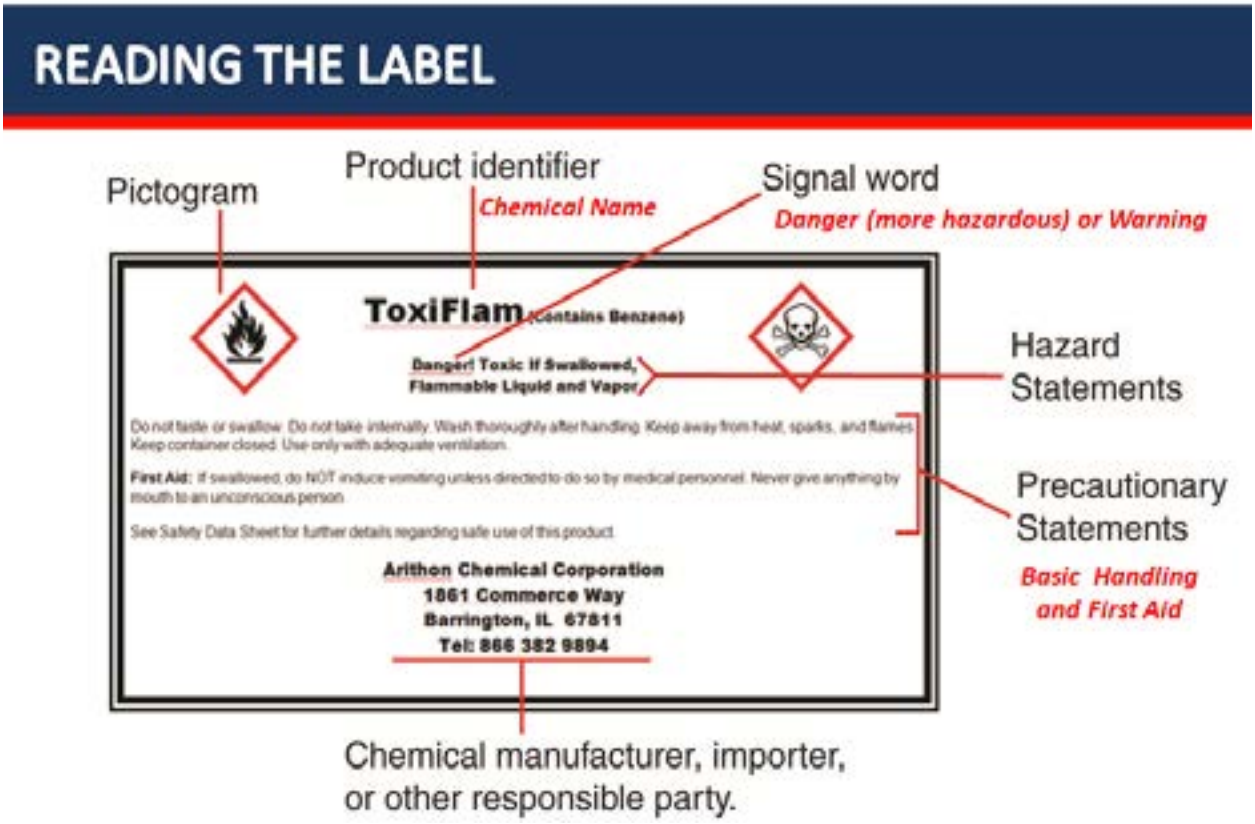
Appendix B

GHS COMPLIANT CHEMICAL LABEL



APPENDIX C

GHS COMPLIANT HAZARD PICTOGRAMS

TN TDOT Department of Transportation

Workplace Chemical List(WCL)

Region #: _____ District # _____ Building Location _____

Work4Us

Non-manufacturing employers shall compile and maintain a workplace chemical list, which shall contain the following information for each hazardous chemical normally used or stored in the workplace in excess of fifty-five gallons (55 gal.) or five hundred pounds (500 lbs.):

	Product Identifier	CAS#, If applicable	Hazardous Chemical Y/N?	Non-hazardous or consumer product	Work Area Used	Work Area Stored	Current SDS on File? Y/N	Additional Comments
1								
2								
3								
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Occupational Health & Safety Division: Safety Written Program		
Lockout/Tagout (LOTO) Program **OHS-003**	**Issued: 3/21/2022**	**Revised:**

I. Introduction

The purpose of LOTO is to protect employees from the release of stored or potential energy during maintenance operations and activities. This applies to general industry workers performing servicing and/or maintenance on machines or equipment and who are exposed to the unexpected energization, startup, or release of hazardous energy. Also, constructing, installing, setting up, adjusting, inspecting, modifying, maintaining and/or servicing machines or equipment, including lubrication, cleaning or unjamming of machines or equipment, and making adjustments or tool changes, where employees could be exposed to the unexpected energization or startup of the equipment or release of hazardous energy. Under the standard, the term "unexpected" also covers situations in which the servicing and/or maintenance is performed during ongoing normal production operations if:

- An employee is required to remove or bypass machine guards or other safety devices
- An employee is required to place any part of his or her body into a point of operation or into an area on a machine or piece of equipment where work is performed, or into the danger zone associated with the machine's operation.

There are many types of potentially hazardous energy such as: chemical, compressed air, compressed hydraulic fluid, electricity, gravity, kinetic energy, and nuclear energy.

The intent of this program is to establish practices to comply with the following:

29 CFR 1910.147, The Control of Hazardous Energy (Lockout/Tagout)

Exclusions to this standard:

1. Minor tool changes and adjustments, and other minor servicing activities that take place during normal production operations which are routine, repetitive, and integral to the use of that production equipment, as long as workers are effectively protected by alternative measures which provide effective machine safeguarding protection.
2. Work on cord and plug connected electrical equipment, if the equipment is unplugged from the energy source and the authorized employee has exclusive control of the plug.

II. Definitions

Affected Person – a person whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized (Qualified) Person – a person who locks out or tags out machines or equipment in order to perform servicing or maintenance and requires additional training under the standard.

Other - (those whose work activities are or may be in an area where energy control procedures may be utilized) must be instructed about the procedure and about the prohibition relating to attempts to restart or reenergize machines or equipment that are locked out or tagged out.

Activation/Energization – to set machinery into motion by starting, switching, pushing, moving, or otherwise engaging power sources for such equipment.

Capable of being locked out- An energy isolating device is capable of being locked out if it has a hasp or other means of attachment to which, or through which, a lock can be affixed, or it has a locking mechanism built into it. Other energy isolating devices are capable of being locked out, if lockout can be achieved without the need to dismantle, rebuild, or replace the energy isolating device or permanently alter its energy control capability.

Energy isolating device- A mechanical device that physically prevents the transmission or release of energy, including but not limited to the following: A manually operated electrical circuit breaker; a disconnect switch; a manually operated switch by which the conductors of a circuit can be disconnected from all ungrounded supply conductors, and, in addition, no pole can be operated independently; a line valve; a block; and any similar device used to block or isolate energy. Push buttons, selector switches and other control circuit type devices are not energy isolating devices.

Energy source- Any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy.

Lockout- The placement of a lockout device on an energy isolating device, in accordance with an established procedure, ensuring that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

Lockout device- A device that utilizes a positive means such as a lock, either key or combination type, to hold an energy isolating device in the safe position and prevent the energizing of a machine or equipment. Included are blank flanges and bolted slip blinds.

Tagout- The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Tagout device. A prominent warning device, such as a tag and a means of attachment, which can be securely fastened to an energy isolating device in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

Normal production operations- The utilization of a machine or equipment to perform its intended production function.

Setting up- Any work performed to prepare a machine or equipment to perform its normal production operation.

Servicing and/or maintenance- Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the *unexpected d*energization or startup of the equipment or release of hazardous energy.

III. Authorized Employee- General Requirements and LOTO Equipment

Only authorized employees shall remove locks, locking devices, or tags from machinery or equipment because they are the employees that placed the device on the equipment.

Only authorized employees shall conduct repairs, replace parts, or adjust machinery or equipment.

Authorized employees, and others covered by this procedure, shall only use TDOT issued lockout/tagout materials and items such as locks, locking devices, restraints, and tags. See Appendix C for standardized materials.

All qualified authorized employees shall be issued a lock with one key, a hasp, and tag, all of which shall be uniquely identifiable to that employee. All locks shall be keyed differently unless an employee is issued a series of locks for complex lockout/tagout tasks.

All locks shall be numbered and individually keyed with duplicate master keys controlled by the Maintenance Supervisor.

Additional locks and hasps may be checked out from a supervisor on a shift-by-shift basis.

Other locking devices (clamps, blinds, blanks, etc.) and restraints (chains, chocks, etc.) shall be suitable for their intended purposes.

Dual or redundant controls shall be removed from machinery and equipment.

IV. Machine/Equipment Specific Procedures

A schedule shall be developed for each piece of machinery or equipment before lockout/tagout procedures are performed. This shall be developed using the LOTO Procedure Form template illustrated in Appendix B by the Safety Manager/Coordinator in consultation with the Maintenance Supervisor and outlines the following:

- The energy sources
- Location of disconnects
- Type of disconnect
- Special hazards
- Special safety procedures

Equipment specific procedures must be developed, documented and communicated to control potentially hazardous energy when employees are servicing it.

Exception: The employer need not document the required procedure for a particular machine or equipment, when all of the following elements exist:

- The machine or equipment has no potential for stored or residual energy, or for reaccumulation of stored energy after shut down, which could endanger employees.
- The machine or equipment has a single energy source that can be readily identified and isolated.
- The isolation and locking out of that energy source will completely deenergize and deactivate the machine or equipment.
- The machine or equipment is isolated from that energy source and locked out during servicing or maintenance.
- A single lockout device will achieve a locked-out condition.
- The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance.
- The servicing or maintenance does not create hazards for other employees.

V. General Lockout/Tagout Standard Operating Procedure

Before a machine or piece of equipment is shut down, the "authorized" employee performing the maintenance shall have knowledge regarding the magnitude of energy, the hazards of the energy to be controlled, and the means by which to control the energy and shall also consult the machine or equipment's specific procedures.

Preparation for shutdown:

1) All affected employees shall be notified that the machinery or equipment is out of service and of the reason for the lockout/tagout.
2) Machine and Equipment Shutdown/De-energization:
3) The machine or equipment shall be shut down using the machine specific procedures.
4) If the machine or equipment is in operation, it shall be shut down following standard stopping procedures.

Machine and Equipment Isolation:

1) Move switch or panel arms to the "Off" or "Open" position and close all valves or other energy isolating devices so that the energy source(s) is disconnected from the machine or equipment.
2) After the machine or equipment is shutdown/de-energized, place the switch, valve, or other energy isolating device(s) in the position that positively isolates the equipment from its energy source(s).

Stored Energy:

1) All potential or residual energy shall be relieved, disconnected, restrained, or otherwise rendered safe.
2) When the re-accumulation of stored energy to a hazardous level is possible, verification of isolation shall be continued until the maintenance service is complete.
3) Stored energy shall be relieved or restrained by grounding, repositioning, blocking, and/or bleeding the system.

Lockout or Tagout Device Application:

1) Devices shall be affixed to energy isolating devices by authorized employees only and shall be affixed in a manner that will hold the energy isolating devices from the "Safe" or "Off" position.
2) Tagout devices shall be affixed in such a manner than will clearly state that the operation or movement of energy isolating devices from the "Safe" or "Off" position is prohibited and shall be attached to the same point a lock would be, and if that is not possible, the tag shall be affixed

as close to the device in a position that is immediately obvious to any employee that may come close to the equipment.

Verification of Isolation:

1) Prior to beginning work on machines or equipment that have been locked or tagged out, authorized employees shall verify that the isolation or de-energization of the machine or equipment has been accomplished.
2) After assuring that no employees are placed in danger, test all lock and tag outs by following the normal start-up procedures as a check on having the machine or equipment properly disconnected from all energy sources. Return all controls to the "Safe" or "Off" position.

Extended Lockout/Tagout:

1) Should the shift change before the completion of maintenance or service, the lockout/tagout shall remain.
2) If the task is reassigned to the next shift, those employees shall lock and tag out before the previous shift may remove their locks and tags.

Release from Lockout/Tagout:

1) The work area shall be inspected to ensure that all nonessential items are removed and that the components of the machine or equipment are fully operational;
2) Ensure that all guards have been properly reinstalled;
3) The work areas shall be inspected to insure that all employees have been safely positioned or removed from the area;
4) All affected employees shall be notified that the lockout/tagout is being lifted;
5) Each lockout or tagout device shall be removed from each energy isolating device by the employee who applied it.

Special Lockout/Tagout Standard Operating Procedure

In situations where lockout/tagout devices need to be removed temporarily, the following sequence of actions shall be followed:

1) Remove all nonessential items and ensure that the machine or equipment's components are operationally intact;
2) Notify affected employees that lockout/tagout devices have been removed temporarily and that all employees are out of the work area;
3) Employees who applied lockout/tagout devices remove them;
4) Energize to test or position;
5) De-energize and isolate all systems and reapply control measures.

6) Should an employee leave the facility before removing the lock or tag, a supervisor may remove them through the following steps:
7) Verify that the employee who applied the lock is not at the facility or job site;
8) Make all reasonable efforts to contact the authorized employee to inform him/her that their lockout or tagout device has been removed;
9) Ensure that the authorized employee has this knowledge before he/she resumes work, including unscheduled work.
10) The supervisor shall ensure that all tools have been removed from the work area, all guards properly replaced, and that all employees are free from hazard before the machine or equipment is returned to operation.

Where maintenance, repairs, cleaning, servicing, adjusting, or setting up operations cannot be accomplished with the prime mover or energy source disconnected, the following conditions shall be met:

- The operating station where the machine may be activated shall be under the control of a qualified operator
- All participants shall be in clear view of the operator or in positive communication
- All participants shall be beyond the reach of machine elements which may move rapidly and present a hazard
- Where machine configuration or size requires that the operator leave the control station to install tools, and where there are machine elements which may move rapidly if activated, each element shall be locked out.

Electrical Plug-Type Equipment:

1) Unplug the equipment from the wall or in-line socket;
2) Attach a “Do Not Operate” tag and plug box and lock on the end of the power cord;
3) Test equipment to ensure power source has been removed by triggering the “Start” or “On” switch;
4) Perform required operations;
5) Replace all guards removed properly;
6) Inspect the power cord and socket prior to plugging equipment back in. Any defects shall be repaired before placing equipment back into service.

Procedures Involving More Than One Employee:

1) If more than one employee is assigned to a task requiring lockout/tagout, each employee shall place their own lock/tag on the energy isolating device;
2) If work on equipment cannot be completed by the end of the employee's shift, the authorized employee shall remove their individual devices and replace them with a shop lock and an "Out of Service" tag prior to leaving the facility.
3) The oncoming employee shall have the shop lock removed and replace it with their own locks and tags and verify that equipment will not operate prior to resuming service/maintenance.

VI. Employee Training

All authorized TDOT employee shall be trained in the following topics:

- General lockout/tagout procedures
- Specific procedures for different machines and equipment
- Location and use of specific procedures
- Procedures when questions arise

All affected employees shall be trained in the following topics:

- The purpose of and use of Lockout/Tagout procedures.
- Employees shall be instructed in these procedures upon initial assignment, periodically, or whenever procedures are revised, or when:
    - The employee lacks the skill to work safely and poses greater hazard to themselves and other employees;
    - When there is a change in the equipment used;
    - When refresher training is deemed necessary to maintain employee competence.

VII. Periodic Inspections

Periodic Inspections will take place on an annual basis by an authorized employee not involved in the energy control procedure being inspected to ensure that the energy control procedures continue to be implemented properly, that the employees are familiar with their responsibilities, and that any deviations or procedural inadequacies that are observed are corrected.

Periodic Inspection Requirements

Any deficiencies or deviations from the procedures must be identified and corrected. Use the TDOT Periodic Inspection and Summary Template illustrated in Appendix A.

Appendix A

LOCKOUT/TAGOUT PERIODIC INSPECTION

Page ____ of ____

TDOT	Date
Location: / Building: / Dept.	
Machine/Equipment Name	I.D. No.
Authorized Inspector (Print)	I.D. No.

The identified machine/equipment requires a periodic inspection of the energy control procedures according to §1910.147(c)(6) – The Control of Hazardous Energy (Lockout/Tagout). Check (✓) or complete all elements of this form that apply to the Periodic inspection. [NOTE: This standard does not apply to construction, agriculture, or maritime industries.]

ENERGY SOURCES

☐ Electrical	☐ Hydraulic	☐ Chemical	☐ Other:
☐ Mechanical	☐ Pneumatic	☐ Thermal	

ENERGY ISOLATING DEVICES

☐ A manually operated electrical circuit breaker	☐ A similar device used to block or isolate energy
☐ A disconnect switch	☐ Other:
☐ A manually operated switch by which the circuit's conductors can be disconnected from all underground supply conductors (no pole can be operated independently)	
☐ A line valve ☐ A block	*NOTE: Push buttons, selector switches, and other circuit type devices are not energy-isolating devices.*
☐ The authorized employees understand the energy control procedures for this machine/equipment	☐ The lockout/tagout procedures are being followed
☐ The authorized employees understand how the requirements of the standard apply	☐ Employees understand their responsibilities in the energy control procedures
☐ The authorized employees understand which locks/tags are to be used on this machine/equipment	☐ Any identified deviations or inadequacies that require attention are listed on the following page
☐ Tagout procedures have been reviewed when tagout alone is the only means of energy isolation	☐ Tagout also uses valve handle removal
☐ Tagout also uses the removal of an isolating circuit element	☐ Tagout also uses the opening of an extra disconnect switch
☐ Tagout also uses blocking of a controlling switch	

THE ITEMS CHECKED ABOVE HAVE BEEN REVIEWED/EXPLAINED WITH THE AUTHORIZED EMPLOYEES AT THE TIME OF THE PERIODIC INSPECTION. (AFFECTED EMPLOYEES WERE INCLUDED IF TAGOUT ALONE IS USED.)

Employee (Signature)	Date	Employee (Signature)	Date

I hereby certify the periodic inspection for compliance with lockout/tagout standards on this machine/equipment as specified by OSHA §1910.147 has been satisfactorily completed with the employees identified above.

Authorized Inspector:			
	Signature	Title	Date

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LOCKOUT/TAGOUT PERIODIC INSPECTION SUMMARY SHEET

Page ____ of ____

Location	Date
Machine/Equipment Name	I.D. No.
Authorized Inspector (Print)	Title

Record any deviations or inadequacies that need attention:

Deviations or inadequacies to be corrected by (date)

Routed to	Date
Authorized Inspector (signature)	Date

Repairs/corrections have been completed:

Name (signature)	Title	Date

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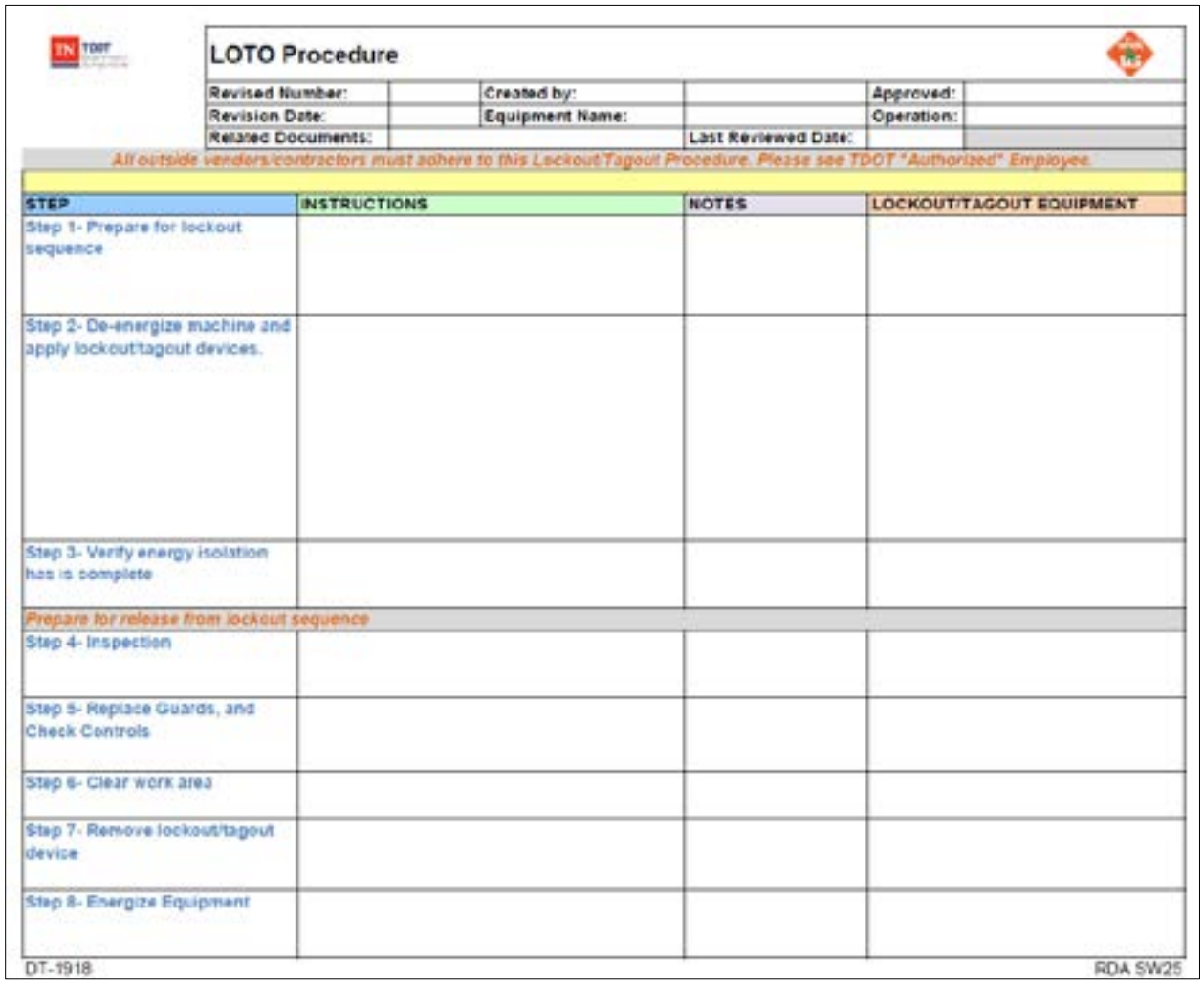
Appendix B



LOTO Procedure

Revised Number:		Created by:		Approved:	
Revision Date:		Equipment Name:		Operation:	
Related Documents:			Last Reviewed Date:		

All outside vendors/contractors must adhere to this Lockout/Tagout Procedure. Please see TDOT "Authorized" Employee.

STEP	INSTRUCTIONS	NOTES	LOCKOUT/TAGOUT EQUIPMENT
Step 1- Prepare for lockout sequence			
Step 2- De-energize machine and apply lockout/tagout devices.			
Step 3- Verify energy isolation has is complete			
Prepare for release from lockout sequence			
Step 4- Inspection			
Step 5- Replace Guards, and Check Controls			
Step 6- Clear work area			
Step 7- Remove lockout/tagout device			
Step 8- Energize Equipment			

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Appendix C

Standardized Equipment

Contact the headquarters OHS Division for the standardized approved LOTO equipment vendor and ordering information.

LOTO Procedure

Revised Number:		Created by:		Approved:	
Revision Date:		Equipment Name:		Operation:	
Related Documents:			Last Reviewed Date:		

All outside vendors/contractors must adhere to this Lockout/Tagout Procedure. Please see TDOT "Authorized" Employee.

STEP	INSTRUCTIONS	NOTES	LOCKOUT/TAGOUT EQUIPMENT
Step 1- Prepare for lockout sequence			
Step 2- De-energize machine and apply lockout/tagout devices.			
Step 3- Verify energy isolation has is complete			
Prepare for release from lockout sequence			
Step 4- Inspection			
Step 5- Replace Guards, and Check Controls			
Step 6- Clear work area			
Step 7- Remove lockout/tagout device			
Step 8- Energize Equipment			

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Occupational Health & Safety Division: Safety Written Program		
Trenching and Excavation Program OHS-004	**Issued: 7/1/2019**	**Revised:**

I. INTRODUCTION

TDOT is committed to preventing injuries and illnesses of all employees. One of the preventable hazards of construction work is the danger of trench cave-ins. Yet every year in the U.S., there are an estimated 75 to 200 deaths and more than 1,000 lost work days per year from trenching accidents. Other hazards associated with trenches include contact with numerous underground utilities, hazardous atmospheres, water accumulation, and collapse of adjacent structures. For these reasons, we have written Excavation Procedures for both our daily and occasional excavation workers. It is the policy at TDOT to permit only trained and authorized personnel to create or work in excavations.

The Headquarters Occupational Health and Safety Division coordinates this program and is responsible for reviewing and updating the program, as necessary. Copies of the written program may be obtained from the Regional Safety Managers or the Headquarters Occupational Health and Safety Division.

II. DEFINITIONS

Trench (Trench excavation) means a narrow excavation (in relation to its length) made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

Excavation means any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

Cave-in means the separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

Competent person means one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Protective system means a method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

Stable rock means natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Registered Professional Engineer means a person who is registered as a professional engineer in the state where the work is to be performed.

III. BEFORE WORK BEGINS

1. **Remove surface encumbrances**.

   All surface encumbrances (hindrances, obstacles) that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.

2. **Determine if Underground Installations are present.**

   The estimated location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be determined prior to opening an excavation.

   When excavation operations approach the estimated location of underground installations, the exact location of the installations shall be determined by safe and acceptable means.

   While the excavation is open, underground installations shall be protected, supported or removed as necessary to safeguard employees.

3. **Determine if a walkway will be required.**

   Walkways shall be provided where employees or equipment are required or permitted to cross over excavations. Guardrails which comply with §1926.502(b) shall be provided where walkways are 6 feet (1.8 m) or more above lower levels.

III. ACCESS AND EGRESS

1. **Proper means of egress (exit) from trench excavations is required.**

A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet (1.22 m) or more in depth so as to require no more than 25 feet (7.62 m) of lateral travel for employees.

2. **Exposure to vehicular traffic requires high visibility clothing.**

Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material. Follow TDOT requirements for wearable PPE in work zones.

3. **Exposure to falling loads shall not be permitted.**

No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials.

4. **Warning system for mobile equipment must be present**

When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

IV. **HAZARDOUS ATMOSPHERES**

To prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements shall apply:

- Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet (1.22 m) in depth.
- Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres.

- Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.
- When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

Contact the Regional Safety Staff to determine if testing is required before entering the trench/excavation.

V. PROTECTION FROM HAZARDS ASSOCIATED WITH WATER ACCUMULATION

- Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.
- If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.
- If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a competent person.

Contact your Regional Safety staff before proceeding if these conditions occur.

IV. STABILITY OF ADJACENT STRUCTURES

Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.

Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted except when:

A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or

The excavation is in stable rock; or

A registered professional engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity; or

A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

Sidewalks, pavements, and appurtenant structure shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

VI. Protection of employees from loose rock or soil.

Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face.

Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection.

Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet (.61 m) from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

VII. INSPECTIONS

Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions.

An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift using the Trench

Inspections shall also be made after every rainstorm or other hazard increasing occurrence.

These inspections are only required when employee exposure can be reasonably anticipated.

Where the competent person or Regional Safety Staff finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

VII. Protective Systems

Each employee in an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with requirements set forth by OSHA:

Excavations are made entirely in stable rock; or

Excavations are less than 5 feet (1.52m) in depth and examination of the ground by a competent person provides no indication of a potential cave-in.

Protective systems shall have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

Competent persons and/or the Regional Safety Staff will determine that the proper protective systems are in place when required by 29 CFR 1926.652.

VIII. EMPLOYEE TRAINING

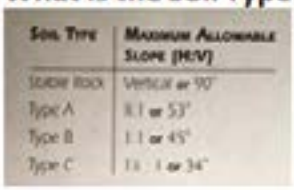
All TDOT employees involved in trenching and excavations will be required to complete an awareness level training upon initial assignment.

Competent Persons under this standard will be required to attend the TDOT competent persons training set forth by the TDOT OHS Division Training Department. Competent persons should reference the **Competent Person's Guide** for Trenching and Excavation Safety.

APPENDIX A

Trenching and Excavation Safety Checklist

Contract or Activity Number: _____
Site Location (SR / LM): _____
Date: _____
(COMPLETE ONE FORM FOR EACH DAY OR EACH CONDITION CHANGE)

Competent person(s) on job site: **Name:**_____ _____ _____		**Activity Summary** **Depth:**_____FT **Width:**_____FT		
Competent person will be on jobsite at all times **(If competent person leaves, JOB STOPS!)**		Initial(s):		
What is the Soil Type?  **Soil A** **Soil B** **Soil C**		Initial(s):		
General Inspection		**Yes**	**No**	**N/A**
1.	Insure hard hats and vest (or class 3 shirts) worn by all employees.			
2.	Inspections should be made daily, post rain event, or change of condition.			
3.	Are spoils, materials, and equipment set back at least 2ft. from the edge of the excavation?			
4.	Is the trench (or confined area) 4ft. or greater? (If so, contact the regional safety office before work begins)			
5.	Is the trench (or confined area) 5ft or greater in depth? (If yes, a protective system must be used. Contact the Regional Safety Office prior to work beginning.)			
Sloping		Yes	No	N/A
6.	If Yes on question 5, can it be Sloped Back?			
7.	What is the Slope? (Assume 1:1)			
8.	If Sloping, what size equipment needed?			
Fall Protection		**Yes**	**No**	**N/A**
6.	Walkways and bridges over excavations 6ft or more in depth are equipped with guardrails.			
7.	Are barriers provided to protect all workers? (Workers in excavation and workers walking above)			
8.	Are warning systems established and used when mobile equipment is operating near the edge of an excavation? (Ex: spotters, equipment radius, internal traffic control, warning line system, etc.)			
9.	Are employees prohibited from working under suspended loads and/or inside swing radius?			

APPENDIX A CONTINUED

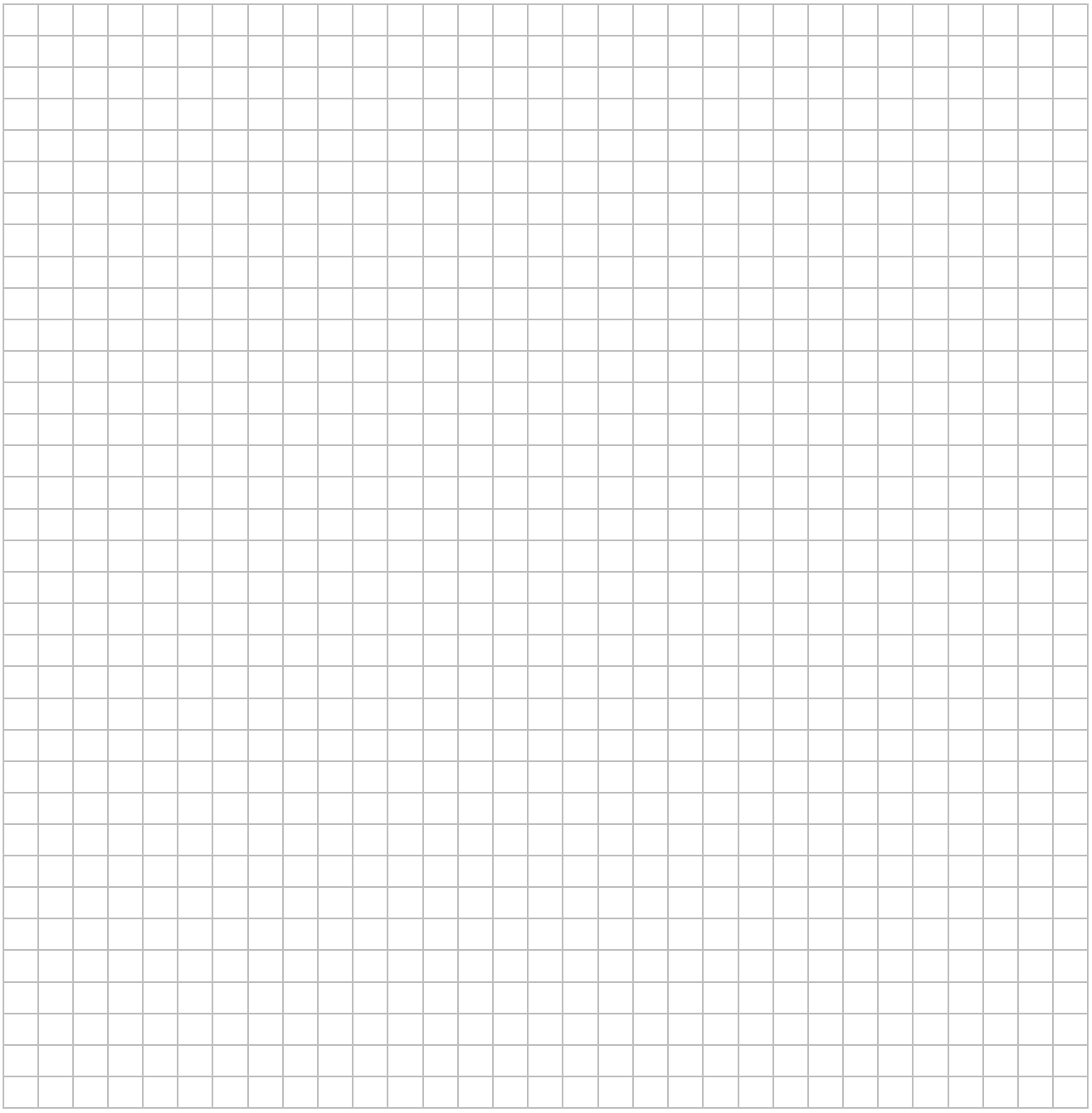
Trenching and Excavation Safety Checklist

10.	Are ladders or other means of access and egress in place in all trenches 4 ft. or more deep?			
11.	Are the ladders that are used in excavations secured and extended 3 ft. above the edge of the excavation?			
12.	Are employees prohibited from working on the faces of sloped or benched excavations above other employees?			
13.	Are adjacent structures supported and secured?			
14.	Must prohibit excavation below the level of the base or footing of any foundation (bridge piers, abutments, and etc.) and retaining wall that could pose a hazard to the employees.			
Wet Conditions		**Yes**	**No**	**N/A**
15.	Are precautions taken to protect employees from water accumulation?			
16.	Is water removal equipment needed? (Water pumps, drains, etc.)			
17.	Is water or runoff diverted after every rainstorm? (Slope, berms, and etc.)			
Utilities		**Yes**	**No**	**N/A**
18.	Are utility companies contacted and/or utilities located as required? (Number is 811)			
19.	Are the exact locations marked? One call ticket #._____ (Pre-excavation photos recommended.)			
20.	Are underground installations protected, supported, or removed when excavation is open?			
Support Systems		**Yes**	**No**	**N/A**
21.	Has competent person assured that the material or equipment used for protective systems is able to support the intended loads?			
22.	Are materials and equipment used for protective systems free from damage or defects that might impair their proper function?			
Hazardous Atmosphere		**Yes**	**No**	**N/A**
23.	Is there adequate air flow throughout the trench?			
24.	Trenches Greater Than 5' depth; testing conducted to ensure that atmosphere remains safe. (***Contact Regional Safety Office for testing & evaluation***)			
Comments:				

Signature: _____

APPENDIX B

Trench Diagram



Occupational Health & Safety Division: Safety Written Program		
OHS-005 Incident Analysis Report (IAR)	**Issued: 03/01/2022**	**Revised:**

I. INTRODUCTION

TDOT is committed to preventing injuries and illnesses of all employees. The purpose of an incident analysis is to provide a process for identifying and correcting safety hazards and at-risk behaviors. Specifically, an incident analysis is used after the occurrence of a serious injury, property damage or near miss. A key part of the incident analysis requires an intentional plan, and the steps for implementation, to avoid or eliminate the hazard in the future. An incident investigation provides a systematic and standardized tool for determining root causes, developing corrective actions and communicating this information across all TDOT locations for lessons learned and prevention for the future.

II. WHEN TO CONDUCT AN INCIDENT ANALYSIS REPORT (IAR)

An incident analysis report is required to be conducted and submitted post incident for the following:

1. Upon the request of Executive and Regional Leadership or the HQ OHS Division
2. If an injury results in triggering required TOSHA reporting such as death, amputation or in-patient hospitalization

Depending on the severity and time needed for investigation, due dates may vary. The HQ OHS Division, Safety Manager will assign the request for IAR and provide a due date. Regional Safety Offices will communicate with the HQ Safety Manager if additional time or resources are needed.

Typical triggers for IAR Request:

A. Serious Injuries

1) Lost Time or extended Light Duty

If an employee is too injured to return to work, corrective actions need to be implemented to address the situation leading up to the injury and prevent the injury from reoccurring.

2) Injury Trends due to Frequency

Investigations may be requested after a trend in a certain type of injury has been identified. An example would be injuries occurring as employees exit a certain piece of equipment.

3) Violation of Safety Policies, Standards or Guidance resulting in injury

B. Serious Property Damages

1) At Fault motor vehicle/equipment

When an employee gets into a motor vehicle/equipment accident involving another driver and is determined to be at-fault and/or results in an injury.

2) Property damage trends due to frequency

Investigations may be requested after a trend in a certain type of property damage has been identified.

3) **Property damage resulting in potential for loss of life or catastrophic property damage**
4) **Violation of Safety Policies, Standards or Guidance resulting in property damage**

C. Serious Near Miss (potential for loss of life or catastrophic Injury)

A near miss incident investigation may be requested after an event occurs that **could have but did not** result in loss of life of catastrophic injury or property damage. It is important to examining near miss events because behavior and processes can be addressed and modified to prevent injuries or property damage from occurring in the future from a similar situation.

1) **Serious Near Miss Trends due to Frequency**
   Investigations should also be conducted after a trend in a certain type of near-miss exposure has been identified. An example would be a near-miss event occurring from a close encounter with a vehicle while performing flagger operations.
2) **Violation of Safety Policies, Standards or Guidance resulting in a serious near miss**

D. Incidents involving TOSHA violations

III. REQUIREMENTS FOR CONDUCTING THE INCIDENT INVESTIGATION

A. TDOT Incident Analysis Report Guide and TDOT Incident Analysis Report Template

This guide provides in depth steps and guidance for conducting the Incident Analysis Report and using the TDOT Incident Analysis Report Template. This template was created to be used as an investigation tool, as well as help standardize and communicate details and lessons learned about serious incidents. ***To access the TDOT Incident Investigation Guide and the Incident Analysis Report Tool template, go to the Occupational Health and Safety (OHS) Division SharePoint site>> Incident Reporting Page OR access it through the T_JJ_OHSStateTeam files tab on Microsoft Teams.***

B. Incident Analysis Team

When requested the Regional Safety Office will conduct an incident analysis. An Incident Analysis Team includes the following at a minimum:

1. Regional Safety Office
2. District Supervisor- when applicable
3. Injured employee or employee primarily involved in the property damage or serious near-miss incident (if the employee is able to participate)

The Incident Analysis Team may also include the following (depending on the needs of the investigation):

- Key Witnesses (TDOT Employees and Contractors)
- Safety Committee members
- Other subject matter experts (SMEs)

HQ OHS will be available to assist in any investigation and/or compiling of the Incident Analysis Report.

C. Submitting to HQ OHS Division Review and Filing

HQ OHS Division Safety Manager or designee will review all completed IARs to assist and ensure the following:

- Template standardization and formatting are present
- Confidential information is not used
- Corrective actions and planning for closure are in place (this is very important when a TOSHA violation is involved)
- Communication and Review of completed IARs across all Regions for best practices sharing and lessons learned

Once the IAR has been reviewed and completed, the HQ Safety Manager will retain an electronic copy of the file and post a copy in a file within the OHS State Team files section within the T_JJ_OHSStateTeam in Microsoft Teams.

TDOT Incident Analysis Report Guide

This document is to serve as a guide to the TDOT Regional and HQ Safety Staff for compiling the Incident Analysis Report. The purpose of an incident analysis is to provide a process for identifying and correcting safety hazards and at-risk behaviors. Specifically, an incident analysis is used after the occurrence of a serious injury or near-miss. **The incident analysis prevents opportunities, to improve safety, from being overlooked.** In fact, a key part of the incident analysis requires an intentional plan, and the steps for implementation, to avoid or eliminate the hazard in the future. **The ultimate goal: PROTECT OUR EMPLOYEES.**

An incident analysis is an excellent safety tool for 3 reasons:

1) It **provides clear steps** for addressing and implementing corrective actions

2) It includes **invaluable input from front line employees**

3) The **findings and corrective actions can be shared and implemented department wide**

Why is this important for you? When faced with investigating a serious injury, near miss, or vehicle/equipment accident, you will have the steps and guidelines to address the incident and plan air-tight corrective actions.

Why is this important for the department? It helps us continue to provide - and improve - safety for employees.

Index and Glossary of Terms

Index

Terms

5 Whys – A method for determining the root cause of an incident.

IW1– Injured Worker – List chronologically by order of injuries.

W1 – Worker who is a bystander or witness to the event – List chronologically.

Corrective Action – Actions taken to rectify an unsafe situation or practice.

Barriers to Safe Behavior – Barriers that prevent a safety culture.

Guidance for Conducting an Incident Analysis

- **What are the criteria for when an Incident Analysis should be conducted?**
  - The qualities of an incident that warrant an investigation revolve around the severity, frequency, and potential for loss of life and/or catastrophic injury or damage. An incident investigation must be conducted every time a lost time injury occurs. Investigations should also be conducted after a trend in a certain type of injury has been identified. The criteria for conducting an Incident Analysis largely depends on the severity of the incident, or the severity of the possible outcomes of a near-miss incident. An Incident Analysis can be requested by Executive Leadership, Headquarters Safety, as well as Regional Management or Safety Offices. Supervisors are also permitted to conduct or request an analysis, at their discretion.
  - In summary, the following situations require an incident analysis:
    1. Lost time injuries
    2. A type of injury that has been identified as a trend
    3. Injuries that could have resulted in loss of life or severe harm
    4. Motor vehicle accidents involving the public when the TDOT employee is At-Fault
    5. A property damage accident involving an injury, deemed At-Fault by the TDOT opeartor
    6. Any time an injury, property damage or near-miss event occurs in violation of a safety policy or standard operating guide or program
    7. At the request of Executive Leadership, the Safety Division or Regional Safety Offices.
    8. Any near-miss incident that could have resulted in loss of life, catastrophic injury or property damage.
- **Who conducts the Incident Analysis?**
  - The Regional Safety Office will conduct an incident analysis. They may also oversee and assist district supervisors with an incident analysis.
- **Who is involved or interviewed during the analysis?**
  - The Regional Safety Office will conduct an incident analysis. The Regional Safety Office may also oversee and assist district supervisors with an incident analysis. An Incident Analysis Team includes the following at a minimum:
    1. Regional Safety Office
    2. District Supervisor
    3. Injured employee or employee primarily involved in the property damage or serious near-miss incident
  - The Incident Analysis Team may also include the following (depending on the needs of the investigation):
    - Key Witnesses
    - Safety Committee members

- Other subject matter experts (SMEs)

HQ OHS will be available to assist in any investigation and/or compiling of the Incident Analysis Report.

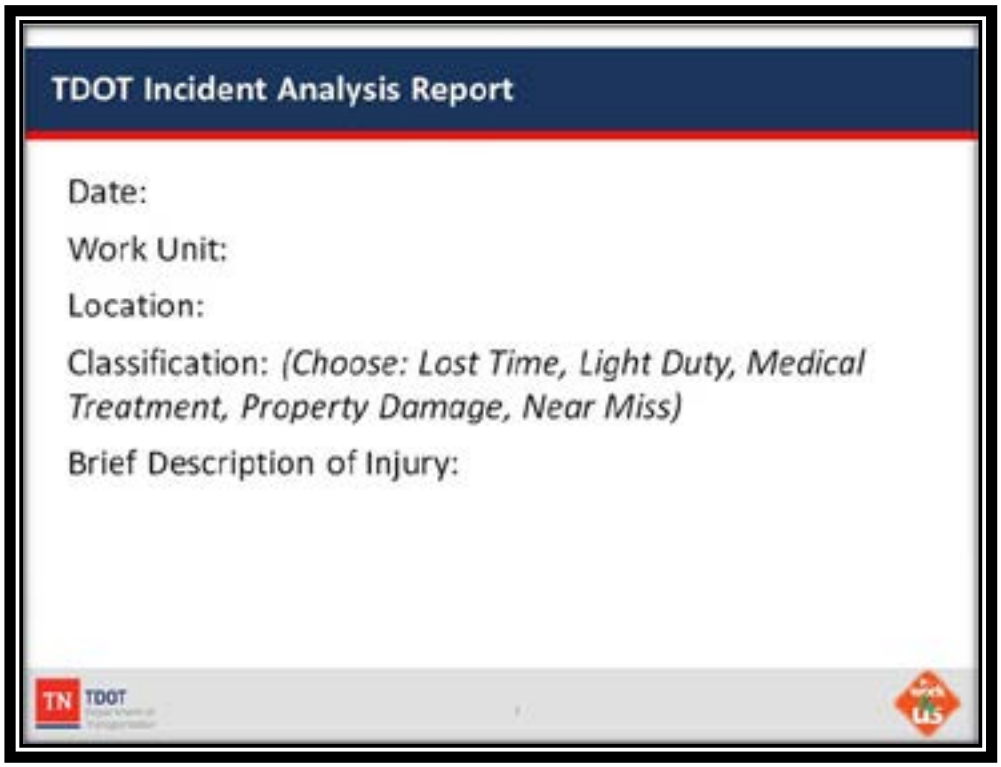
- **When should an Incident Analysis be completed after an incident?**
  - There are four components to completing an Incident Analysis.
    1. First and foremost, the scene should be secured immediately following and incident to ensure there are no imminent dangers.
    2. After the scene is secured, full attention should be directed to providing medical care to an injured employee.
    3. Implement immediate corrective actions
    4. Submit completed Personal injury Form and/or Property Damage Forms

- **Who sees an Incident Analysis Report once is it completed?**
  - Executive Leadership, Headquarters Safety, Regional Leadership and Safety Offices are among those who may review an Incident Analysis.
- **Appendix A - Steps for responding to an incident and completing an Incident Analysis**
  - Appendix A provides a brief outline for the steps that need to be taken immediately following an incident.
- **Appendix B - Root Cause Analysis Checklist**
  - This checklist should be used a tool to determine contributing factors to an incident.

TDOT Incident Analysis Report

The first slide of the TDOT Incident Analysis Report Template is intended to give a quick snap shot of the incident. Select the classification(s) that apply and remove those that are not applicable.

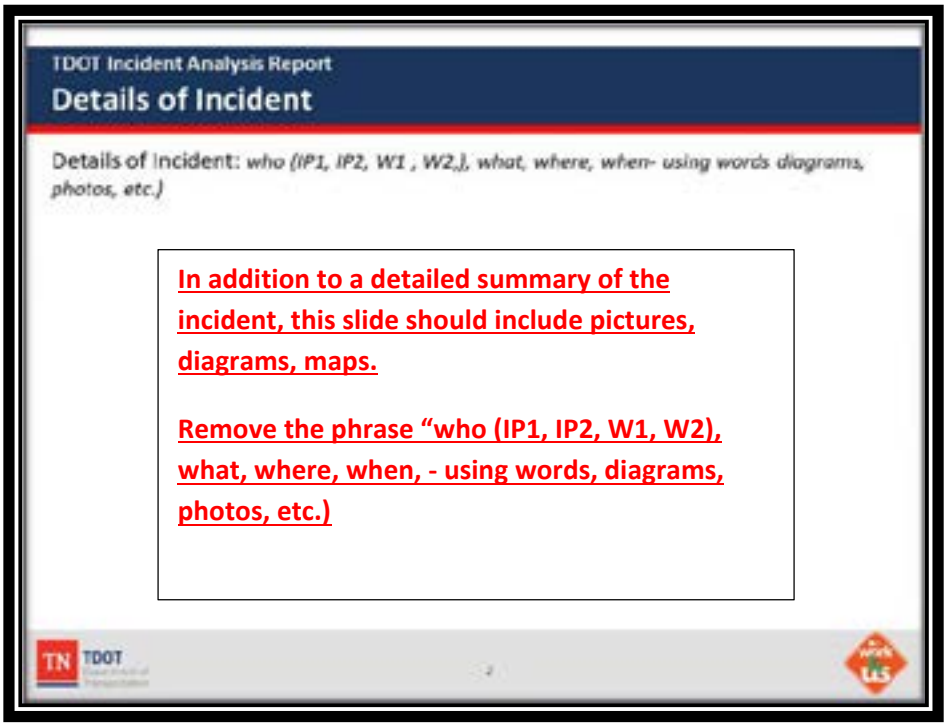
It is important to remember that the utmost protection must be given to the privacy of any employees involved in the incident. A breach in information can quickly violate **HIPPA laws**. Thus, **the use of the employee's name is strictly prohibited.** Therefore, an incident should be referred to by the work unit and nature of injury or property damage. For example, an incident could be referred to as the "District ABC Hand Injury".

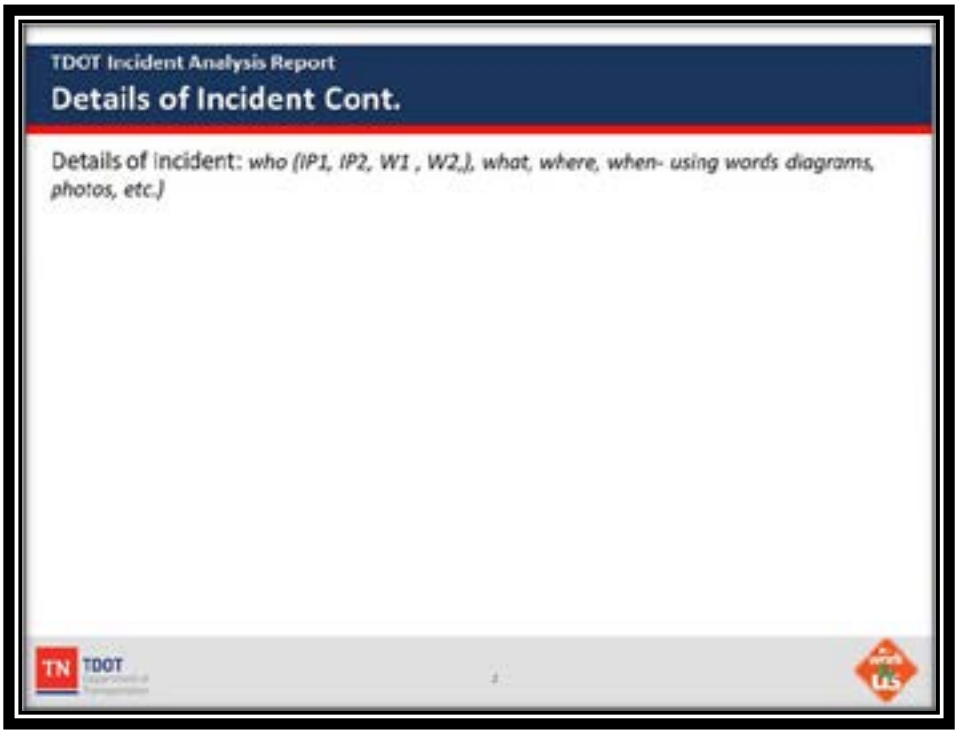


DO NOT USE ANY EMPLOYEE NAMES IN THE REPORT

Details of Incident

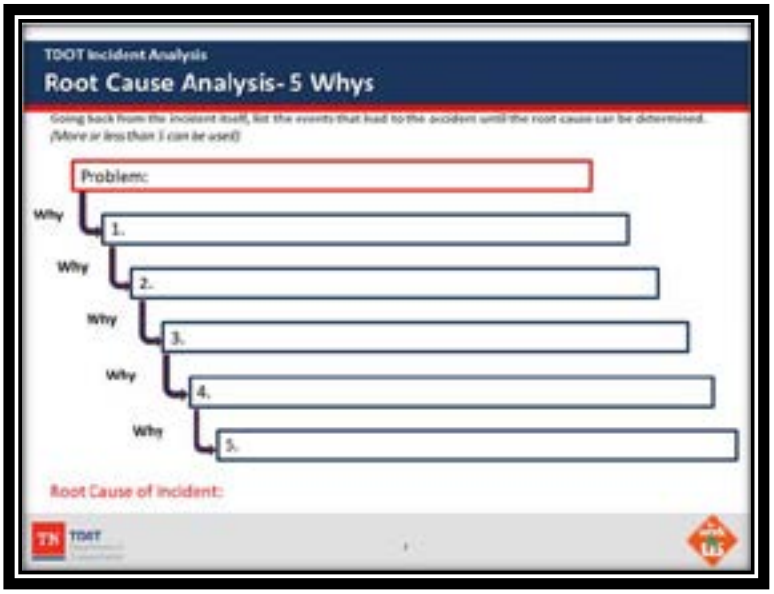
This slide is intended to give a more in depth narrative about the incident, as well as the events leading up to the incident. The reader or those attending the report meeting should be able to have a clear understanding of what happened, and the nature of injuries and/or damage. This slide should include and relevant pictures and diagrams. Duplicate the "Details of Incident Cont." slide as many slides as necessary, so that all pertinent information is included.

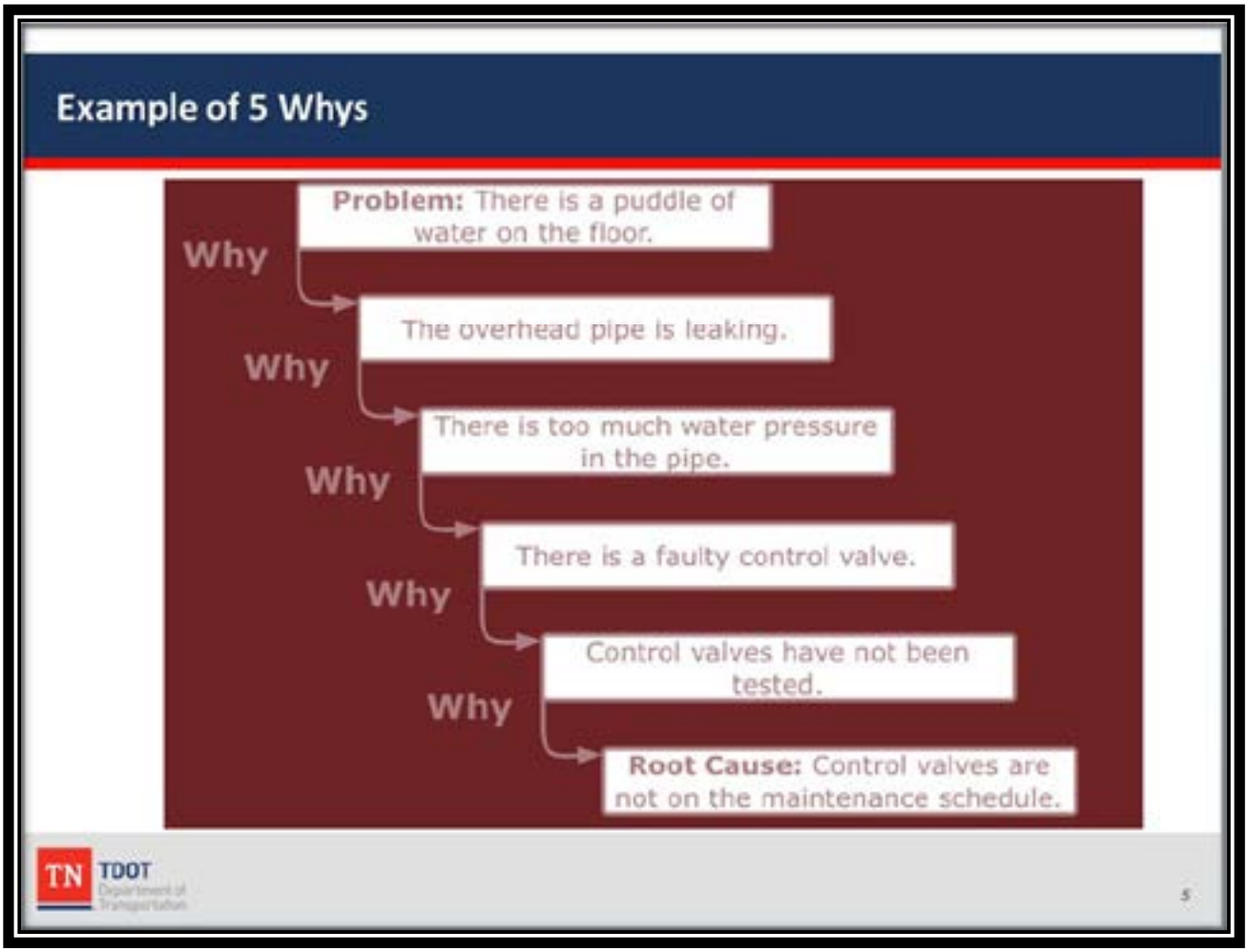




Root Cause Analysis – 5 whys

The 5 Whys is a method for finding the root cause of an incident. The approach is simple. Going backwards from the incident itself, ask why each event occurred. Continue asking why until it is determined that there cannot be another event traced back. The last discovered event will be the root cause of the incident. See slide below for an example. When you are preparing a report, be sure to remove this example.

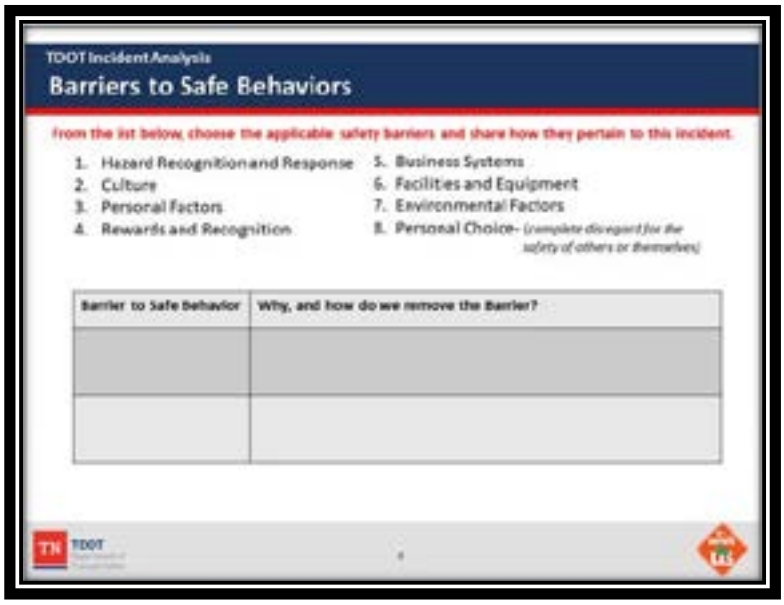


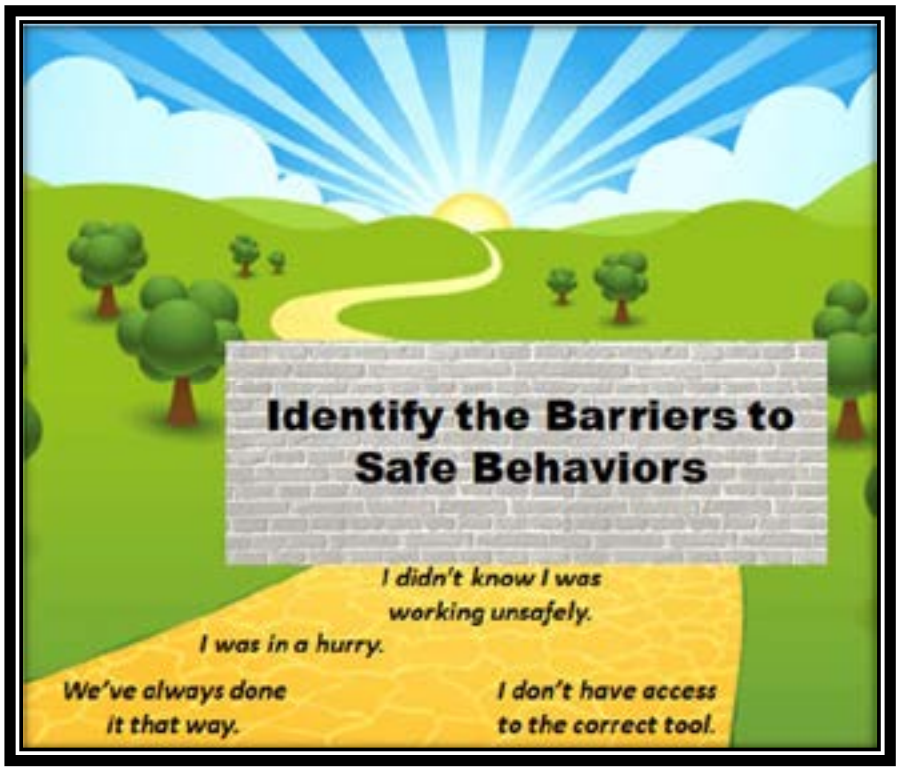


Barriers to Safe Behavior

There are eight barriers to safety. Determining which of these barriers need to be removed is the key to creating and fortifying a culture of safety. Determining which barriers apply to the incident should be determined during interviews with employees who were involved, or witness to, in the accident. In the report, list each barrier that applies to the situation and briefly detail why and how the barrier can be removed. The eight barriers are as follows:

1. **Hazard Recognition and Response**
2. **Culture**
3. **Personal Factors**
4. **Rewards and Recognition**
5. **Business Systems**
6. **Facilities and Equipment**
7. **Environmental Factors**
8. **Personal Choice**





Description of the Barriers to Safe Behavior

1. **Hazard Recognition and Response**
   Generally a lack of knowledge in regards to the hazards or risks around them. New employees can often fall into this barrier.
   What you may hear….
   "I've always done it this way."
   "I didn't realize that was unsafe."
   "No one told me this was an issue."
   "I wasn't trained."

2. **Culture**
   Established unsafe or at risks due to tribal knowledge, lack of guidance or feedback.
   What you may hear…
   "We've always done it this way"
   "That's how I was taught to do it"

3. **Personal Factors**
   When personal factors such as fatigue, stress, or other emotions cause distractions or inattention to the hazards or task at hand.
   What you my hear…
   "I was distracted. I am so tired from being up all night with a sick kid."
   "I'm not feeling well. My brain feels foggy and I'm not thinking as clearly as I should be."

4. **Rewards and Recognition**
   When a reward or type of recognition either (formal or informal), can inadvertently cause shortcuts to be taken, people to rush the task. Rewards can be self-imposed.
   What you may hear…
   "I was in a hurry to get done so I could make it to my kid's soccer game on time."
   "Great job today! We worked hard and fast." (knowing shortcuts were taken)

5. **Business Systems**
   When a policy, procedure or process should be developed or revised. When an administrative control, such as job rotation, should be implemented. When there may be an issue with leadership, or perceptions of leadership.
   What you may hear…

   "The current SOG says that we need to do it "this way" but "this way" causes an even bigger hazard because of this and that."
   "I told my supervisor that we didn't have the correct tool and I was told to make "this" tool work for now."

6. **Facilities and Equipment**

When the work facilities or equipment have an issue that could cause a barrier to safe behavior such as out of service machine, lack of adequate lighting, no pedestrian walkways established etc.

What you may hear…

"The machine in my area is out of service so I had to manually lift and move the material resulting in my back injury."

7. **Environmental Factors**

Weather, wildlife, insects, nature etc.

What you may hear…

"I was running to get away from a swarm of bees and I tripped over this pile of material."

8. **Personal Choice**

This barrier is generally not the barrier because employee has (*complete disregard for the safety of others or themselves)* This is not to be confused with the idea that the employee "chose" to use this tool instead of that tool, or "chose" to take a shortcut. Behaviors that are in the normal realm of work related activities should not be considered for this barrier. Generally, the at-risk behavior happens due to lack of knowledge or a culture issue.

What you may hear…

"Jim Bob said, hey watch this! And then proceeded to ride on the forks of the forklift up to the top shelf in the warehouse."

Corrective Actions

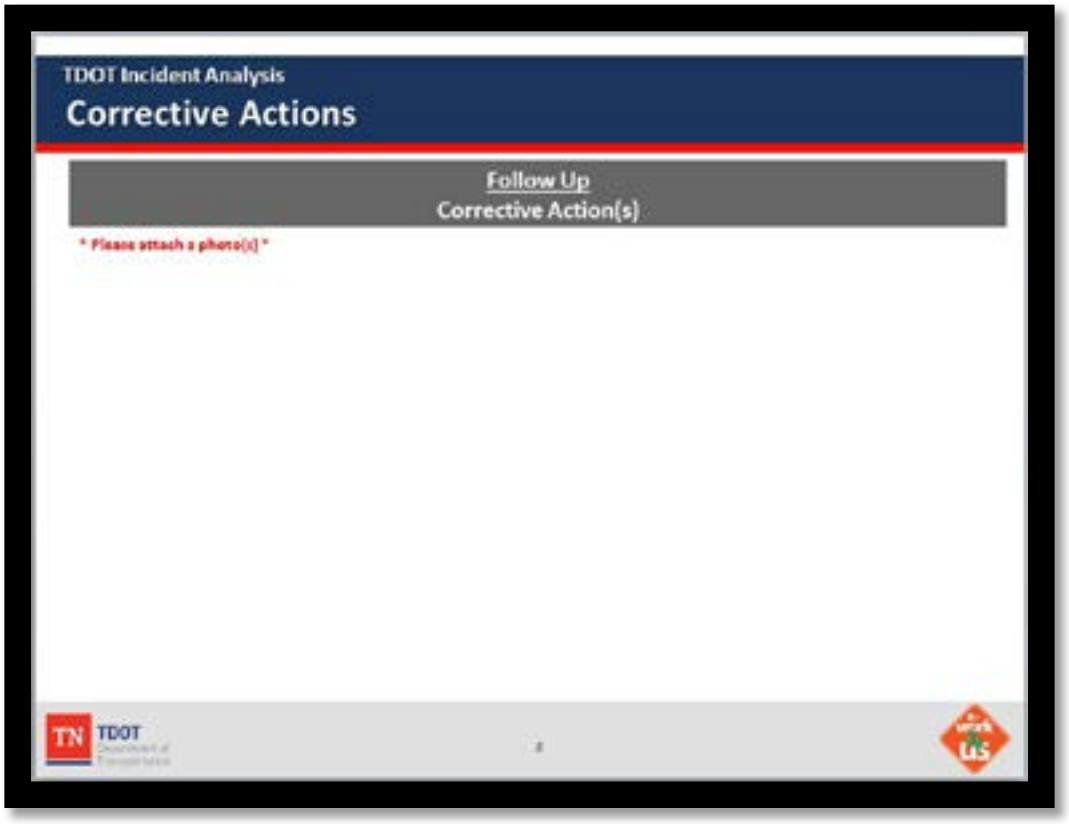
After every major injury, property damage or near-miss, corrective actions must be implemented to avoid similar situations from occurring in the future. Corrective actions are classified into **three** major categories. **Immediate, Follow Up and Long Term**.

Immediate Corrective Actions

Immediate corrective actions are those that can be implemented immediately following the incident. An example would be cleaning grease off of a floor. Use this slide to detail the actions that were taken immediately following the event. Along with a detailed description, include any relevant pictures and diagrams. Duplicate and use as many slides are need to showcase all of the immediate corrective actions taken. Be sure to remove the phrase "* Please attached a photo(s)*" from the slide.

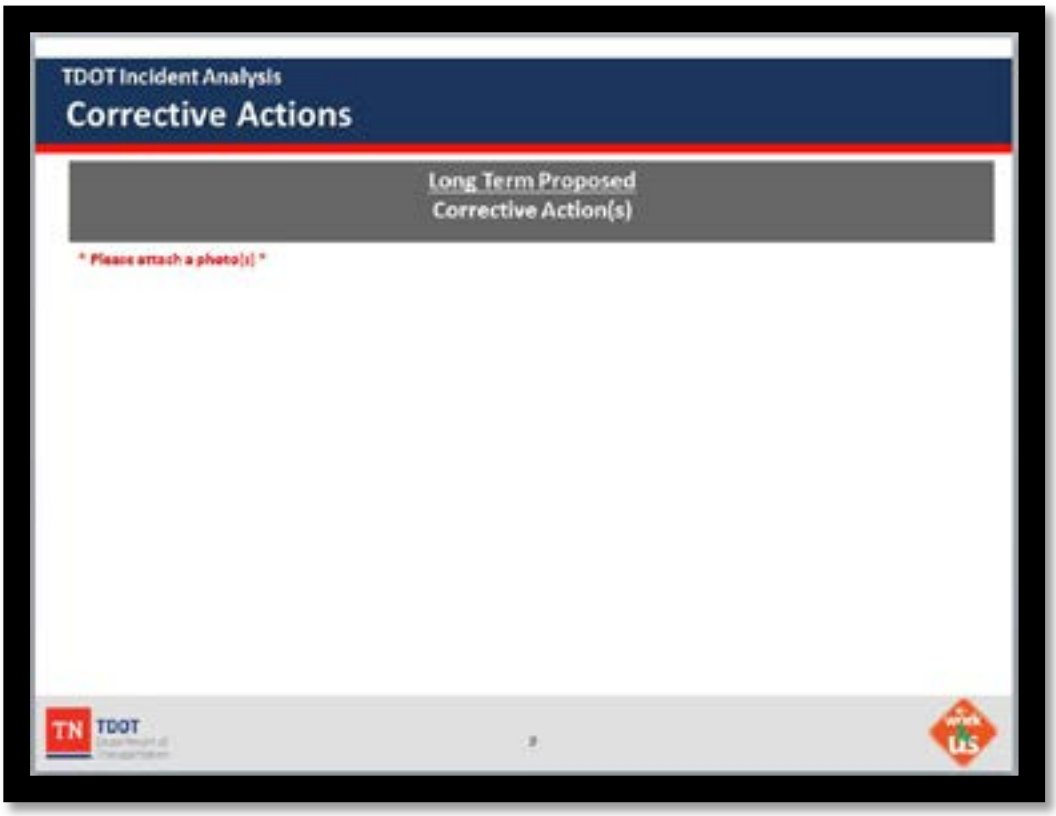
Follow Up Corrective Actions

Follow Up Corrective Actions are implemented in the days after an event. They are corrective actions that cannot be implemented immediately following the incident but the resources and time can be allocated shortly thereafter. An example would be the purchase of PPE. Along with a detailed description, include any relevant pictures and diagrams. Duplicate and use as many slides are need to showcase all of the immediate corrective actions taken. Be sure to remove the phrase "* Please attached a photo(s)*" from the slide.



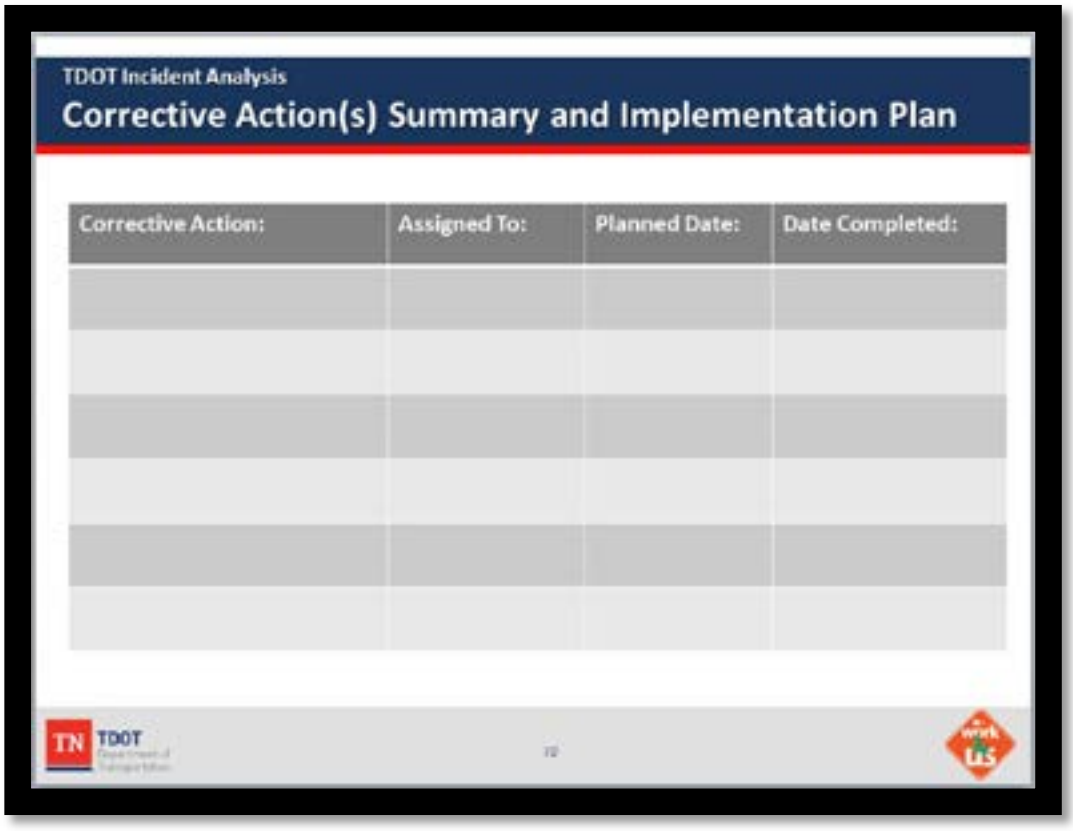
Long Term Corrective Actions

Long Term Corrective Actions are those that take more time and allocation of resources than immediate and follow-up corrective actions. They may require the procurement of safety equipment and/or involvement of leadership or policy/guideline implementation. Along with the description of the long term corrective action(s) sought, detail the steps taken to achieve their implementation. Include any relevant pictures and diagrams. Duplicate and use as many slides are need to showcase all of the immediate corrective actions taken. Be sure to remove the phrase "* Please attached a photo(s)*" from the slide.



Corrective Action(s) Summary and Implementation Plan

This slide summarizes all of the corrective actions taken as well as planned. Furthermore, it lists who each corrective action is assigned to along with the anticipated completion date.



Appendix A

Go to the scene of the accident/incident before any of the physical evidence is disturbed.

***Conduct the investigation*:** Conducting an effective accident investigation will involve the following steps:

Control the scene. Correct any immediate hazards, secure the area, and preserve evidence. You may need to correct hazards such as fallen electrical wires, falling debris, fires, chemical spills, or other physical or health hazards. You may also need to provide PPE, isolating pressurized systems, and emergency lighting to ensure the safety of workers responding to the accident.

***Identify and collect evidence**.* Take pictures of the scene, take samples of spilled materials, interview witnesses, review health and safety records and training records, and consider operations errors such as unguarded or defective equipment, poor ventilation or lighting, toxic gases, excessive noise, radiation, or floor openings. This step includes taking notes that can help you develop your final accident investigation report.

***Determine the root cause(s)** of the accident:* Review all of your collected evidence and facts surrounding the accident. The root cause is the *true cause* of the accident. For instance, if an employee is injured in a fall and was not wearing fall protection, the obvious cause of the accident would be the employee not wearing fall protection. However, if you look further, you'd see that the employer did not consistently enforce the company policy requiring fall protection. Therefore, the root cause would be the employer not enforcing the work rule. Other root causes can include lack of training, faulty equipment, failure to maintain equipment, lack of equipment guarding, etc.

***Develop corrective actions*.** Work to reduce or eliminate the chances of another accident occurring. Usually, corrective actions directly address the root cause of the accident. For instance, if an employee was injured by falling off a ladder, corrective actions could include eliminating the need to climb the ladder through the use of extender poles or other engineering solution; ensuring that workers know how to properly use ladders and are trained to use them correctly and developing, implementing, and enforcing a safety and health program.

***Communicate findings**.* Report your findings to upper management and other affected departments. In order to effectively communicate the findings of the investigation, provide the following information in the final report:

- A description of the accident (including date, time and location);
- The facts determined during the investigation (including chronology as appropriate);
- A list of the suspected root causes; and
- The recommendations for corrective and preventive action (including timing and responsibility for completion).

Implement corrective actions. Ensure the corrective actions you've developed are actually carried out.

Appendix B

ROOT CAUSE ANALYSIS- CAUSES AND CORRECTIONS CHECKLIST TOOL

(Check (√) if item is a determined cause or selected corrective action.)		
CATEGORY	**CAUSE OF ACCIDENT:**	**CORRECTIVE ACTION:**
Site conditions	□ Exposure to hazardous site conditions (e.g., chemicals, air contaminants, extreme temperatures, noise)	□ Perform job hazard analysis and implement engineering, administrative, or work practice controls to eliminate or reduce exposure to acceptable levels.
		□ Provide adequate inventories of appropriate personal protective equipment/clothing and tools and train employee in their locations, use, and limitations.
		□ Train employees in appropriate protective work practices, detection methods, and emergency and hazard reporting procedures.
		□ Provide disciplinary action for failing to follow established work practice controls or report hazards.
	□ Poor ergonomics	□ Develop and implement a written procedure to report signs and symptoms of musculoskeletal disorders and review employee reports.
		□ Perform a job hazard analysis and implement engineering, administrative, or work practice controls to eliminate or reduce musculoskeletal disorders.
		□ Train employees in proper work techniques and procedures.
		□ Review and adjust workloads and breaks to eliminate or reduce musculoskeletal disorders.
	□ Poor housekeeping or improper storage	□ Provide labeled waste receptacles and storage containers/space of sufficient size, quantity, and location.
		□ Provide readily available clean-up equipment and materials.
		□ Provide sufficient time for housekeeping.
		□ Frequently inspect work areas for poor housekeeping and storage conditions.
	□ Overwhelming workload	□ Review and lighten workload to safer, more realistic level or spread out deadlines.
		□ Provide equipment and tools to lessen the workload.
		□ Train more than one employee in the same job function and spread workload among more than one employee.
		□ Identify and implement more efficient work practices.

The remainder of the checklist continued on the next page.

CATEGORY:	**CAUSE OF ACCIDENT:**	**CORRECTIVE ACTION:**

Facility and equipment (includes personal protective equipment)	□ Unguarded, defective, or inadequate facility or equipment	□ Review job requirements and select facility/equipment in accordance with requirements. Ensure proper installation or assembly.
		□ Review and correct any deficiencies in your procedures to inspect, maintain, repair, or replace facility/equipment.
		□ Remove and mark any unguarded, defective, or inadequate facility/equipment from use and repair or return it.
		□ Ensure safety devices (i.e., guards or shielding) are in place before use of facility/equipment.
	□ Improper use of facility or equipment	□ Closely supervise employee use of a facility/equipment.
		□ Provide disciplinary action for using a facility/equipment improperly.
		□ Follow manufacturer instructions for proper use of a facility/equipment and use facility/equipment within safe parameters (e.g., do not speed or overload).
		□ Find out why the employee used the facility/equipment improperly and correct that cause.
	□ No facility or equipment available	□ Review facility/equipment requirements for the job.
		□ Provide the appropriate facility/equipment as required for the job.
		□ Ensure adequate inventories of proper equipment are available.
		□ Revise procedures for purchasing equipment.
	□ Failure to use facility or equipment	□ Find out why the employee failed to use the facility/equipment and correct that cause.
		□ Ensure that the appropriate and employee-compatible facility/equipment is readily available.
		□ Train or retrain employee in proper use of a facility/equipment.
Chemicals and stock materials	□ Hazardous, wrong, or defective chemical or stock material	□ Review chemical/material requirements for the job and select chemical/material in accordance with requirements. Ensure chemical/material is compatible with the process and other chemicals/materials.
		□ Do not open, store, or use chemical/material until it is inspected and confirmed as correct.
		□ Train employees to follow proper storage and handling precautions (including the use of proper personal protective equipment) for the hazardous chemical/material.
		□ Mark, remove from use, and return defective chemical/material.
	□ Too much or too little chemical or stock material inventory	□ Develop and implement a chemical/material inventory tracking system.
		□ Anticipate chemical/material inventory needs and stock accordingly.
		□ Develop and implement or revise procedures for purchasing chemical/material.
		□ Provide sufficient storage space for chemical/material.
The remainder of the checklist continued on the next page.		
CATEGORY:	**CAUSE OF ACCIDENT:**	**CORRECTIVE ACTION:**

Design, layout, and location	□ Poor layout or location	□ Perform a job hazard analysis and change the layout of the work area or the location of machines, equipment, materials, or employees.
		□ Provide barricades, guarding, or warning signs, devices, markings, or colors.
		□ Improve lighting.
		□ Provide sufficient space or access.
	□ Inadequate or defective design	□ Review and redesign to remove inadequacies/defects.
		□ Use correct data and review computations.
	□ Design or layout inhibits maintenance	□ Review and redesign to remove maintenance barriers.
Change	□ Change to facility, process, technology, equipment, materials, or procedures	□ Establish and implement or revise written procedures to manage changes to facilities, processes, technology, equipment, materials, or procedures.
		□ Perform a job hazard analysis before and after a change to a facility, process, technology, equipment, material, or procedure.
		□ Develop and implement a policy and procedure for employees to report any changes to facilities, processes, technology, equipment, and procedures.
		□ Notify or train employees in any change to facilities, processes, technology, equipment, materials, or procedures.
	□ Poor or no planning	□ Review and revise, correct, update, clarify, or improve existing plan.
		□ Develop and implement a written plan.
		□ Train supervisors/employees in any new or revised plan.
Inspection, monitoring, and hazard analysis	□ No inspection, monitoring, or hazard analysis	□ Develop and implement a procedure to inspect/monitor/analyze hazards.
		□ Ensure adequate, qualified, and trained staff is delegated and available for inspection/monitoring/analysis.
		□ Provide inspection/monitoring/analyzing equipment.
		□ Provide disciplinary action for failing to inspect/monitor/analyze.
	□ Poor inspection, monitoring, or hazard analysis	□ Review and revise procedure to inspect/monitor/analyze.
		□ Ensure adequate, qualified, and trained staff is delegated and available for inspection/monitoring/analysis.
		□ Provide disciplinary action for failing to follow inspection/monitoring/analysis procedure.
		□ Provide and use proper, maintained equipment for inspection/monitoring/analysis.
The remainder of the checklist continued on the next page.		
CATEGORY:	**CAUSE OF ACCIDENT:**	**CORRECTIVE ACTION:**

Maintenance and hazard correction	□ No maintenance, repair, or replacement	□ Develop and implement procedure to maintain, repair, or replace facilities or equipment, along with a system to prioritize necessary maintenance, repairs, and replacement. Follow manufacturer instructions.
		□ Ensure adequate, qualified, and trained staff is available for maintenance, repair, or replacement.
		□ Provide disciplinary action for failing to maintain, repair, or replace facilities, equipment, or tools in accordance with procedure.
		□ Select facilities/equipment that allow for easy maintenance, repair, and replacement.
	□ Poor maintenance, repair, or replacement	□ Review and revise procedure to maintain, repair, or replace facilities/equipment. Include proper lockout/tagout procedure and follow manufacturer instructions.
		□ Ensure adequate, qualified, and trained staff is available for maintenance, repair, or replacement.
		□ Provide disciplinary action for failing to follow procedure to maintain, repair, or replace facilities/equipment.
		□ Select facilities/equipment that allow for easy maintenance, repair, and replacement.
	□ No hazard correction	□ Develop and implement a procedure to perform and track corrective actions.
		□ Delegate supervisor/employee to perform and track corrective actions.
		□ Provide disciplinary action for failing to perform a corrective action.
	□ Poor hazard correction	□ Review and revise existing procedure to perform/track corrective actions.
		□ Delegate supervisor/employee to perform and track corrective actions.
		□ Provide disciplinary action for failing to follow the corrective action procedure.
		□ Monitor the effectiveness of corrective actions after completion.

The remainder of the checklist continued on the next page.

CATEGORY:	**CAUSE OF ACCIDENT:**	**CORRECTIVE ACTION:**

Work procedures and practices	□ No work procedure/practice or procedure/work practice is missing or not readily available	□ Develop written work procedure/practice and place a copy in readily available location.
		□ Find existing work procedure/practice and notify affected employee(s) of its location.
		□ Relocate existing work procedure/practice and notify affected employee(s) of its new location.
	□ Ineffective work procedure/practice (e.g., unsafe, incomplete, out-of-date, confusing, contradicting, noncompliant)	□ Review and correct, complete, update, divide, simplify, clarify, or otherwise revise work procedure/practice.
		□ Train or retrain employee/supervisor in work procedure/practice.
		□ Provide a contact person or telephone helpline for work procedure/practice assistance.
	□ Work procedure/practice not followed	□ Provide disciplinary action for failing to follow work procedure/practice.
		□ Provide incentive to follow work procedure/practice.
		□ Train or retrain employee/supervisor in work procedure/practice.
		□ Provide a contact person or telephone helpline for work procedure/practice assistance.
Communication and reporting	□ Failure to communicate or report	□ Provide communication/reporting method (e.g., form form, telephone number, or contact name).
		□ Train/Retrain supervisor/employee in communication/reporting method and procedure.
		□ Provide disciplinary action for failing to communicate/report.
		□ Remove communication/reporting barriers.
	□ Poor communication (e.g., confusing, contradicting, inconsistent, incorrect, difficult terminology, lengthy, English only)	□ Improve communication (e.g., remove confusion, contradictions, inconsistency, inaccuracy, difficult terminology, length).
		□ Inspect signs/labels/tags for readability and replace any unreadable ones.
		□ Communicate in a language that can be understood by employee and use symbols/graphics/demonstration to communicate.
		□ Use the most effective and efficient communication method (e.g., face-to-face, phone, e-mail).
	□ Illiteracy or language issues	□ Communicate in a language that can be understood by employee and use symbols/graphics/demonstration to communicate.
		□ Provide hands-on employee training.
		□ Offer reading and language courses.
	□ Poor or no documentation	□ Develop and use documentation and retention procedure and form(s).
		□ Train supervisor/employee in documentation procedure and its importance.
		□ Provide disciplinary action for failing to document properly.
		□ Provide work time for documentation.
The remainder of the checklist continued on the next page.		
CATEGORY:	**CAUSE OF ACCIDENT:**	**CORRECTIVE ACTION:**

Training	□ No training provided	□ Set training requirements for job type.
		□ Prepare training content and provide training.
		□ Provide incentives for attending training.
		□ Provide disciplinary action for failing to attend training.
	□ Inadequate training (e.g., not complete, lacking hands-on training, no refresher training, boring, lacking evaluation)	□ Review and revise training content.
		□ Provide thorough testing and evaluation and refresher training.
		□ Allow for employee questions during training.
		□ Keep employee training records.
Employee issues	□ Physical or mental incapability (relating to vision, hearing, strength, injury, illness, disability, etc.)	□ Review job requirements and update job description if necessary. Ensure that your company does not discriminate on the basis of a disability.
		□ Redesign job or job procedure or implement a reasonable job accommodation where feasible.
		□ Temporarily transfer employee or provide days away from work until employee is capable.
		□ Use a post-offer pre-employment test to ensure the individual can perform the essential job functions with or without reasonable accommodation. Ensure that your company does not discriminate on the basis of a disability.
	□ Lack of skill, qualification, experience, or familiarity	□ Provide job orientation and training.
		□ Provide mentor, buddy, observer, or contact.
		□ Review job requirements and update job description if necessary.
		□ Use a post-offer pre-employment test to ensure the individual can perform the essential job functions with or without reasonable accommodation. Ensure that your company does not discriminate on the basis of a disability.
	□ Poor attitude (e.g., anger, complacency, horseplay)	□ Provide closer supervision and disciplinary action.
		□ Offer or refer employee for counseling.
		□ Implement a behavior-based safety program and provide positive and negative feedback.
		□ Determine the cause of the poor attitude and correct that cause if possible.
	□ Inattention, distraction, fatigue, or stress	□ Provide closer supervision and disciplinary action.
		□ Offer or refer employee for counseling.
		□ Review and revise work hours (e.g., provide more or longer breaks, rotate employees, shorten work day or work week).
		□ Determine the cause of the behavior (e.g., incentives to rush due to piecework) and correct that cause.
	□ Under the influence of illegal substances, alcohol, or legal medications	□ Provide disciplinary action.
		□ Implement drug and alcohol testing.
		□ Offer or refer employee for counseling.
The remainder of the checklist continued on the next page.		
CATEGORY:	**CAUSE OF ACCIDENT:**	**CORRECTIVE ACTION:**

Management issues	□ Poor or no supervision	□ Review job requirements of supervisor and update job description if necessary.
		□ Train supervisor in responsibilities.
		□ Get supervisor to accept responsibilities.
		□ Provide disciplinary action for failing to meet supervisor responsibilities.
	□ Poor or no discipline or accountability	□ Review, revise, and follow disciplinary program and policy.
		□ Incorporate items of accountability within supervisor/employee performance reviews.
		□ Train supervisor in how and when to provide disciplinary action.
		□ Provide disciplinary action if supervisor fails to follow disciplinary program or policy.
	□ Poor or no policy or rule (e.g., safety policy or rule)	□ Review and revise, correct, update, clarify, or otherwise improve existing policy or rule.
		□ Develop and implement policy or rule.
		□ Train supervisors/employees in revised or new policy or rule.
	□ Lack of management support	□ Inform management of importance of safety and company's regulatory obligations, as well as the cost savings of safety programs and direct/indirect costs of accidents.
Management issues, continued External causes	□ Lack of management support □ Natural disaster or weather condition or event	□ Request funding for safety resources and programs or find inexpensive ways to meet needs.
		□ Request removal of barriers to safe behaviors and request incentives for safe behaviors.
		□ Develop a written action plan for likely natural disasters or weather conditions or events.
External causes Other	□ Natural disaster or weather condition or event □ Criminal or terrorist activity	□ Train employees in action plans for likely disasters/weather conditions/events.
		□ Use disaster/weather monitoring and alerting device.
		□ Close facility during severe disasters/weather conditions/events.
		□ Develop a written action plan for likely criminal or terrorist activity.
	□ Criminal or terrorist activity □ _____	□ Practice action plans for likely criminal or terrorist activity.
		□ Train employees in action plans for likely criminal or terrorist activity.
		□ Set up security and protective measures.
		□ _____
Other Unknown	□ _____ □ Unknown	□ _____
		□ Unknown

Occupational Health & Safety Division: Safety Written Program		
OHS-006 Personal Fall Protection Systems	**Issued: 6/30/2022**	**Revised:**

I. Introduction

Falls are among the most common causes of serious work-related injuries and deaths. In construction settings, and in general industry settings, TDOT takes measures in our workplaces to prevent employees from falling off elevated work surfaces.

The Headquarters Occupational Health and Safety Division coordinates this program and is responsible for reviewing and updating the program, as necessary. Copies of the written program may be obtained from the OHS SharePoint site, Regional Safety Managers, or the Headquarters Occupational Health and Safety Division.

II. General requirements for Fall Protection for OSHA General Industry and Construction Standards

A. General Industry

The general industry standard, 1910.28(b)(1)(i), states that employers must protect each employee on an unprotected side or edge that is **four feet or more** above a lower level. **General industry activities within TDOT would include garage activities and facility maintenance involving the use of aerial devices/man baskets or working at heights where proper edge protection such as railing is not available.**

B. Construction

The construction standard 1926.501(b)(1) states that fall protection is required when an employee is working with an unprotected side or edge which is **six feet or more** above a lower level. **Within TDOT, typical construction activities include roadway construction projects, bridge inspection and repair, retaining walls, and working in aerials devices.**

III. Personal Fall Protection Systems

A. Definitions

Anchorage: means a secure point of attachment for equipment such as lifelines, lanyards, or deceleration devices.

Body harness: means straps that secure about the employee in a manner to distribute the fall arrest forces over at least the thighs, pelvis, waist, chest, and shoulders, with a means for attaching the harness to other components of a personal fall protection system.

Carabiner: means a connector generally comprised of a trapezoidal or oval shaped body with a closed gate or similar arrangement that may be opened to attach another object and, when released, automatically closes to retain the object.

Competent person: means a person who is capable of identifying existing and predictable hazards in any personal fall protection system or any component of it, as well as in their application and uses with related equipment, and who has authorization to take prompt, corrective action to eliminate the identified hazards.

Connector: means a device used to couple (connect) parts of the fall protection system together.

D-ring: means a connector used:

(i) In a harness as an integral attachment element or fall arrest attachment;

(ii) In a lanyard, energy absorber, lifeline, or anchorage connector as an integral connector; or

(iii) In a positioning or travel restraint system as an attachment element.

Deceleration device: means any mechanism that serves to disperse energy during a fall.

Deceleration distance: means the vertical distance a falling employee travels from the point at which the deceleration device begins to operate, excluding lifeline elongation and free fall distance, until stopping. It is measured as the distance between the location of an employee's body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.

Aerial device: Any vehicle—mounted device, telescoping or articulating, or both, which is used to position personnel.

Articulating boom platform:- An aerial device with two or more hinged boom sections.

Mobile unit: A combination of an aerial device, its vehicle, and related equipment.

Platform: Any personnel-carrying device (basket or bucket) which is a component of an aerial device.

Vehicle: Any carrier that is not manually propelled

Free fall: means the act of falling before the personal fall arrest system begins to apply force to arrest the fall.

Free fall distance: means the vertical displacement of the fall arrest attachment point on the employee's body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, lifeline and lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before the devices operate and fall arrest forces occur.

Lanyard: means a flexible line of rope, wire rope, or strap that generally has a connector at each end for connecting the body belt or body harness to a deceleration device, lifeline, or anchorage.

Lifeline: means a component of a personal fall protection system consisting of a flexible line for connection to an anchorage at one end so as to hang vertically (vertical lifeline), or for connection to anchorages at both ends so as to stretch horizontally (horizontal lifeline), and serves as a means for connecting other components of the system to the anchorage.

Personal fall arrest system: (PFAS) means a system used to arrest an employee in a fall from a walking-working surface. It consists of a body harness, anchorage, and connector. The means of connection may include a lanyard, deceleration device, lifeline, or a suitable combination of these.

Personal fall protection system: means a system (including all components) an employer uses to provide protection from falling or to safely arrest an employee's fall if one occurs. Examples of personal fall protection systems include personal fall arrest systems, positioning systems, and travel restraint systems.

Qualified: describes a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience has successfully demonstrated the ability to solve or resolve problems relating to the subject matter, the work, or the project.

Safety factor: means the ratio of the design load and the ultimate strength of the material.

Self-retracting lifeline/lanyard: means a deceleration device containing a drum-wound line that can be slowly extracted from, or retracted onto, the drum under slight tension during normal movement by T

Snaphook: means a connector comprised of a hook-shaped body with a normally closed gate, or similar arrangement that may be manually opened to permit the hook to receive an object. When released, the snaphook automatically closes to retain the object. Opening a snaphook requires two separate actions. Snaphooks are generally one of two types:

(i) Automatic-locking type (permitted) with a self-closing and self-locking gate that remains closed and locked until intentionally unlocked and opened for connection or disconnection; and

(ii) Non-locking type (prohibited) with a self-closing gate that remains closed, but not locked, until intentionally opened for connection or disconnection.

B. TDOT ACTIVITIES WITH FALL HAZARDS REQUIRING PERSONAL FALL PROTECTION SYSTEM

Operating aerial devices with man baskets or buckets including mobile cranes or forklifts with the ability to have a man basket or bucket attachment:

- Bridge Inspection and Repair
- Tree trimming
- Highway marking/ Overhead Sign Installation
- Geotech Operations
- Garage Technicians
- Construction Inspection
- Facility Maintenance

Note: Whenever possible, aerial devices with man baskets should be used when an unguarded or unprotected edge fall hazard is present.

The following must be worn while operating **any aerial device**:

1. Personal 5-point safety harness
2. Retractable Web Lanyard- **6ft maximum length**
3. A retractable lanyard must be worn attached to boom or basket at the designated attachment point, installed by the manufacturer, when working from an aerial lift or approved forklift man basket attachment, **at ALL times**.

C. GENERAL REQUIREMENTS OF PERSONAL FALL PROTECTION SYSTEMS

Self-retracting lifelines and lanyards that automatically limit free fall distance to 2 feet (0.61 m) or less must have components capable of sustaining a minimum tensile load of 3,000 pounds (13.3 kN) applied to the device with the lifeline or lanyard in the fully extended position.

D-rings, snaphooks, and carabiners must be capable of sustaining a minimum tensile load of 5,000 pounds (22.2 kN).

D-rings, snaphooks, and carabiners must be proof tested to a minimum tensile load of 3,600 pounds (16 kN) without cracking, breaking, or incurring permanent deformation. The gate strength of snaphooks and carabiners must be capable of withstanding a minimum load of 3,600 pounds (16 kN) without the gate separating from the nose of the snaphook or carabiner body by more than 0.125 inches (3.175 mm).

Snaphooks and carabiners must be the automatic locking type that require at least two separate, consecutive movements to open.

Snaphooks and carabiners must not be connected to any of the following unless they are designed for such connections:

- Directly to webbing, rope, or wire rope
- To each other
- To a D-ring to which another snaphook, carabiner, or connector is attached;
- To a horizontal lifeline or
- To any object that is incompatibly shaped or dimensioned in relation to the snaphook or carabiner such that unintentional disengagement could occur when the connected object depresses the snaphook or carabiner gate, allowing the components to separate.

NOTE: Personal fall protection systems and their components must be used exclusively for employee fall protection and not for any other purpose, such as hoisting equipment or materials.

Lanyards, and harnesses used for personal fall protection must be compatible with all connectors used.

NOTE: Body belts are prohibited as part of a personal fall arrest system and TDOT prohibits the use of body belts for TDOT employees.

Personal fall protection systems must be worn with the attachment point of the body harness located in the center of the employee's back near shoulder level. The attachment point may be located in the pre-sternal position (chest) if the free fall distance is limited to 2 feet (0.6 m) or less.

Protection from Damage

Lanyards, lifelines, and harnesses used for personal fall protection must be protected from being cut, abraded, melted, or otherwise damaged.

Personal Fall Protection Systems must also meet these requirements

- Limit the maximum arresting force on the employee to 1,800 pounds
- Bring the employee to a complete stop and limit the maximum deceleration distance the employee travels to 3.5 feet.
- Have sufficient strength to withstand twice the potential impact energy of the employee free falling a distance of 6 feet or the free fall distance permitted by the system; and
- Sustain the employee within the system/strap configuration without making contact with the employee's neck and chin area.

System Use Criteria:

- On any horizontal lifeline that may become a vertical lifeline, the device used to connect to the horizontal lifeline is capable of locking in both directions on the lifeline.
- Personal fall arrest systems are rigged in such a manner that the employee **cannot free fall more than 6 feet or contact a lower level.**

Required Before Use-Equipment Inspections

Personal fall protection systems must be inspected before initial use during each work shift for mildew, wear, damage, and other deterioration, and defective components must be removed from service.

See inspection checklist in Appendix A to perform the visual inspection prior to each use.

Impact Loading

Personal fall protection system or its components subjected to impact loading must be removed from service immediately and not used again until a competent person inspects the system or components and determines that it is not damaged and safe for use for employee personal fall protection.

Rescue

The employer must provide for prompt rescue of each employee in the event of a fall.

Aided Rescue

A worker who is suspended from a lifeline and cannot perform a self-rescue will need help from trained rescuers using appropriate equipment, including appropriate fall protection. Off-site emergency response personnel may rescue suspended workers, although most 911 responders are not trained in how to do so.

- Can you use extension ladders, forklifts, or elevating platforms to perform aided rescues or do you need technical rescue equipment?
- Will the equipment be available and ready to use when you need it?
- Can rescuers always reach a suspended worker with the equipment?
- Do rescuers know how to use the equipment?

If possible, use on-site equipment such as extension ladders, forklifts, or elevating platforms for aided rescues. Only if this equipment isn't available or isn't appropriate should you consider using technical rescue equipment.

1. **Self-Rescue**

   With proper personal fall protection equipment, training and practice, a fallen worker can take steps to minimize suspension trauma. Self-rescue methods allow a fallen worker to temporarily relieve pressure on the legs or in some cases to even lower himself or herself to the lower level. A personal fall-arrest system can save your life if you fall, but your harness won't hold you comfortably while you're suspended. If you can't relieve the pressure it exerts on your legs, which constricts blood flowing back to your heart, you could lose consciousness.

   The first thing you should do is relieve the harness pressure; the foot wrap will relieve the pressure and allow you to climb up or down for short distances. You should learn the foot wrap if you use a personal fall-arrest system and if a fall could leave you suspended more than 35 feet above a lower level.

When an emergency occurs:

- If a suspended worker can't perform a self-rescue, call the on-site emergency-response team and get the appropriate rescue equipment.
- First responders should clear a path to the victim. Others should direct emergency personnel to the scene.
- Prohibit all nonessential personnel from the rescue scene.
- Talk to the worker and try to determine the worker's condition.
- If the worker is accessible, provide comfort and check vital signs. If necessary, administer CPR and attempt to stop bleeding.
- If the worker's injuries are minor, proceed with the rescue. Only trained responders should attempt a technical rescue.
- If the worker has severe injuries, contact emergency medical responders. Remember, 911 responders may not be able to accomplish prompt rescues.

IV. Personal Fall Protection Systems Training

TDOT employees who might be exposed to fall hazards must be trained by a competent person. The program shall enable each employee to recognize the hazards of falling and shall train each employee in the procedures to be followed in order to minimize these hazards.

Training is required by a competent person qualified in the following areas:

- The nature of fall hazards in the work area
- The use of personal fall protection systems, safety monitoring systems, controlled access zones, and other protection to be used
- The role of each employee in the safety monitoring system when this system is used
- The correct procedures for the handling and storage of equipment and materials

When TDOT has reason to believe that any affected employee who has already been trained does not have the understanding and skills required

1. Changes in the workplace render previous training obsolete
2. Changes in the types of fall protection systems or equipment to be used render previous training obsolete
3. Inadequacies in an affected employee's knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill.

Fall Protection Training Record Retention

Regional Training Offices shall retain records according their established records management procedures.

Appendix A
Personal Fall Arrest Systems Checklist

Serial #_____ **Employee Assigned _____**

Inspector Name_____ **Location Stored_____** **Inspection Date_____**

Inspection Checklist			
Harness	**Y**	**N**	**Comments**
Is the harness clean and free of mildew?			
Are all parts present and securely attached (e.g., belts, rings, buckles)?			
Is it free of frayed edges and broken, worn fuzzy fibers?			
Is the harness free of pulled stitches, cuts, or unusual wear patterns?			
Is the harness free of chemical damage?			
D-Rings			
Are D-rings and their metal wear pads free of shape distortion, cracks, sharp edges?			
D-rings free of rough or sharp edges?			
Is the D-ring bar at a 90-degree angle with the long axis of the belt and pivot freely?			
Are the attachment points of D-rings free of unusual wear, frayed or cut fibers?			
Buckles			
Are buckles free of shape distortion?			
Are the attachment points free of unusual wear, frayed or cut fibers?			
Are buckle tongues free of shape distortion, and distortion when moved?			
Do buckle tongues overlap the buckle frame?			
Do buckle tongues move freely back and forth in their socket?			
Rivets			
Are rivets tight and unremovable with use of fingers?			
Does the body side of rivet bases sit against the harness material?			
Do outside rivets sit flat against the harness material?			
8-Point Retractable Web Lanyard Inspection			
Safety retractable locks when the lifeline is pulled sharply with no slippage. Lock-up should be positive.			
Labels are present and fully legible.			
Connecting hooks/carabiners, no damage, distortion, corrosion and working properly.			
Housing and anchorage point free of distortion, cracks, damage			
Each component is inspected per manufacturer's instructions.			
Lifeline fully extends/retracts smoothly w/no hesitation/slack			
Lifeline free of cuts, burns, chemical damage, abrasions, loose strands or corrosion. No Damage Present.			
No loose or missing screws and bent or damaged parts.			

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Below is an example of the Fall Protection Inventory List template. Electronic inventory templates are available for tracking fall protection components. Contact the HQ OHS Division or the Regional Safety office to obtain a digital copy.

Work4Us

Fall Protection Inventory List

Serial Number	Employee Assigned	Harness or Lanyard?	Location Stored	Task Description	Manufacturer	Model	Size	If Lanyard, Length (ft)	In Service Date	Last Inspection	Comments

DT-1930 RDA SW25

Occupational Health & Safety Division: Safety Written Program		
Powered Industrial Truck Operation OHS-007	Issued: 07/31/2021	Revised:

I. Introduction

OSHA's goal is to reduce the number of injuries and illnesses that occur to workers in the workplace from unsafe powered industrial truck usage. By providing an effective training program many other benefits will result. Among these are the lower cost of compensation insurance, less property damage, and less product damage.

TDOT is committed to preventing injuries and illnesses of all employees. This program complies with federal and state laws regarding

It is our intent to comply with the requirements of OSHA's 29 CFR 1926.600, 1926.602(c), and 1926.441 for construction activities. These regulations have requirements for powered industrial truck operations, including that for battery care and charging. We also comply with applicable requirements of design, construction, stability, inspection, testing, maintenance, and operation of ASME/ANSI B56.1-1969, Safety Standard for Low Lift and High Lift Trucks. However, the powered industrial trucks we operate in our storage and maintenance yards and warehouses comply with General Industry Standards 29 CFR 1910.176 and 1910.178.

II. Definitions

Powered Industrial Truck (PIT): - any mobile power-propelled truck used to carry, push, pull, lift, stack or tier materials. Powered industrial trucks can be ridden or controlled by a walking operator. Earth moving and over the road haulage trucks are not included in the definition. Equipment that was designed to move earth but has been modified to accept forks are also not included.

3-Points of Contact/3-Point Stance: Three points of contact means you're using two hands and one foot, or one hand and two feet, to support your body while mounting or dismounting a vehicle, stable platform or ladder. The three points of contact should be broken only after your reach your destination (the ground, vehicle cab, stable platform, etc.)

Center of gravity: the point on an object at which all of the object's weight is concentrated. For symmetrical loads, the center of gravity is at the middle of the load.

Counterweight: the weight that is built into the truck's basic structure and is used to offset the load's weight and to maximize the vehicle's resistance to tipping over.

Grade: the slope of a surface, which is usually measured as the number of feet of rise or fall over a hundred feet horizontal distance (the slope is expressed as a percent).

Load center: the horizontal distance from the load's edge (or the fork's or other attachment's vertical face) to the line of action through the load's center of gravity.

Stability triangle: the 3-point suspension system that runs along an imaginary line between a forklift's two front tires and the center of the rear axle. Even though the vehicle has four wheels, it is only supported at these three points.

Carboy Tilter: A carboy is a rigid container with a typical capacity of 1 to 16 US gallons Carboys are primarily used for transporting liquids, often water or chemicals.

III. PRE-OPERATION REQUIREMENTS- DAILY CHECKLIST

OSHA requires that all PITs be inspected at least daily before being placed in service. Forklifts used on a round-the-clock basis must be inspected before each shift.

1. The operator should conduct a pre-start visual check using the **(OHS Pre Op Checklist in Appendix A)** with the key off.
2. Then perform an operational check with the engine running.

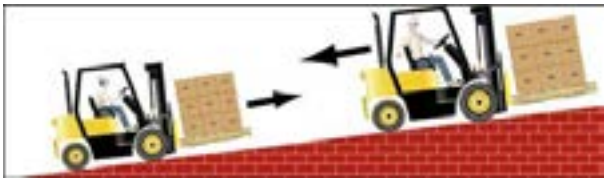
NOTE: ANY PIT in need of repair, defective or in any way unsafe, should not be driven and should be taken out of service immediately. Any problems should be recorded on the appropriate documents and reported to a supervisor.

IV. GENERAL REQUIREMENTS FOR SAFE OPERATION

- Mount and dismount PIT using 3-points of contact (3-point stance).
- Always wear seatbelt if PIT is equipped with a seatbelt.
- Do not engage in stunt driving and horseplay.
- Under all travel conditions the truck must operate at a speed that will permit it to be brought to a stop in a safe manner. The operator must slow down for wet and slippery floors.
- The operator must look in the direction of, and keep a clear view of, the path of travel.
- The operator must slow down, stop and sound the horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view, the operator shall be required to travel with the load trailing.
- Do not pass other trucks traveling in the same direction at intersections, blind spots, or other dangerous locations.
- Grades shall be ascended or descended slowly.
- When ascending or descending grades in excess of 10 percent, loaded trucks shall be driven with the load upgrade.

- Running over loose objects on the roadway surface shall be avoided.
- Do not travel into a position that, if the forklift jumped forward, the brakes failed, or the wrong lever was pushed, a coworker could be pinned between the forklift and another object.
- Keep arms or legs inside the confines of your powered industrial truck.
- Never carry passengers.
- Separate forklift and pedestrian traffic as much as possible.
- Drive slowly into and out of warehouses or other buildings. Going from bright daylight into a darkened warehouse may blind operators just long enough to hit another worker, vehicle or object.
- Slow down and sound the horn at cross aisles and other locations where vision is obstructed.
- In case of tipover, DO NOT attempt to jump off PIT.

While Backing up or Reversing	While Turning
⇒ Keep a clear view. ⇒ Look in the direction of travel. When reversing, look behind. ⇒ Be aware of limited visibility, and use extreme caution when driving in reverse. ⇒ Consider the use of ground guides, rear-view mirrors, spotters, or other aids to increase visibility. ⇒ Consider the noise level in your workplace. Do not assume pedestrians or bystanders are able to hear a back-up alarm. ⇒ Allow plenty of room for pedestrians. You cannot anticipate what people will do. Many have no idea how quickly forklifts accelerate and how sharply they turn. ⇒ Never assume pedestrians or bystanders are aware of the presence of heavy equipment and the intended direction of travel. ⇒ Do not grab the overhead guard when traveling in reverse. This could expose the operator's finger to serious injury.	⇒ When turning, reduce speed to a safe level. ⇒ Proceed with caution when making turns, especially when working in confined areas or narrow aisles. When the lift truck turns a corner, the rear of the lift truck swings in the opposite direction of the turn. ⇒ Anticipate the rear-end swing and start the turn as close to the inside corner as possible. Plan your route and anticipate turns. ⇒ Never turn with forks elevated. ⇒ Never turn on a grade. The forklift may tipover laterally on even a very small grade.

While Traveling on Inclines:	While Parking
⇒ Drive loaded trucks forward going up a ramp with the load upgrade and drive in reverse going down a ramp with the load upgrade. ⇒ Always drive unloaded trucks with the forks downgrade. ⇒ Never drive with the load downgrade. ⇒ Never turn a forklift on a grade   	**Do Not leave a PIT Unattended** ⇒ When the operator is 25 ft. or more away from the vehicle even if it remains in his view, or whenever the operator leaves the vehicle and it is not in his view. ⇒ When a powered industrial truck is left unattended, load engaging means shall be fully lowered, controls shall be neutralized, power shall be shut off, and brakes set. Wheels shall be blocked if the truck is parked on an incline. ⇒ Select a hard, level surface. ⇒ Do not park on a grade, unless wheels are blocked. ⇒ Park in authorized areas only, unless the forklift is disabled. Park a safe distance from fire aisles, stairways or fire equipment. Do not block traffic. ⇒ Fully engage the parking brake. ⇒ Lower the load engaging means (lifting mechanism) fully. **Neutralize the controls:** ⇒ Set the direction lever in neutral, and lock the mechanism (if available). ⇒ Tilt the mast forward slightly and lower the forks to the floor until the fork tips touch the floor. ⇒ If the forklift is disabled, and the forks cannot be lowered to the floor, follow proper lockout/tagout procedures. ⇒ Turn the key to OFF, and stop the engine. Remove the key. *Note: When the operator of an industrial truck is dismounted and within 25 ft. of the truck still in his view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement. It is not required that the power be shut off.*

V. PEDESTRIAN SAFETY

1. Forklift traffic shall be separated from other workers and pedestrians where possible.
2. Yield right of way to pedestrians.
3. When a person or group of people walks across your planned route:

   Stop.

   Wait until the pedestrians pass by.

4. Proceed cautiously through any congested area.
   - ⇒ If an area is cluttered, walk the route first to spot problems.
   - ⇒ Check for situations that require a spotter such as blind spots and use one when traveling.
   - ⇒ Warn pedestrians, by asking them to move, if there is not enough safe clearance.
   - ⇒ Sound the horn when approaching and proceeding through blind corners, doorways and aisles.
   - ⇒ Sound the horn or other alarm when you back up.
   - ⇒ Slow down, stop and sound horn at intersections, corners, and wherever your vision is obstructed.
   - ⇒ When provided on the equipment, use flashing warning light or backup alarms when traveling in reverse.
   - ⇒ Do not move the truck if you do not have a clear view of travel.
   - ⇒ Signal to pedestrians to stand clear.
   - ⇒ Do not allow anyone to stand or pass under the load or lifting mechanism.
   - ⇒ Make eye contact with pedestrians or other forklift operators.

VI. LOADING DOCKS

- When operating a forklift on a loading dock, slow down, watch out for others, and be aware of the edge of the dock.
- At loading docks, properly secure the dock board or bridge plates before driving over them. Drive over them carefully and slowly and never exceed their stated capacity.
- Ensure that tractor trailer tires are chocked on both sides during active loading to ensure trailer creep does not occur.
- If possible, check inside the trailer to ensure trailer floor is in good working condition for active loading.
- Maintain a safe distance from the edge of loading dock.

VII. BATTERY CHARGING- PROPER HANDLING AND STORAGE

Hazards from batteries come in four general areas:

1. **Battery Acid—**The solution in a battery is called an electrolyte, and it is corrosive. It will eat holes in your clothing, etch the concrete floor of your workplace, and damage your skin or eyes.
2. **Hydrogen Gas—**Batteries give off this flammable gas and if it is allowed to accumulate in a small or confined area, it is readily ignitable and can result in an explosion.
3. **Electrical Shock—**Most people have connected "jumper cables" to their car battery and have probably seen the sparks that jump from the battery lead to the cable when the cable is connected to the battery.
4. **Heavy Batteries—**Attempting to handle a battery without proper material handling equipment can result in a severe muscle strain.

Required PPE for Handling Batteries	
Wear goggles designed for working with acid liquid because the electrolyte may bubble up or spray up at any time. **Wear a face shield** to protect your face from the electrolyte. **Wear rubber gloves,** which will resist the acid of the electrolyte and will protect your hands. They also provide a little bit of electrical resistance. **Wear a rubber apron** to protect your clothing and body from the acid.	

Changing and charging storage batteries

- Battery charging installations shall be located in areas designated for that purpose.
- Facilities shall be provided for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of fumes from gassing batteries.
- A conveyor, overhead hoist, or equivalent material handling equipment shall be provided for handling batteries.
- Reinstalled batteries shall be properly positioned and secured in the truck.
- A carboy tilter or siphon shall be provided for handling electrolyte.
- When charging batteries, acid shall be poured into water; water shall not be poured into acid.
- Trucks shall be properly positioned and brake applied before attempting to change or charge batteries.
- Care shall be taken to assure that vent caps are functioning. The battery (or compartment) cover(s) shall be open to dissipate heat.
- Smoking shall be prohibited in the charging area.
- Precautions shall be taken to prevent open flames, sparks, or electric arcs in battery charging areas.

- Tools and other metallic objects shall be kept away from the top of uncovered batteries.

Battery Charging/Changing Emergencies

In case of skin exposure:

- **Know where the emergency shower and eyewash station are located.** The designated battery charging and storage area should have these stations located nearby–especially if electrolyte is handled in the area.
- **Rinse thoroughly with water for at least 10 minutes** and then seek medical attention if electrolyte comes into contact with your eyes or skin.

In case of a spill:

- Know where the spill kit is located. It is designed specifically for acid spills and should be located in the designated battery charging and storage area. Acid spill kits have absorbent materials designed to absorb acid liquids. They also come with acid-resistant PPE. Acid spill kits have tools, such as shovels, and container drums that are made of plastic so they will not be corroded by the acid. Workers must know they should never touch an acid spill unless they have received specific training on spill response and spill cleanup.
- Use the neutralizing solution in the acid spill kit. Baking soda is commonly used to neutralize acid spills.

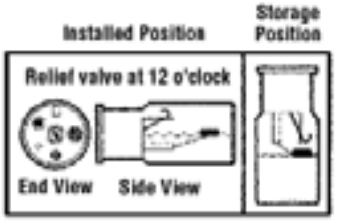
VIII. CHANGING OF PROPANE TANKS- PROPER HANDLING AND STORAGE

Propane Cylinder Storage

- Store the cylinder in an upright position, in well-ventilated area away from ignition sources and sheltered from excessive temperature, where it can be secured and is protected from being struck.
- Protect cylinders from falling. Use a chain or adequate support system. Consider securing each cylinder separately to prevent other cylinders from falling when items are removed from storage.
- Do not store cylinders or park the forklift close to heat sources, doorways, aisles elevators, stairways, and exits.

Handling propane fuel

- Position the tank so the liquid propane does not come in contact with the relief valve.
- Make sure the locking pin engages into the cylinder.
- Make sure the valve is closed tightly.
- Put the cylinder down gently. Do not drop, dent or damage.
- Always protect the valve from any damage.
- Avoid contact with liquid propane, as it can cause frostbite.
- Wear protective gloves while making or breaking connections.
- Ensure that only qualified persons repair carburetors and fuel supply systems.
- Exchange removable cylinders outdoors or in well-ventilated areas, away from sources of ignition.
- Close the valve before breaking connections



Procedure for changing propane (LPG) cylinders:

1. Wear eye protection and insulated, loose fitting gloves such as leather (dry) or insulated neoprene.	**10.** Tighten the connecting nut (wiggle hose).
2. Run the engine until it stops. This ensures that the connection hose is empty.	**11.** Open the valve on the cylinder slowly and check for leaks. Use solution of soap and water. Smell – listen – look.
3. Open the connecting nut and inspect valves for leaking. Do NOT use metal tools.	**12.** If the valve leaks: 1st time - Tighten the nut and continue. 2nd time - Change the cylinder. 3rd time - Change the hose.
4. Disconnect the hose.	**13.** Open the valve fully (slowly).
5. Disconnect the holding strap.	**14.** Check that the hose is turned inward.
6. Remove empty cylinder.	**15.** Secure the hose downward.
7. Inspect replacement cylinder for damage.	**16.** Secure the cylinder.
8. Replace with a full cylinder in the proper position.	**17.** Start the engine and resume operation.
9. Connect the holding straps.	**REMEMBER-NO SMOKING**

IX. TRAINING REQUIREMENTS

The standard requires the development and implementation of a training program based on the general principles of safe truck operation, the types of vehicle(s) being used in the workplace, the hazards of the workplace created by the use of the vehicle(s), and the general safety requirements of the OSHA standard.

Training Frequency

Trained operators must know how to do the job properly and do it safely as demonstrated by workplace evaluation every 3 years or after a safety related incident occurs.

Delivery Methods

Training shall consist of a combination of formal instruction (e.g., lecture, discussion, interactive computer learning, video tape, written material), practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace.

1. **Classroom Type Instruction**

   Formal (lecture, video, etc.) and practical (demonstration and practical exercises) training must be provided.

2. **Hands on Evaluation**

Prior to operating the truck in the workplace, the employer must evaluate the operator's performance and determine the operator to be competent to operate a powered industrial truck safely. The TDOT Operator's Evaluation checklist is illustrated in **Appendix B**.

Refresher Training

Refresher training, including an evaluation of the effectiveness of that training, shall be conducted to ensure that the operator has the knowledge and skills needed to operate the powered industrial truck safely. Refresher training in relevant topics shall be provided to the operator when:

- The operator has been observed to operate the vehicle in an unsafe manner.
- The operator has been involved in an accident or near-miss incident.
- The operator has received an evaluation that reveals that the operator is not operating the truck safely.
- The operator is assigned to drive a different type of truck.
- A condition in the workplace changes in a manner that could affect safe operation of the truck.

Trainees may operate a powered industrial truck only:

- Under the direct supervision of persons who have the knowledge, training, and experience to train operators and evaluate their competence**.**
- **Where such operation does not endanger the trainee or other employees.**

Training Program Content

Powered industrial truck operators shall receive initial training in the following topics, except in topics which are not applicable to safe operation of the truck at TDOT.

PIT-Related Topics	Workplace Conditions-Related Topics
☐ Operating instructions, warnings, and precautions for the types of truck the operator will be authorized to operate. ☐ Differences between the PIT and the automobile. ☐ PIT controls and instrumentation: where they are located, what they do, and how they work. ☐ Engine or motor operation ☐ Steering and maneuvering ☐ Visibility (including restrictions due to loading) ☐ Fork and attachment adaptation, operation, and use limitations. ☐ Vehicle capacity ☐ Vehicle stability ☐ Any vehicle inspection and maintenance that the operator will be required to perform ☐ Refueling and/or charging and recharging of batteries ☐ Operating limitations	☐ Surface conditions where the vehicle will be operated. ☐ Composition of loads to be carried and load stability. ☐ Load manipulation, stacking, and unstacking. ☐ Pedestrian traffic in areas where the vehicle will be operated. ☐ Narrow aisles and other restricted places where the vehicle will be operated. ☐ Hazardous (classified) locations where the vehicle will be operated. ☐ Ramps and other sloped surfaces that could affect the vehicle's stability. ☐ Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust. ☐ Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation.
If an operator was previously trained in one of these topics, and the training is appropriate to the truck and working conditions encountered, additional training on that topic is not required if the operator has been evaluated and found competent to operate the truck safely.	

Appendix A

Daily Pre-Operational Checklist Example

To Access the printable Daily Pre-Operational Checklist via the OHS Division SharePoint site or contact your Regional Safety Team.

TDOT Powered Industrial Truck
Daily Pre-Operational Checklist

Department ID:_____ Circle all that Apply Inspected By: _____
PIT Unit#:_____ Electric/Propane/Diesel/Gas Date: _____
Parking Location:_____ Order Picker/Sit Down/Stand Up/Rough Terrain Out of Service Y/N:_____

Notify Supervisor of any issues and take out of service immediately.	Y	N	N/A	Details
Tires/Wheels				
No cuts, separation, from rim, excessive wear				
Properly inflated				
Lug nuts present and tightly securing each wheel/tire				
Forks				
Top clip retaining pins tightly secured and in good repair (no cracks, bends, excessive wear)				
Forks properly aligned, in good repair (no cracks, bends excessive wear)				
Load back rest securely attached and in good repair (no cracks, bends)				
Mast and Carriage				
Mast assembly in good repair (no cracks, dents, missing stops, broken welds)				
Hydraulic cylinders in good repair (no cracks, or leaks)				
Lift chains and rollers in good repair (no cracks, kinks, rust)				
Lift chains have proper tension, chains and rollers lubricated				
Body				
Body is in good repair and clean (no cracks,dents, grease, lint)				
Battery covers and hazardous parts in place and secure.				
Overhead guard in good repair and securely attached				
Nameplate, safety decals, and warnings legible and in place				
Wire in good repair (no cracks or bends)				
Belts in good repair (no cracks or frays)				
Headlights in good repair and aimed correctly				
Taillights and reflectors (no cracks or breaks)				
Warning lights in good repair				
Hoses in good repair (no leaks, cracks, kinks)				
Chains and cables in good repair (no cracks or bends)				
Control levers properly labled				
Cab				
Seatbelt working properly and (no frays, excessive wear)				
Seat in good repair, working properly if adjustable				
Mirrors clean, in good repair and aquisted properly				
Control levers properly labeled				
Fire Extinguisher is charged and mounted (if applicable)				
Fluids				
Hydraulic fluid level adequate (all)				
Brake fluid level adequate (all)				
Sufficient fuel for operation (gas, diesel, LPG)				
Engine oil level adequate (gas, diesel, LPG)				
Radiator coolant level adequate (gas, diesel, LPG)				
Transmission fluid level adequate (gas, diesel, LPG)				

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Notify Supervisor of any issues and take out of service immediately.	Y	N	N/A	Details
Battery				
Battery and connections in good repair and tight (no corrosion, missing cable insulation, cracks or excessive wear				
Cell caps and battery cover in place				
Electrolyte level adequate and battery charged				
Attachments (if applicable)				
Nameplate accounts for attachment being used?				
Attachment is in good repair (no cracks or bends)				
Platform (if applicable)				
Work platform clean, in good repair (no cracks or holes)				
Guardrails or other limiting device in good repair (no cracks, bends)				
Guardrails or other limiting device close properly, lock securely				
Systems and Controls				
Engine/motor runs smoothly				
Accelerator works and functions smoothly				
Steering is smooth and responsive (free of excessive play)				
Turn signals work properly (if applicable)				
Horn, whistle, gong or other warning device sounds properly				
Back Up alarm works properly				
Brake works and functions smoothly (no grabbing)				
Parking brake functions properly (holds on an incline)				
Drive control in forward and reverse works, functions smoothly				
Lift controls raise and lower forks or platform properly and smoothly (no excess drift)				
Tilt control forward and backward works, functions smoothly (no excess drift)				
Attachment control works, functions smoothly (no hesitation)				
Safety interlock works (order pickers)				
Gripper jaws open and close quickly and smoothly (order pickers)				
Hour Meter works				
Fuel Gauge works				
Ammeter indicator lamp works				
Battery discharge indicator works (order picker)				
Oil pressure indicator lamp works				
Water temperature gauge works				
Propane Tank (if applicable)				
Tank restraint brackets in good repair (no cracks, bends, rust)				
Tank properly mounted on the locator pin				
Tank fits within profile of the truck				
Tank in good repair, no cracks dents or rust				
Hoses and connectors in good repair and securely attached (no cracks or kinks)				
Pressure relief valve pointing up				
Additional Details on Issues noted:				

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Issues Resolved by: Date Resolved:

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Appendix B

PIT Operator Evaluation Example

To access the printable PIT Operator's Evaluation Checklist via the OHS Division SharePoint site or contact your Regional Safety Team.

PIT Operator Evaluation

Operator: _____ **Evaluator:** _____

Location: _____ **Hands On Pass/Fail:** _____

Employee ID# _____ **Classroom Training Completed Date:** _____

Date of Evaluation: _____ **Evaluator's Signature:** _____

S= Satisfactory, U=Unsatisfactory	S	U	Comments
Pre-Op Inspection and Start Up			
Demonstrates conducting Daily Pre-Op Checklist			
Fastens seatbelt			
Fall Harness inspected, donned, and properly attached (if applicable)			
Picking Up Load			
Checks load capacity before lifting and uses approved containers			
Distributes load evenly when lifting and lowering			
Load is stable and balanced			
Forks are positioned all the way under load			
Tilt/lift load function for stability is used			
Stopped forklift before load/raised lowered			
Lowered to safe travel height before moving			
Overhead obstruction check			
Back out slowly/look behind for obstructions			
Traveling with Load			
Obey signs and drive in proper PIT aisles, paths, roadways			
Legs/arms inside running lines			
Slows down, stops and Sounds horn at intersections			
Reasonable speed for maneuvering			
Changing directions- stop and then proceed, use signal (if applicable)			
Drive backward- when load blocks front view (demonstrate)			
Look before backing to avoid obstacles, pedestrians			
Keeps safe distance between other PITs and moving equipment			
Distance of forks from ground is as low as possible			
Braking and stopping is smooth			
Load Manipulation, Stacking, Unstacking			
PIT centered when moving in to place load			
Speed of lift keeps load stable			
Forward movement keeps load stable			
Position load on rack evenly and neatly			
Place load in marked area			
Back off slow/check for pedestrians			
Fork clears pallet or load after placing-before moving up or down			
Parking			
Place forks on floor, controls in neutral, brake on, power off			
Mount/dismount with 3 points of contact			
Propane Tanks			
Demonstrates steps to change out propane tank wearing proper PPE			
Battery Charging			
Demonstrates hooking up charger wearing proper PPE			

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Appendix C

Principles of Stability

(The purpose of this appendix is to provide a resource for employees who need additional instruction and understanding on the stability triangle.)
Determining the stability of a powered industrial truck is simple once a few basic principles are understood. There are many factors that contribute to a vehicle's stability: the vehicle's wheelbase, track, and height; the load's weight distribution; and the vehicle's counterweight location (if the vehicle is so equipped). The "stability triangle," used in most stability discussions, demonstrates stability simply.

Whether an object is stable depends on the object's moment at one end of a system being greater than, equal to, or smaller than the object's moment at the system's other end. This principle can be seen in the way a see-saw or teeter-totter works: that is, if the product of the load and distance from the fulcrum (moment) is equal to the moment at the device's other end, the device is balanced and it will not move. However, if there is a greater moment at one end of the device, the device will try to move downward at the end with the greater moment.

The longitudinal stability of a counterbalanced powered industrial truck depends on the vehicle's moment and the load's moment. In other words, if the mathematic product of the load moment (the distance from the front wheels, the approximate point at which the vehicle would tip forward) to the load's center of gravity times the load's weight is less than the vehicle's moment, the system is balanced and will not tip forward. However, if the load's moment is greater than the vehicle's moment, the greater load-moment will force the truck to tip forward.

Center of gravity is the point on an object at which all of the object's weight is concentrated. For symmetrical loads, the center of gravity is at the middle of the load.
Counterweight is the weight that is built into the truck's basic structure and is used to offset the load's weight and to maximize the vehicle's resistance to tipping over.
Fulcrum is the truck's axis of rotation when it tips over.
Grade is the slope of a surface, which is usually measured as the number of feet of rise or fall over a hundred foot horizontal distance (the slope is expressed as a percent).
Lateral stability is a truck's resistance to overturning sideways.
Line of action is an imaginary vertical line through an object's center of gravity.
Load center is the horizontal distance from the load's edge (or the fork's or other attachment's vertical face) to the line of action through the load's center of gravity.
Longitudinal stability is the truck's resistance to overturning forward or rearward.
Moment is the product of the object's weight times the distance from a fixed point (usually the fulcrum). In the case of a powered industrial truck, the distance is measured from the point at which the truck will tip over to the object's line of action. The distance is always measured perpendicular to the line of action.
Track is the distance between the wheels on the same axle of the truck.
Wheelbase is the distance between the centerline of the vehicle's front and rear wheels.

The Stability Triangle

Almost all counterbalanced powered industrial trucks have a three-point suspension system, that is, the vehicle is supported at three points. This is true even if the vehicle has four wheels. The truck's steer axle is attached to the truck by a pivot pin in the axle's center. When the points are connected with imaginary lines, this three-point support forms a triangle called the stability triangle. Figure 1 depicts the stability triangle.

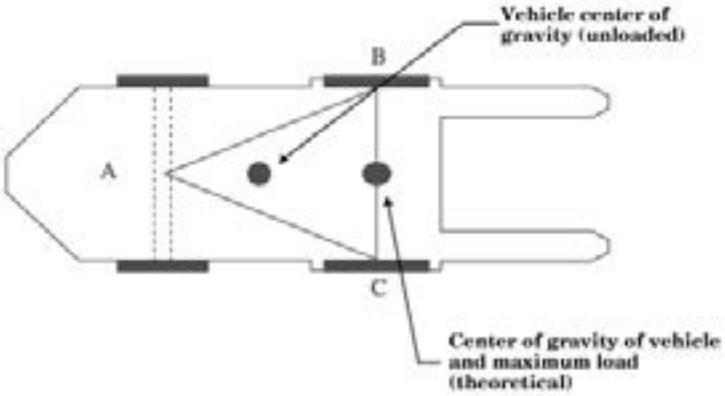
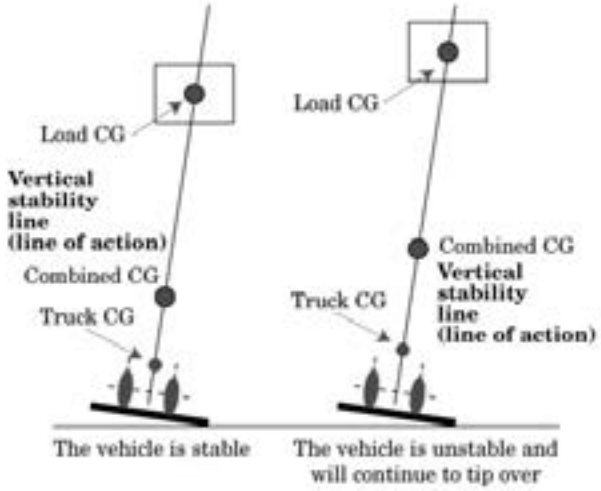


Figure 1

1. When the vehicle is loaded, the combined center of gravity (CG) shifts toward line B–C. Theoretically the maximum load will result in the CG at the line B–C. In actual practice, the combined CG should never be at line B–C.

2. The addition of additional counterweight will cause the truck CG to shift toward point A and result in a truck that is less stable laterally.

When the vehicle's line of action, or load center, falls within the stability triangle, the vehicle is stable and will not tip over. However, when the vehicle's line of action or the vehicle/load combination falls outside the stability triangle, the vehicle is unstable and may tip over. (See Figure 2.)



Longitudinal Stability

The axis of rotation when a truck tips forward is the front wheels' points of contact with the pavement. When a powered industrial truck tips forward, the truck will rotate about this line. When a truck is

stable, the vehicle-moment must exceed the load-moment. As long as the vehicle-moment is equal to or exceeds the load-moment, the vehicle will not tip over. On the other hand, if the load moment slightly exceeds the vehicle-moment, the truck will begin to tip forward, thereby causing the rear to lose contact with the floor or ground and resulting in loss of steering control. If the load-moment greatly exceeds the vehicle-moment, the truck will tip forward.

To determine the maximum safe load-moment, the truck manufacturer normally rates the truck at a maximum load at a given distance from the front face of the forks. The specified distance from the front face of the forks to the line of action of the load is commonly called the load center. Because larger trucks normally handle loads that are physically larger, these vehicles have greater load centers. Trucks with a capacity of 30,000 pounds or less are normally rated at a given load weight at a 24-inch load center. Trucks with a capacity greater than 30,000 pounds are normally rated at a given load weight at a 36- or 48-inch load center. To safely operate the vehicle, the operator should always check the data plate to determine the maximum allowable weight at the rated load center.

Although the true load-moment distance is measured from the front wheels, this distance is greater than the distance from the front face of the forks. Calculating the maximum allowable load-moment using the load-center distance always provides a lower load-moment than the truck was designed to handle. When handling unusual loads, such as those that are larger than 48 inches long (the center of gravity is greater than 24 inches) or that have an offset center of gravity, etc., a maximum allowable load-moment should be calculated and used to determine whether a load can be safely handled. For example, if an operator is operating a 3,000 pound capacity truck (with a 24-inch load center), the maximum allowable load-moment is 72,000 inch-pounds (3,000 times 24). If a load is 60 inches long (30-inch load center), then the maximum that this load can weigh is 2,400 pounds (72,000 divided by 30).

Lateral Stability

The vehicle's lateral stability is determined by the line of action's position (a vertical line that passes through the combined vehicle's and load's center of gravity) relative to the stability triangle. When the vehicle is not loaded, the truck's center of gravity location is the only factor to be considered in determining the truck's stability. As long as the line of action of the combined vehicle's and load's center of gravity falls within the stability triangle, the truck is stable and will not tip over. However, if the line of action falls outside the stability triangle, the truck is not stable and may tip over. Refer to Figure 2.

Factors that affect the vehicle's lateral stability include the load's placement on the truck, the height of the load above the surface on which the vehicle is operating, and the vehicle's degree of lean.

Dynamic Stability

Up to this point, the stability of a powered industrial truck has been discussed without considering the dynamic forces that result when the vehicle and load are put into motion. The weight's transfer and the resultant shift in the center of gravity due to the dynamic forces created when the machine is moving, braking, cornering, lifting, tilting, and lowering loads, etc., are important stability considerations.

When determining whether a load can be safely handled, the operator should exercise extra caution when handling loads that cause the vehicle to approach its maximum design characteristics. For example, if an operator must handle a maximum load, the load should be carried at the lowest position possible, the truck should be accelerated slowly and evenly, and the forks should be tilted forward cautiously. However, no precise rules can be formulated to cover all of these eventualities.

TDOT Powered Industrial Truck
Daily Pre-Operational Checklist

Department ID:_____ *Circle all that Apply* **Inspected By: _____**

PIT Unit#:_____ **Electric/Propane/Diesel/Gas** **Date: _____**

Parking Location:_____ **Order Picker/Sit Down/Stand Up/Rough Terrain** **Out of Service Y/N:_____**

Notify Supervisor of any issues and take out of service immediately.	**Y**	**N**	**N/A**	**Details**
Tires/Wheels				
No cuts, separation, from rim, excessive wear				
Properly inflated				
Lug nuts present and tightly securing each wheel/tire				
Forks				
Top clip retaining pins tightly secured and in good repair (no cracks, bends, excessive wear)				
Forks properly aligned, in good repair (no cracks, bends excessive wear)				
Load back rest securely attached and in good repair (no cracks, bends)				
Mast and Carriage				
Mast assembly in good repair (no cracks, dents, misssing stops, broken welds)				
Hydraulic cylinders in good repair (no cracks, or leaks)				
Lift chains and rollers in good repair (no cracks, kinks, rust)				
Lift chains have proper tension, chains and rollers lubricated				
Body				
Body is in good repair and clean (no cracks,dents, grease, lint)				
Battery covers and hazardous parts in place and secure.				
Overhead guard in good repair and securely attached				
Namplate, safety decals, and warnings legible and in place				
Wire in good repair (no cracks or bends)				
Belts in good repair (no cracks or frays)				
Headlights in good repair and aimed correctly				
Tailights and reflectors (no cracks or breaks)				
Warning lights in good repairt				
Hoses in good repair (no leaks, cracks, kinks)				
Chains and cables in good repair (no cracks or bends)				
Control levers properly labled				
Cab				
Seatbelt working properly and (no frays, ecessive wear)				
Seat in good repair, working properly if adjustable				
Mirrors clean, in good repair and asjusted properly				
Control levers properly labeled				
Fire Extinguisher is charged and mounted (if applicable)				
Fluids				
Hydraulic Fluid level adequate (all)				
Brake fluid level adequate (all)				
Sufficient fuel for operation (gas, diesel, LPG)				
Engine oil level adequate (gas, diesel, LPG)				
Raidator coolant level adequate (gas, diesel, LPG)				
Transmission fluid level adequate (gas, diesel, LPG)				

Notify Supervisor of any issues and take out of service immediately.	Y	N	N/A	Details
Battery				
Battery and connections in good repair and tight (no corrosion, missing cable insulation, cracks or excessive wear				
Cell caps and battery cover in place				
Electrolyte level adequate and battery charged				
Attachments (if applicable)				
Nameplate accounts for attachment being used?				
Attachment is in good repair (no cracks or bends)				
Platform (if applicable)				
Work platform clean, in good repair (no cracks or holes)				
Guardrails or other limiting device in good repair (no cracks, bends)				
Guardrails or other limiting device close properly, lock securely				
Systems and Controls				
Engine/motor runs smoothly				
Accelerator works and functions smoothly				
Steering is smooth and responsive (free of excessive play)				
Turn signals work properly (if applicable)				
Horn, whistle, gong or other warning device sounds properly				
Back Up alarm works properly				
Brake works and functions smoothly (no grabbing)				
Parking brake functions properly (holds on an incline)				
Drive control in forward and reverse works, functions smoothly				
Lift controls raise and lower forks or platform properly and smoothly (no excess drift)				
Tilt control forward and backward works, functions smoothly (no excess drift)				
Attachment control works, functions smoothly (no hesitation)				
Safety interlock works (order pickers)				
Gripper jaws open and close quickly and smoothly (order pickers)				
Hour Meter works				
Fuel Gauge works				
Ammeter indicator lamp works				
Battery discharge indicator works (order picker)				
Oil pressure indicator lamp works				
Water temperature gauge works				
Propane Tank (if applicable)				
Tank Restraint brackets in good repair (no cracks, bends, rust)				
Tank properly mounted on the locator pin				
Tank fits within profile of the truck				
Tank in good repair, no cracks dents or rust				
Hoses and connectors in good repair and securely attached (no cracks or kinks)				
Pressure relief valve pointing up				
Additional Details on Issues noted:				

Issues Resolved by: **Date Resolved:**

PIT Operator Evaluation

Operator: _____ **Evaluator:**_____

Location: _____ **Hands On Pass/Fail:** _____

Employee ID#_____ **Classroom Training Completed Date:**_____

Date of Evaluation: _____ **Evaluator's Signature:**_____

S= Satisfactory, U=Unsatisfactory	S	U	Comments
Pre-Op Inpection and Start Up			
Demonstrates conducting Daily Pre-Op Checklist			
Fastens seatbelt			
Fall Harness inspected, donned, and properly attached (if applicable)			
Picking Up Load			
Checks load capacity before lifting and uses approved containers			
Distributes load evenly when lifting and lowering			
Load is stable and balanced			
Forks are positioned all the way under load			
Tilft/lift load function for stabilty is used			
Stopped forklift before load/raised lowered.			
Lowered to safe travel height before moving			
Overhead obstruction check			
Back out slowly/look behind for obstructions			
Traveling with Load			
Obey signs and drive in proper PIT aisles, paths, roadways			
Legs/arms inside running lines			
Slows down, stops and Sounds horn at intersections			
Reasonable speed for maneuvering			
Changing directions- stop and then proceed, use signal (if applicable)			
Drive backward- when load blocks front view (demonstrate)			
Look before backing to avoid obstacles, pedestrians			
Keeps safe distance between other PITs and moving equipment			
Distance of forks from ground is as low as possible			
Braking and stopping is smooth			
Load Manipulation, Stacking, Unstacking			
PIT centered when moving in to place load			
Speed of lift keeps load stable			
Forward movement keeps load stable			
Position load on rack evenly and neatly			
Place load in marked area			
Back off slow/check for pedestrians			
Fork clears pallet or load after placing-before moving up or down			
Parking			
Place forks on floor, controls in neutral, brake on, power off			
Mount/dismount with 3 points of contact			
Propane Tanks			
Demonstrates steps to change out propane tank wearing proper PPE			
Battery Charging			
Demonstrates hooking up charger wearing proper PPE			

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TDOT Aeronautics Tugger
Daily Pre-Operational Checklist

Department ID:_____
Unit#:_____

Inspected By: _____
Date: _____
Out of Service Y/N:_____

Notify Supervisor of any issues and take out of service immediately.	**Y**	**N**	**N/A**	**Details**
MAIN POWER DISCONNECT HANDLE- Verify that motive and hydraulic (optional)/ winch power is cut off when the handle is pulled to the disconnected "off" position by subsequent application of accelerator/winch functions.				
DEADMAN EMERGENCY/PARK BRAKE - Stand on deadman pedal. Select forward drive. Gradually accelerate until moderate speed reached. Move the direction/accelerator handle to NEUTRAL and before tug de-accelerates remove foot from deadman pedal completely while tug is going straight. Tug should stop abruptly and hold.				
SERVICE FOOT BRAKE - With tug in motion, check operation of foot brake. Pedal should not depress more than 3 inches (7 cm.) from its rest position before braking action is felt. Depressed pedal should feel firm and not spongy. Braking action should be positive and proportional to applied pedal effort.				
STEERING - While driving forward at slow speed, perform lock-to-lock steering maneuver to verify that steering force is smooth and steady.				
DIRECTION/ACCELERATOR HANDLE - With tug in motion, ensure speed control functions respond smoothly and proportional to accelerator handle input.				
LIGHTS - Ensure operational.				
PEDALS - Ensure service and deadman brake foot pedals have anti-slip pads intact and not excessively worn.				
ANTI-SKID SURFACES - Anti-skid surface on operator's platform should be intact and not excessively worn.				
TIRES - Visually check front drive tires to ensure adequate inflation. Tires should not bulge on bottom ground contact area with tug empty. Visually check all tires for casing integrity.				
HOOK SAFETY CATCH - Push winch strap hook safety catch to open position. Ensure that return spring on catch supplies enough force to fully close catch and that catch is free moving.				
WINCH ASSEMBLY- Check that the winch on rear deck mounting bolts are tight and that on first capture operation the winch and remote control functions (optional hydraulic winch)as selected on the remote control.				
WINCH STRAP AND STRUT STRAPS - Visually confirm "D" ring and hook attachment stitching, and strap in good condition.				
STRUT STRAP PROTECTIVE SLEEVE - Touch nylon sleeve cover to ensure free of grease build-up and grit which could scratch nose wheel strut oleo shiny surface. Wipe off any grit before use, then wash with detergent at first opportunity. Order replacement if missing.				
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GPU ELECTRICAL CONNECTORS AND CABLES - On tugs equipped with GPU, inspect GPU extension and aircraft adapters and, tug's GPU outlet connectors. Ensure cable and connector components not damaged or worn.				
BATTERY CHARGER CABLES AND CONNECTORS - Inspect all chargers' input and output wires and connector plugs. Ensure not damaged or worn.				
AIRCRAFT WHEEL CHOCKS - Ensure adequate supply of serviceable chocks, sized for aircraft type(s) to be moved, are secured onboard tug or available on site for both sides of both main gear, regardless of whether aircraft brakes are set or not when aircraft released.				
FIRE EXTINGUISHER - On tugs so equipped by owner, check for damaged handle, pins, levers, mounting bracket and broken seal. If gauge type, verify gauge registers in "CHARGED" zone. Remove unserviceable extinguisher from tug and operational area immediately.				
MISCELLANEOUS - Any additional defect(s) that the operator feels is a direct and immediate safety risk. E.g.: Sharp protrusion due to a component break which constitutes an injury hazard.				
Additional Details on Issues noted:				

Issues Resolved by: **Date Resolved:**

GENERAL SAFETY RULES

- The tug must be operated and serviced by qualified and authorized personnel only.
- Ensure tug serviceability by complying with the published servicing, inspection and pre-use safety check requirements.
- Perform Operator's Safety Check before first use of the tug on each work shift.
- Report any tug damage or unserviceability to a supervisor immediately.
- Understand all operating instructions before using the tug.
- Comply with all published operating instructions and airport traffic safety regulations while using the tug.
- Drive the unit only while properly positioned completely within the operator's compartment and with the arm rests in the horizontal deployed position.
- Do not transport passengers on any portion of the tug other than in the passenger position of the operator's compartment. Ensure passenger uses passenger safety handle on the console and places right arm rest in the horizontal deployed position for security.
- Tow only within the tug's rated aircraft weight capacity.
- Tow aircraft at speeds not exceeding 3mph (5km/h).
- Ensure all loads being moved are secured.
- Ensure unit is operating at speed of 2mph (3km/h) or greater before applying maximum drive power to tug.
- Avoid sudden stops.
- Do not initiate turns at high speed.
- When towing aircraft always use gradual brake application.
- During slippery conditions, reduce speed and anticipate slower braking reaction.
- Remain completely within the operator's compartment until the unit is completely stopped before leaving the operator's position.
- When leaving the tug unattended, turn the key switch to the OFF position and pull parking brake to apply.
- When charging, ensure the corresponding battery compartment deck cover is open.
- Do not attempt to leave the tug while it is in motion.

Aircraft Tugger Operator Evaluation

Operator: _____ **Evaluator:**_____

Aircraft Model(s): _____ **Hands On Pass/Fail:** _____

Employee ID#_____ **Tugger Safety Class Completed Date:**_____

Date of Evaluation: _____ **Evaluator's Signature:**_____

S= Satisfactory, U=Unsatisfactory	S	U	Comments
Pre-Op Inpection, Start Up and Battery Charging			
Demonstrates steps in conducting Daily Pre-Op Checklist			
Demonstrates proper battery charger hookup and disconnect.			
General Travel			
Places armrests down as a restraint and and raises bucket/cradle off ground before travel begins			
Remains within operator's compartment until completely stopped			
Moves the directional / accelerator control handle gradually to ensure smooth, controlled acceleration and deceleration.			
Ensures unit is operating at speed of 2 mph (3 km/h) or greater before applying maximum drive power to tug.			
Avoids sudden stops.			
Does not initiate turns at high speeds.			
Approach to Aircraft- General			
Stops at least 30 ft from aircraft using brake pedal to test brakes.			
Approaches approach the aircraft at walking speed toward the aircraft wheel in line with the direction the tire is pointing (the nose or tail wheel's direction of travel)			
Stops tug 3 ft. (1 m) from the aircraft wheel, and lowers the nose wheel cradle to 2 in. (5 cm) above the ground.			
Verifies that the aircraft brakes are ON. If not, set the aircraft brakes or install wheel chocks on both sides of the main wheel.			
Approaches the aircraft and slow the unit to a full stop so that the cradle stops 2 in. (5 cm) from the edge of the aircraft tire and the cradle is centered on the tire.			
Lowers the nose wheel cradle so that it rests on the ground.			
Steps off the deadman pedal which sets the tugs park brake and walks to the tug's left side near winch.			
Capture of Aircraft- General			
Winches aircraft onto the cradle monitoring strap tension.			
Raises nose cradle assembly sufficiently to allow it to clar ground or floor obstacles during towing monitoring the stap tension.			
Installs front gate to act as backup aircraft wheel stop safeguard			
Demonstrates the different capture methods between different aircraft models (if applicable)			
Transport of Aircraft			
During towing or push out, keep the aircraft’s wheel and lower strut within the aircraft’s prescribed or indicated turn limits for the existing steering system configuration at the time of the tow.			
Assigns and positions wing walking and signalling personnel as required for the safe movement of the aircraft.			
When maneuvering in congested areas, stops to perform visual inspections and reverse the direction as required to avoid contact with other objects.			
Periodically checks aircraft nose wheel to ensure it remains positioned on the cradle, clear of the tug’s structure			

Occupational Health & Safety Division: Safety Written Program		
OHS-008 Walking Working Surfaces	**Issued: 6/01/2022**	**Revised:**

I. INTRODUCTION

Falls are among the most common causes of serious work-related injuries and deaths. In construction settings, and in general industry settings, TDOT takes measures in our workplaces to prevent employees from falling off elevated work surfaces such as ladders (mobile and fixed), stairways, loading docks, overhead platforms, elevated workstations, into floor and wall openings, bridge edges, retaining walls, etc.

The Headquarters Occupational Health and Safety Division coordinates this program and is responsible for reviewing and updating the program, as necessary. Copies of the written program may be obtained from the OHS SharePoint site, Regional Safety Managers, or the Headquarters Occupational Health and Safety Division.

OSHA defines "**construction** work" as work for construction, alteration and/or repair, including painting and decorating. **General Industry** refers to any industry not included in construction, maritime or agriculture. It includes workplaces such as health care, manufacturing, warehousing, distribution and retail and office settings.

A walking-working surface is any horizontal or vertical surface on or through which an employee walks, works, or gains access to a work area or workplace location. These are areas where slips, trips, and falls can occur.

This TDOT OHS Program will include the following sections and key definitions for each topic will reside in each section:

A. **General requirements for Walking/Working Surfaces and Fall Protection under the OSHA Standards for General Industry and Construction**
B. **Aisles, Walkways and Floors**
C. **Ladders**
D. **Stairways**
E. **Dockboards**

A. General requirements for Walking/Working Surfaces and Fall Protection for OSHA General Industry and Construction Standards

The general industry standard, 1910.28(b)(1)(i), states that employers must protect each employee on a walking-working surface with an unprotected side or edge that is **four feet or more** above a lower level. **General industry activities within TDOT would include garage activities, facility maintenance, office work areas, loading docks, stockrooms, etc.**

The construction standard 1926.501(b)(1) states that fall protection is required when an employee is working on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is **six feet or more** above a lower level. **Within TDOT, typical construction activities include roadway construction projects, bridge inspection and repair, retaining walls, working in aerials devices.**

Definitions

Dangerous equipment: means equipment, such as vats, tanks, electrical equipment, machinery, equipment or machinery with protruding parts, or other similar units, that, because of their function or form, may harm an employee who falls into or onto the equipment.

Guardrail system: means a barrier erected along an unprotected or exposed side, edge, or other area of a walking-working surface to prevent employees from falling to a lower level.

Hole: means a gap or open space in a floor, roof, horizontal walking-working surface, or similar surface that is at least 2 inches (5 cm) in its least dimension.

Lower level: means a surface or area to which an employee could fall. Such surfaces or areas include, but are not limited to, ground levels, floors, roofs, ramps, runways, excavations, pits, tanks, materials, water, equipment, and similar surfaces and structures, or portions thereof.

Ramp: means an inclined walking-working surface used to access another level.

Runway: means an elevated walking-working surface, such as a catwalk, a foot walk along shafting, or an elevated walkway between buildings.

Toeboard: means a low protective barrier that is designed to prevent materials, tools, and equipment from falling to a lower level, and protect employees from falling.

Unprotected sides and edges: mean any side or edge of a walking-working surface (except at entrances and other points of access) where there is no wall, guardrail system, or stair rail system to protect an employee from falling to a lower level.

1. General Industry- General Requirements

a) Surface conditions

- All places of employment, passageways, storerooms, service rooms, and walking-working surfaces are kept in a clean, orderly, and sanitary condition.
- The floor of each workroom must be clean and in a dry condition. When wet processes are used, drainage must be maintained and dry standing places such as false floors, platforms, and mats must be provided.
- Walking-working surfaces must be free of hazards such as sharp or protruding objects, loose boards, corrosion, leaks, spills, snow, and ice.

b) Loads

Each walking-working surface must be able to support the maximum intended load for that surface.

c) Access and Egress

A safe means of access and egress (entrance and exit) to and from walking-working surfaces must be provided.

d) Inspection, Maintenance, and Repair

- Walking-working surfaces must be visually inspected, regularly and maintained in a safe condition.
- If hazardous conditions are recognized during inspection, hazards must be corrected or repaired before an employee uses the walking-working surface again.
    - If the correction or repair cannot be made immediately, the hazard must be guarded to prevent employees from using the walking-working surface until the hazard is corrected or repaired; and
    - When any correction or repair involves the structural integrity of the walking-working surface, a qualified person must perform or supervise the correction or repair.

2. Construction- General Requirements

a) Structural Integrity

Walking/working surfaces where employees are required to work must have the strength and structural integrity to support employees safely. Employees shall be allowed to work on those surfaces only when the surfaces have the required strength and structural integrity.

b) Unprotected sides and edges

Each employee on a walking/working surface (horizontal and vertical surface) with an unprotected side or edge which is **6 feet** or more above a lower level shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.

c) Holes

- Each employee on walking/working surfaces shall be protected from falling through holes more than 6 feet (1.8 m) above lower levels, by personal fall arrest systems, covers, or guardrail systems erected around such holes.
- Each employee on a walking/working surface shall be protected from tripping in or **stepping into** or **through** holes by covers.
- Each employee on a walking/working surface shall be protected from objects falling **through** holes by covers.

d) Ramps, runways, and other walkways

Each employee on ramps, runways, and other walkways shall be protected from falling 6 feet (1.8 m) or more to lower levels by guardrail systems.

e) Excavations

- Each employee at the edge of an excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, or barricades when the excavations are not readily seen because of plant growth or other visual barrier;
- Each employee at the edge of a well, pit, shaft, and similar excavation 6 feet (1.8 m) or more in depth shall be protected from falling by guardrail systems, fences, barricades, or covers.

f) Dangerous equipment

- Each employee less than 6 feet (1.8 m) above dangerous equipment shall be protected from falling into or onto the dangerous equipment by guardrail systems or by equipment guards.
- Each employee 6 feet (1.8 m) or more above dangerous equipment shall be protected from fall hazards by guardrail systems, personal fall arrest systems, or safety net systems.

g) Walking/working surfaces not otherwise addressed

Each employee on a walking/working surface 6 feet or more above lower levels shall be protected from falling by a guardrail system, safety net system, or personal fall arrest system.

h) Protection from falling objects

Each employee is required to wear a hard hat as well as other protection methods must be implemented to prevent objects from falling from higher levels such as:

- Erect toeboards, screens, or guardrail systems to prevent objects from falling from higher levels; or
- Erect a canopy structure and keep potential fall objects far enough from the edge of the higher level so that those objects would not go over the edge if they were accidentally displaced; or,
- Barricade the area to which objects could fall, prohibit employees from entering the barricaded area, and keep objects that may fall far enough away from the edge of a higher level so that those objects would not go over the edge if they were accidentally displaced.

B. Aisles, Walkways and Floors

Aisles and walkways are a part of nearly every work environment. They allow workers to smoothly get from one part of a workplace to another, acting as a shield from dangerous equipment in some cases. However, if not maintained properly, aisles and walkways can be a source of slip, trip, and fall hazards, as well as struck-by hazards.

Aisle/walkway: A designated pathway inside a building or work environment.

- Mark aisles and walkways as such.
- Keep aisles and walkways free from obstructions and trip hazards as well as sharp or protruding objects, loose boards, snow and ice.
- Provide sufficient safe clearance where mechanical handling equipment is used.
- Inspect aisles and walkways on a regular basis and as necessary.
- Correct any hazardous condition before allowing workers to use the aisles or walkways.

Inspections shall be completed annually, at a minimum, utilizing the checklists for Aisles and Walkways, and Floors. These checklists are also a good resource for intermittent visual inspections and items to look for between annual inspections. The Regional Safety Office will work with Regional and District staff to designate inspectors and management of required checklists.

See Appendix A for Aisles and Walkways Checklist and Appendix B for Floors Checklist.

C. Ladders

Under the updated Walking-Working Surfaces rule, OSHA has consolidated existing requirements that regulate portable wood, portable metal, and fixed ladders into one ladder regulation. The changes cover all ladders used in general industry, except those that are designed into a machine or piece of equipment or used for emergency operations. Both general and specific ladder requirements are contained in the Ladder regulation, which covers design, maintenance, and use.

Definitions

- **Cage**: means an enclosure mounted on the side rails of a fixed ladder or fastened to a structure behind the fixed ladder that is designed to surround the climbing space of the ladder. A cage also is called a ‘‘cage guard’’ or ‘‘basket guard.’’
- **Carrier**: means the track of a ladder safety system that consists of a flexible cable or rigid rail attached to the fixed ladder or immediately adjacent to it.

- **Combination ladder**: means a portable ladder that can be used as a stepladder, extension ladder, trestle ladder, or stairway ladder. The components of a combination ladder also may be used separately as a single ladder.
- **Extension ladder**: means a non-self-supporting portable ladder that is adjustable in length.
- **Fixed ladder**: means a ladder with rails or individual rungs that is permanently attached to a structure, building, or equipment. Fixed ladders include individual-rung ladders, but not ship stairs, step bolts, or manhole steps.
- **Grab bar**: means an individual horizontal or vertical handhold installed to provide access above the height of the ladder.
- **Individual-rung ladder**: means a ladder that has rungs individually attached to a building or structure. An individual-rung ladder does not include manhole steps.
- **Ladder**: means a device with rungs, steps, or cleats used to gain access to a different elevation.
- **Ladder safety system**: means a system designed to eliminate or reduce the possibility of falling from a ladder. A ladder safety system usually consists of a carrier, safety sleeve, lanyard, connectors, and body harness. Cages and wells are not ladder safety systems.
- **Mobile**: means manually propelled or moveable.
- **Mobile ladder stand (ladder stand)**: means a mobile, fixed-height, self-supporting ladder that usually consists of wheels or casters on a rigid base and steps leading to a top step. A mobile ladder stand also may have handrails and is designed for use by one employee at a time.
- **Mobile ladder stand platform**: means a mobile, fixed-height, self-supporting unit having one or more standing platforms that are provided with means of access or egress.
- **Portable ladder**: means a ladder that can readily be moved or carried, and usually consists of side rails joined at intervals by steps, rungs, or cleats.
- **Riser**: means the upright (vertical) or inclined member of a stair that is located at the back of a stair tread or platform and connects close to the front edge of the next higher tread, platform, or landing.
- **Side-step ladder**: means a type of fixed ladder that requires an employee to step sideways from it in order to reach a walking-working surface, such as a landing.
- **Stepladder**: means a self-supporting, portable ladder that has a fixed height, flat steps, and a hinged back.
- **Stepstool** means a self-supporting, portable ladder that has flat steps and side rails. For purposes of the final rule, stepstool includes only those ladders that have a fixed height, do not have a pail shelf, and do not exceed 32 inches (81 cm) in overall height to the top cap, although side rails may extend above the top cap. A stepstool is designed so an employee can climb and stand on all of the steps and the top cap.
- **Trestle Ladder** also known as a Double Front Ladder, is a self-supporting portable ladder that is non-adjustable in length, and hinged at the top. It consists of two sections and is designed to be climbed by two persons at the same time, one on each side.

- **Through ladder**: means a type of fixed ladder that allows the employee to step through the side rails at the top of the ladder to reach a walking-working surface, such as a landing.
- **Well:** means a permanent, complete enclosure around a fixed ladder.

General Requirements for Ladders

- Use ladders for the purpose they were designed.
- Ensure ladders meet OSHA specifications.
- Follow all ladder climbing technique requirements including 3 points of contact or 3-Point Stance:
    - Facing the ladder while climbing up and down,
    - Using at least one hand to firmly grasp the ladder at all times, and
    - Not carrying any object or load that could cause employees to lose their balance and fall.
- Train employees in ladder climbing techniques.
- Maintain ladders in a safe condition.
- Inspect ladders before the first use every shift and as necessary.
- Remove defective ladders from service.
- Phase out all cages and wells on fixed ladders by 2036.
- Train employees in ladder safety systems or personal fall arrest systems.

Ladder inspections shall be completed annually, at a minimum, utilizing the **Portable Ladder Inspection Checklist** and **Ladder Inventory template**. The Regional Safety Office will work with Regional and District staff to designate inspectors and management of required checklists and inventory documents.

See Appendix C for Portable Ladder Inspection Checklist and Inventory and OSHA Quick Card for Portable Ladder Safety

D. Stairways

Stairways are a common fixture in many workplaces. However, they can pose hazards to workers if not constructed and maintained properly.

Definitions

- **Alternating tread-type stair**: means a type of stairway consisting of a series of treads that usually are attached to a center support in an alternating manner such that an employee typically does not have both feet on the same level while using the stairway.

- **Handrail**: means a rail used to provide employees with a handhold for support.
- **Open riser**: means the gap or space between treads of stairways that do not have upright or inclined members (risers).
- **Rung, step, or cleat**: means the crosspiece of a ladder on which an employee steps to climb up and down.
- **Ship stair (ship ladder)**: means a stairway that is equipped with treads, stair rails, and open risers, and has a slope that is between 50 and 70 degrees from the horizontal.
- **Spiral stairs**: means a series of treads attached to a vertical pole in a winding fashion, usually within a cylindrical space.
- **Stair rail or stair rail system**: means a barrier erected along the exposed or open side of stairways to prevent employees from falling to a lower level.
- **Stairway (stairs)**: means risers and treads that connect one level with another, and includes any landings and platforms in between those levels. Stairways include standard, spiral, alternating tread-type, and ship stairs.
- **Standard stairs**: means a fixed or permanently installed stairway. Ship, spiral, and alternating tread-type stairs are not considered standard stairs.
- **Tread**: means a horizontal member of a stair or stairway, but does not include landings or platforms.

Summary of requirements

- Equip all stairways that are four feet or more above a lower surface with stair rail systems and guardrails.
- Stairs must have uniform riser heights and tread depths between landings.
- Proper landing platforms must be provided with an effective width of the platform no less than 20 inches.
- Inspect all stairways regularly and as necessary.
- Maintain stairways in a safe condition.

Inspections shall be completed annually, at a minimum, utilizing the checklists for Standard Stairways. The Regional Safety Office will work with Regional and District staff to designate inspectors and management of required checklists.

See Appendix D for Standard Stairways Checklist.

E. Dockboards

OSHA requires that dockboards (i.e., bridge plates) be provided with a means, such as edging or curbing, to prevent equipment such as powered industrial trucks, from running off the edge. This is intended to protect employees from injury in the event that equipment falls off the edge of the dockboard. Also, any transport vehicle onto which a dockboard has been placed must be prevented from moving via measures (such as wheel chocks or sand shoes) during loading/unloading. While current Federal Motor Carrier Safety Administration (FMCSA) standards contain brake regulations that are intended to prevent movement of trailers during loading/unloading of commercial motor vehicles (CMVs), OSHA explicitly maintains that it has authority over:

- Transport vehicles that do not meet the definition of a commercial motor vehicle (CMV); and
- CMVs **not** operated in interstate commerce, which includes CMVs that transport materials on private roads or within a work establishment.

The dockboards regulation applies to all general industry employers that use dockboards. Many transport employers must also comply with the wheel chocking portion of the dockboards regulation.

Definitions

- **Dockboard**: means a portable or fixed device that spans a gap or compensates for a difference in elevation between a loading platform and a transport vehicle. Dockboards include, but are not limited to, bridge plates, dock plates, and dock levelers.
- **Fall hazard**: means any condition on a walking-working surface that exposes an employee to a risk of harm from a fall on the same level or to a lower level.
- **Loading platforms**: means loading docks, interior floors, driveways, or other walking or working surfaces.
- **Maximum intended load**: means the total load (weight and force) of all employees, equipment, vehicles, tools, materials, and other loads the employer reasonably anticipates to be applied to a walking-working surface at any one time.
- **Run-off guard**: means a vertical edge, curb, or lip running parallel with the normal traffic flow at each side of the dockboard to prevent a transfer vehicle from exiting the dockboard.
- **Transfer vehicles**: means mechanical powered or non-powered devices to move a payload, include, but are not limited to, powered industrial trucks, powered pallet movers, manual forklifts, hand carts, hand trucks, and other types of material-handling equipment.
- **Transport vehicles**: means a cargo-carrying vehicle that workers may enter or walk onto to load or unload cargo and materials. Transport vehicles include, but are not limited to, trucks, trailers, semi-trailers and rail cars.

- **Wheel chocks/sand shoes**: means wedges of sturdy material placed against a transport vehicle's wheels to prevent movement while dockboards are in place and workers are using them.

TDOT employees working on loading docks must:

- Ensure that dockboards can support the maximum intended load.
- Ensure that transfer vehicles cannot run off the edge of the dockboard.
- Secure portable dockboards from moving while being used.
- Ensure that portable dockboards have handholds or another means for placement and removal.
- Prevent the accidental movement of transport vehicles while it is being used by employees.

Vehicle immobilization measures, such as wheel chocks or sand shoes, shall be used to prevent the transport vehicle (*e.g.* a truck, semi-trailer, trailer) on which a dockboard is placed, from moving while employees are on the dockboard;

Portable dockboards shall be equipped with handholds or other means to permit safe handling. During the removal of a trailer from a loading dock while in the process of loading or unloading, forklift operators shall not be in trailer or hostler when the removal occurs.

Per OSHA, powered industrial truck (PIT) standard at 29 CFR 1910.178(l)(3), a PIT shall not be operated on a trailer that has been backed to a dock, unless the trailer is properly secured or restricted from movement prior to boarding.

Inspections shall be completed annually, at a minimum, utilizing the checklists for Dockboards. The Regional Safety Office will work with Regional and District staff to designate inspectors and management of required checklists, if applicable.

See Appendix E for Dockboards checklist.

Appendix A

Aisles and Walkways Checklist

	Design and Construction	Y/N
1	Is the flooring of aisles and walkways in good repair?	
2	Are aisles and walkways clean, orderly, and in sanitary condition?	
3	Are aisles and walkways free of hazards (e.g., protruding objects, loose boards, corrosion, leaks, spills, snow, and ice)?	
4	Do aisles and walkways provide a safe means of access and egress for employees?	
5	Are aisles and walkways at least three feet wider than the largest equipment to be utilized, or a minimum of four feet? May 15, 1972 Letter of Interpretation	
6	Are barriers or other means provided for aisles and walkways near hazardous machinery, welding operations, and similar hazards?	
	Lighting	
7	Are aisles and walkways adequately illuminated with lights in good repair and working properly?	
	Exit Routes	
8	Does the aisle or walkway provide sufficient capacity for the number of persons it must accommodate along the entire path of travel if part of an exit route?	
9	Is the aisle or walkway at least 28 inches wide at all points if part of an exit route?	
10	Are stairs or ramps provided along the aisle or walkway where not substantially level if part of an exit route?	
11	Is the aisle or walkway free of obstructions (e.g., boxes, tools, pallets, racks, decorations, furniture, etc.) and/or obstruct visibility if part of the exit route?	
12	Does the aisle or walkway have adequate lighting if part of an exit route?	
	Markings and Labeling	
13	Are permanent aisles and walkways appropriately marked? February 14, 1977 Letter of Interpretation	
14	Are lines that delineate aisles and walkways clearly defined (e.g., paint, powder stripping, etc.)?	
15	Are aisle and walkway lines composed of dots, squares, strips, or continuous?	
16	Are aisle and walkway lines at least two inches wide?	
17	Are the lines or markings that delineate aisles and walkways in good repair?	
18	Are changes in direction or elevation clearly marked?	
	Inspection and Maintenance	
19	Are aisles and walkways inspected regularly, and as necessary, to ensure they are in safe condition?	
20	Are deficiencies corrected or repaired before an employee uses an aisle or walkway again?	
21	If an aisle or walkway correction or repair cannot be made immediately, are employees prevented from using the aisles or walkway until repaired?	
22	If an aisle or walkway repair involves structural integrity, does a qualified person perform or supervise the correction or repair?	

Additional Notes

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Appendix B
Floors Checklist

	Design and Construction	Y/N
1	Can each walking-working surface support the maximum intended load?	
2	Is a safe means of access and egress provided to and from floors?	
	Housekeeping	
3	Are floors clean and, to the extent feasible, in a dry condition?	
4	When wet processes are used, is drainage maintained and, to the extent feasible, dry standing places, such as false floors, platforms, and mats provided?	
5	Are floors maintained free of hazards such as sharp or protruding objects, loose boards, corrosion, leaks, spills, snow, and ice?	
	Fall Protection	
6	Is adequate fall protection provided for employees working on floors with an unprotected side or edge that is 4 feet or more above a lower level?	
7	Are employees protected from tripping into or stepping into or through any hole that is less than 4 feet above a lower level by covers or guardrail systems? (6ft for construction activities)	
8	Are employees protected from falling through any hole that is 4 feet or more above a lower level?	
9	Are stairway floor holes guarded by a fixed guardrail system on all exposed sides, except at the stairway entrance? For any stairway used less than once per day where traffic across the stairway floor hole prevents the use of a fixed guardrail system (e.g., holes located in aisle spaces), a hinged floor hole cover and a removable guardrail system may be used.	
10	Are employees protected from falling into a ladderway floor hole or ladderway platform hole by a guardrail system and toeboards erected on all exposed sides, except at the entrance to the hole, where a self-closing gate or an offset must be used?	
11	Are employees protected from hatchway and chute floor holes by either a hinged floor-hole cover and fixed guardrail, a removable guardrail system and toeboards on not more than two sides of the hole and a fixed guardrail system on all other exposed sides; or a guardrail system or a travel restraint system when a work operation necessitates passing material through a hatchway or chute floor hole?	
	Repair pits, service pits, and assembly pits less than 10 feet in depth	
12	If fall protection is not used, is access limited within 6 feet of the edge of the pit to authorized employees, including the use of floor markings, warning lines, signage, and/or stanchions?	
	Inspection and Maintenance	
13	Are floors inspected regularly, and as necessary, to ensure they are in safe condition?	
14	Are deficiencies corrected or repaired before an employee uses the floor again?	
15	If a floor correction or repair cannot be made immediately, are employees prevented from using the floor until repaired?	
16	If a floor repair involves structural integrity, does a qualified person perform or supervise the correction or repair?	

Additional Notes

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Appendix C

Portable Ladder Inspection Checklist

OSHA defines a "ladder" as a device with rungs, steps, or cleats used to gain access to a different elevation. Ladders come in three general types:
(1) portable ladders
(2) fixed ladders
(3) mobile ladder stands and stand platforms.

Inspect ladders before the first use every shift and as necessary. ("As necessary" inspections occur when conditions have changed). Take out of service any equipment with damages or issues.

Ladder ID_____ Inspector Name_____ Inspection Date_____

Inspection Checklist			
Condition	**Y**	**N**	**Comments**
1. Are labels and markings clearly legible with capacity in lbs.?			
1. Is the ladder free of sharp edges and burrs?			
2. Ladder is free from corrosion and decay?			
3. Joints between rungs or steps and side rails tight?			
4. Side rails and rungs free of excessive dents or bends?			
5. Hardware and fittings in good condition?			
6. Safety feet and other auxiliary equipment in good condition?			
7. Free from oil, grease, or other slippery materials?			
8. Free from shake?			
Set-Up			
8. Ladder is used for the purpose it is designed?			
9. Ladder is on stable and level surface?			
10. Metal spreader and locking device is in place while open?			
11. Ladder is not loaded beyond the maximum intended load?			
Mobile Ladder Stand Platform			
Handrails at least 36" high and midrails present on platforms between 4-10 ft?			
Platform is guarded on all exposed sides, toeboards present?			
Wheels/casters on equipped to prevent movement?			
Storage			
12. Is ladder stored in a secured manner preventing damage?			
Maintenance			
13. If ladder is damaged, is it tagged out and removed from service?			

Additional Notes

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Electronic inventory templates are available for tracking ladder inventory. Contact the HQ OHS Division or the Regional Safety office to obtain a digital copy.

TDOT Ladder Inventory

Region: _____ Work Unit: _____

ID	Type	Manufacturer and Model	Capacity lbs	Description of typical tasks	Storage Location	Last Inspection Date	Photo

DT-1929

RDA SW25

OSHA® QUICK CARD

Portable Ladder Safety

Falls from portable ladders (step, straight, combination and extension) are one of the leading causes of occupational fatalities and injuries.

- Read and follow all labels/markings on the ladder.
- Avoid electrical hazards! – Look for overhead power lines before handling a ladder. Avoid using a metal ladder near power lines or exposed energized electrical equipment.
- Always inspect the ladder prior to using it. If the ladder is damaged, it must be removed from service and tagged until repaired or discarded.

3-Point Contact

- Always maintain a 3-point (two hands and a foot, or two feet and a hand) contact on the ladder when climbing. Keep your body near the middle of the step and always face the ladder while climbing (see diagram).
- Only use ladders and appropriate accessories (ladder levelers, jacks or hooks) for their designed purposes.
- Ladders must be free of any slippery material on the rungs, steps or feet.
- Do not use a self-supporting ladder (e.g., step ladder) as a single ladder or in a partially closed position.
- Do not use the top step/rung of a ladder as a step/rung unless it was designed for that purpose.
- Use a ladder only on a stable and level surface, unless it has been secured (top or bottom) to prevent displacement.
- Do not place a ladder on boxes, barrels or other unstable bases to obtain additional height.
- Do not move or shift a ladder while a person or equipment is on the ladder.
- An extension or straight ladder used to access an elevated surface must extend at least 3 feet above the point of support (see diagram). Do not stand on the three top rungs of a straight, single or extension ladder.

- The proper angle for setting up a ladder is to place its base a quarter of the working length of the ladder from the wall or other vertical surface (see diagram).
- A ladder placed in any location where it can be displaced by other work activities must be secured to prevent displacement or a barricade must be erected to keep traffic away from the ladder.
- Be sure that all locks on an extension ladder are properly engaged.
- Do not exceed the maximum load rating of a ladder. Be aware of the ladder's load rating and of the weight it is supporting, including the weight of any tools or equipment.

For more information:

OSHA Occupational Safety and Health Administration
U.S. Department of Labor
www.osha.gov (800) 321-OSHA (6742)

The proper angle for a non-self-supporting ladder is approximately **75 degrees above horizontal**. **This means that the base should be set out one-fourth of the ladder's height to its top support point.**

EXAMPLE: If a ladder is to be supported at a point 20 feet off the ground, its base should be set 5 feet out from the wall (20 feet divided by 4= 5feet). An easy way to measure this, if the ladder top will rest against the wall, is to pace off the length of the ladder or count the rungs and divide by four to get the proper distance from the wall for placing the foot of the ladder.

Appendix D
Standard Stairways Checklist

	General and Condition	Y/N
1	Are standard stairs provided for access from one walking-working surface to another when operations necessitate regular and routine travel between levels?	
2	Stairs are in good repair, free from hazards, reasonably slip resistant (free from loose handrails, corrosion, protruding objects, spills etc.)	
	Design and Construction	
3	Are stairs at least 22 inches wide between vertical barriers?	
4	Are handrails, stair rail systems or guardrails provided as necessary?	
5	Do stairways have at least a 6 feet 8 inches vertical clearance from any tread to any overhead clearance measured from the leading edge of the tread?	
6	Can stairs support a load of five times the normal anticipated live load, but not less than 1,000 pounds?	
	Steps	
7	Do stairs have uniform riser heights and tread depths?	
8	Do the stairs have an angle between 30 and 50 degrees from the horizontal?	
9	Do stairs have a maximum riser height, and maximum tread depth of 9.5 inches if installed after 1/2017?	
	Fall Protection	
10	Is a stair rail system and handrail(s) present on flights of stairs having at least 3 treads and at least 4 risers?	
11	Is at least one handrail present if the stairway is enclosed on both sides and is less than 44 inches wide?	
12	Are handrails present on both sides if the stairway is enclosed on both sides and is more than 44 inches wide but less than 88 inches wide?	
13	Are handrails present on each side and in the middle of the stair if it is enclosed on both sides and is more than 88 inches wide?	
14	Is a stair rail system with a handrail present on the open side of the stairway if it is less than 44 inches wide?	
15	Are handrails present on both sides if the stairway is enclosed on both sides and is more than 44 inches wide but less than 88 inches wide?	
16	Are handrails present on each side and in the middle of the stair if it is enclosed on both sides and is more than 88 inches wide?	
17	Is a stair rail system with a handrail present on the open side of the stairway if it is less than 44 inches wide	
18	Is a stair rail system with a handrail present on the open side of the stairway and a handrail on the enclosed side if it is more than 44 inches wide but less than 88 inches wide?	
19	Is a stair rail system with a handrail present on the open side, one handrail on the enclosed side, and one intermediate handrail located in the middle of the stair if it is greater than 88 inches wide?	
20	Is a stair rail system present on each open side of the stairway if it is less than 44 inches wide?	
21	Is a stair rail system with a handrail present on each open side of the stairway if it is more than 44 inches wide but less than 88 inches wide?	
22	Is a stair rail system with a handrail present on each open side and one intermediate handrail located in the middle of the stair if it is greater than 88 inches wide?	
23	Is a handrail on at least one side with earth built up on both sides present on exterior stairs less than 44 inches wide?	

Continues on next page

24	Is a handrail on at least one side with earth built up on both sides present on exterior stairs less than 44 inches wide?	
	Handrails	
25	Is the height of handrails 30-38 inches measured from the leading edge of the stair tread to the top surface of the handrail?	
26	Is the clearance between handrails and any other object at least 2.25 inches?	
27	Are handrails smooth-surfaced have the shape and dimension necessary so that employees can grasp the handrail firmly?	
28	Are handrails capable of withstanding, without failure, a force of at least 200 pounds applied in any downward or outward direction within 2 inches of any point along the top edge of the rail?	
	Landings and Platforms	
29	Is a platform provided when a door or gate opens directly onto a stairway?	
30	Is a guardrail or stair rail system provided if the landing is 4 feet or more above the lower level?	
31	Does the swing of the door or gate not reduce the platform's usable depth to less than 20 inches if installed?	
32	Is the stairway landing or platform at least as wide as the stairway?	
33	Is the stairway landing or platform at least 30 inches in depth measured in the direction of travel?	
	Inspection and Maintenance	
34	Are stairways inspected regularly, and as necessary, to ensure they are in safe condition?	
35	Are deficiencies corrected or repaired before an employee uses a stairway again?	
36	If a stairway correction or repair cannot be made immediately, are employees prevented from using the stairway until repaired?	
37	If a stairway repair involves structural integrity, does a qualified person perform or supervise the correction or repair?	

Additional Notes

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Appendix E
Dockboards Checklist

Dockboard is a portable or fixed device that spans a gap or compensates for a difference in elevation between a loading platform and a transport vehicle. Dockboards include, but are not limited to, bridge plates, dock plates, and dock levelers.

Design	**Y**	**N**
1. Dockboards used capable of supporting maximum intended load?		
2. Portable dockboards equipped with handholds or other means to permit safe handling?		
Use		
3. Portable dockboards secured by anchoring in place or using equipment or devices that prevent the dockboard from moving out of a safe position?		
4. When securing the dockboard is not feasible, is there sufficient contact between the dockboard and the surface to prevent the dockboard from moving out of a safe position?		
5. Are measures, such as wheel chocks or sand shoes, used to prevent transport vehicles (e.g. a truck, semitrailer, trailer, or rail car) from moving while employees are on the dockboard?		
Fall Protection		
6. Is each employee on a dockboard protected from falling 4 feet or more to a lower level by a guardrail system or handrails? This does not apply when dockboards are being used solely for materials-handling with motorized equipment, the fall hazard is 10 feet or less, and the employees have been properly trained.		
Inspection and Maintenance		
7. Are dockboards inspected regularly, and as necessary, to ensure they are in safe condition?		
8. Are deficiencies corrected or repaired before an employee uses the dockboard again?		
9. If a dockboard repair involves structural integrity, does a qualified person perform or supervise the correction or repair?		
Training		
10. Is each employee who uses a dockboard trained to properly place and secure the equipment?		
11. Is each employee who uses a dockboard trained to recognize the fall hazards in the work area?		
12. Is retraining provided when deficiencies in performance or knowledge are noted, or there are changes in the workplace or equipment?		

Additional Notes

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Occupational Health & Safety Division: Safety Written Program		
OHS-009 Injury or Property Damage Incident Reporting	**Issued: 10/01/2023**	**Revised:**

I. INTRODUCTION

All safety related incidents must be reported in a timely manner and tracked. Data is gathered for two primary reasons. The first, is that we must track safety related incidents so that we can investigate why they occurred, identify important trends and implement solutions to prevent future incidents of the same kind from arising again. The second reason we must track safety related incidents is that regulatory agencies such as the Federal Occupational Safety and Health Administration (OSHA), and if applicable, State Regulatory Agencies such as Tennessee Occupational Safety and Health Administration (TOSHA) under the Tennessee Department of Labor, require accurate and timely reporting of workplace injuries.

Applicable Standards and Reference documents:

- OSHA 29 CFR 1904.5 Title: Determination of work-relatedness.
- Tennessee Department of Labor and Workforce Development TDLWD 0800-01-03
- TDOT Policy 230-23 Return to Work/Temporary Duty Assignments (6/30/2020)
- TDOT Policy 305-03 Motor Vehicle Utilization (01/15/2021)
- Personal Injury Report - PowerApps
- Property Damage Report - PowerApps
- State of Tennessee Auto Liability Program- Auto Accident Reporting Instructions

II. DEFINITIONS

1. **Work Related Injury-** Per the OSHA Standard 29 CFR 1904.5 Determination of work-relatedness, an injury or illness is work-related if an event or exposure in the work environment either caused or contributed to the resulting condition or significantly aggravated a pre-existing injury or illness. Work-relatedness is presumed for injuries and illnesses resulting from events or exposures occurring in the work environment. Injuries and illnesses that occur while an employee is working at home, including work in a home office, will be considered work-related if the injury or illness occurs while the employee is performing work for pay or compensation in the home, and the injury or illness is directly related to the performance of work rather than to the general home environment or setting.

   Exceptions: Situations where injury and illness occur in the work environment but are not considered work related are the following:

   - The time of the injury or illness, the employee was present in the work environment as a member of the general public rather than as an employee.

- The injury or illness involves signs or symptoms that surface at work but result solely from a non-work-related event or exposure that occurs outside the work environment.
- The injury or illness results solely from voluntary participation in a wellness program or in a medical, fitness, or recreational activity such as blood donation, physical examination, flu shot, exercise class, racquetball, or baseball.
- The injury or illness is solely the result of an employee eating, drinking, or preparing food or drink for personal consumption (whether bought on the employer's premises or brought in). For example, if the employee is injured by choking on a sandwich while in the employer's establishment, the case would not be considered work-related.
- Note: If the employee is made ill by ingesting food contaminated by workplace contaminants (such as lead) or gets food poisoning from food supplied by the employer, the case would be considered work-related.
- The injury or illness is solely the result of an employee doing personal tasks (unrelated to their employment) at the establishment outside of the employee's assigned working hours.
- The injury or illness is solely the result of personal grooming, self-medication for a non-work-related condition, or is intentionally self-inflicted.
- The injury or illness is caused by a motor vehicle accident and occurs on a company parking lot or company access road while the employee is commuting to or from work.
- The illness is the common cold or flu
- The illness is a mental illness. Mental illness will not be considered work-related unless the employee voluntarily provides the employer with an opinion from a physician or other licensed health care professional with appropriate training and experience (psychiatrist, psychologist, psychiatric nurse practitioner, etc.) stating that the employee has a mental illness that is work-related.

2. **Report Only/First Aid** - When an employee receives a minor work-related injury that can be treated with simple first aid or non-prescription medicine.
3. **Medical Treatment**- When an employee injures themselves while at work and needs to seek medical attention at a hospital and urgent care clinic, but is able to return to work the same day or next day next day after being injured.
4. **Light Duty (Transitional/Modified)-** When an employee injures themselves and needs to seek medical attention at a hospital and urgent care clinic but is able to return to work the same day or next day next day after being injured with modified job duties.
5. **Lost Time** (Indemnity Claim)- When employee is injured and the doctor prescribes days away from work- employee cannot perform any job duties per the physicians instructions.
6. **Hospitalization** is when an injured worker goes to the hospital, and that visit results in being “admitted” or “in-patient”. This does NOT include visits and treatment in an urgent care or emergency room (ER) where the employee is treated and released. Work Related hospitalizations must be reported to TOSHA within 24 hours of the admittance. This does not include admittance for diagnostics or observations.

7. **Personal Injury Report (PIR)**- TDOT online SharePoint report required to be filled out by Supervisor or Person-in-Charge for any classification of injury. A CorVel Claim will be required to be generated prior to submitting the report to the respective safety office for approval.
8. **Property Damage Report (PDR)-** TDOT online SharePoint report required to be filled out by Supervisor or Person-in-Charge for any property damage to TDOT facilities, vehicles, equipment, and/or tools. PDR is required if TDOT causes property damage to facilities, vehicles, equipment, tools not owned by TDOT, i.e. private property, businesses, motoring public.
9. **Auto Accident Report-** report required any time an auto accident occurs while driving a state vehicle, rental or your own vehicle in the course of your employment. This is completed prior to the TDOT PDR.

III. REPORTING AN INJURY CLAIM REQUIRMENTS

A. TDOT Injured Employee Requirements- no matter how minor the work-related injury/illness:

1. If an employee is injured, they must notify their Supervisor immediately.
2. A call must be made to CorVel (3rd party administrator) at (866) 245-8588 Option #1.
3. Injured worker will speak with a 24/7 nurse who will determine if the injury can be treated with simple first aid or if the injured worker needs to seek medical attention.
4. If medical attention is needed the supervisor, or reporting personnel, will need to complete the First Notice of Loss (FNOL) by calling: (866) 245-8588 Option #2.
5. If Medical Treatment was sought- provide doctor's release paperwork and follow up appointment doctor's notes to your Supervisor.
6. If employee receives Lost Time from the physician upon release from treatment, the employee will need to elect their choice for "Payroll Options" and inform the Supervisor for completing the online PIR. Notify your Supervisor of the prescribed lost time information.

B. TDOT Supervisor/Manager Requirements

If the employee will need medical attention aside from first aid self-care, the Supervisor must complete the First Notice of Loss for their employee by following the procedures for Injured Employee Requirements listed above.

1. Once the injury is reported to CorVel, the supervisor must complete and submit the Personal Injury Report (PIR) in SharePoint. This is submitted to the Safety Division in your respective Region/HQ for review and approval.
2. To access the online PIR click this link: Personal Injury Report - PowerApps
3. Ask employee what option they chose for Payroll Options Section of PIR and choose what they selected prior to submitting to Safety Office.
4. The Supervisor/timekeeper will also code the time sheet as LWOP on the first FULL day of missed work.

5. Follow-up with injured employee to receive doctor's notes and send a copy to your respective safety office for injury classification and tracking.
6. In the case of a work-related hospitalization:
    a. Managers/Supervisors who have injured employees being treated in the ER, shall stay in communication with that employee or designated family member (if employee is incapacitated), to determine if a status change has occurred. An example of status change would be if an ER visit results in an in-patient hospitalization, or if the injury meets the criteria reporting severe injuries- loss of an eye or amputation.
    b. The Regional Safety Office shall be notified immediately when an employee's status changes or if the employee is admitted to the hospital. Regional Safety Staff shall then coordinate with the HQ OHS Division for required regulatory reporting to TOSHA.

NOTE: Workplace Fatalities must be reported to TOSHA within 8 hours of occurrence. The HQ OHS Division must be notified immediately if a TDOT workplace fatality occurs.

C. RESTRICTIONS FROM PHYSICIAN/DOCTOR

If an injured employee is released by his/her doctor to return to work with restrictions:

- Restrictions are carefully reviewed by the RTW Committee (District Eng., Reg. Safety Officer, Employee's Supervisor and the regional Employee Relations Representative).
- If appropriate work is available, the employee will be given temporary, alternative job duties for up to 90 days IAW the RTW Policy.
- If absolutely no "light duty" assignments are available, the employee will be sent home and continue to receive Workers' Compensation pay until restrictions are lifted or modified by his/her doctor.

IV. PROPERTY DAMAGE REPORTING

A. TDOT employee Property damage reporting requirements

1. Report all TDOT property damages within 24 hours of occurrence (within the work shift, is preferred)
2. Report property damages to your supervisor, if damages are observed, even if you were not directly involved with an incident.
3. If an auto accident property damage occurs with the motoring public (regardless of fault) adhere to the State of Tennessee Auto Accident Reporting Procedures which are outlined in **Appendix A.** This reporting must be completed within 24 hours of the accident or TDOT is subject to penalties.

Appendix A

State of Tennessee Auto Liability Program
A Program of the Tennessee Treasury Department
Division of Claims and Risk Management

Auto Accident Reporting Instructions

IF YOU ARE INVOLVED IN AN AUTO ACCIDENT WHILE DRIVING A STATE VEHICLE, RENTAL, OR YOUR OWN VEHICLE WHILE IN THE COURSE OF YOUR EMPLOYMENT, FOLLOW THE INSTRUCTIONS BELOW:

1. Don't leave the scene. Be prepared to communicate ALL details of the incident to the State's adjuster.
2. Call emergency services (911 or police non-emergency number) as needed.
3. Take at least 4 photos of both vehicles, license plates, parking situation, insurance card for other party, and any notable unrelated damages.
4. Call the State of TN Auto Accident Call Center immediately to report the incident, then call your supervisor and follow your department's applicable procedures. Accidents not reported within 24 hours are subject to a penalty.
5. Do not admit fault in the accident or promise coverage or reimbursement to anyone.

State of TN Auto Accident Call Center:
(855) 253-0629

Be prepared to provide the following information to the Call Center:

- Incident date, time, and location
- State driver's name, phone number, and email
- Any/all other drivers' names and phone numbers, plus emails if available
- Any other involved passengers' names and phone numbers, plus emails if available
- Vehicle information for all vehicles, including license plate number and/or VIN
- Your State Supervisor's name, phone number, or other contact information
- Confirm if any fatalities or non-fatal injuries occurred

IF YOU HIT AN UNOCCUPIED VEHICLE:

1. Fill out a Damage Notification Card and leave it on the unoccupied vehicle.
2. Call the State of TN Auto Accident Call Center immediately at (855) 253 0629 with date, time, and location of the incident, as well as any additional information you may have.
3. Take photos of both vehicles, as well as the license plate and VIN tag of the other vehicle (on the driver side dash, near the windshield).

Tennessee Department of Treasury
Authorization #329401; May 2022;
2500 copies. This public document was
promulgated at a cost of 16¢ each.

Tennessee Treasury
Division of Claims & Risk Management

TN TDOT Department of Transportation	Policy Number: 230-23
DEPARTMENTAL POLICY State of Tennessee Department of Transportation	Effective Date: June 30, 2020
Approved By: 	Supersedes: June 30, 2016
SUBJECT: Return to Work/Temporary Duty Assignments	

RESPONSIBLE OFFICE: Human Resources

AUTHORITY: T.C.A. §4-3-2303. If any portion of this policy conflicts with applicable state or federal laws or regulations, that portion shall be considered void. The remainder of this policy shall not be affected thereby and shall remain in full force and effect.

RELATED POLICIES: TDOT Policy 230-17: Outside Employment Disclosure; TDOT Policy 230-18: CDL and Safety-Sensitive Employees Alcohol & Drug Testing; TDOT Policy 230-20: Special Leave without Pay; TDOT Policy 230-21: On-Call Availability

PURPOSE: The purpose of this policy is to establish a Return-to-Work (RTW) program and process to be utilized by the Tennessee Department of Transportation.

APPLICATION: All Tennessee Department of Transportation (TDOT) employees.

DEFINITIONS.

1. Division of Risk Management and Claims Administration (DRMCA): An administrative unit of the Office of the Treasurer established to promulgate rules and regulations to ensure orderly filing, investigation, hearing, and disposition of claims brought before it by or on behalf of an employee or against the state.
2. Family Medical Leave Act: Federal law requiring covered employers to provide employees job-protected and unpaid leave for qualified medical and family reasons. State of Tennessee policy may require the use of accrued annual, sick, or compensatory leave to be taken concurrent with FMLA leave prior to taking leave in an unpaid status.
3. Restricted or Light Duty: Modification of work assignment to conform to temporary limitations and/or restrictions as defined by the employee's treating physician/medical provider.
4. Return to Work: A process triggered when an employee's restrictions from an injury are accommodated and the employee is allowed to come back to work. This return-to-work program is not reinstatement or reemployment.
5. Task Inventory for Modified/Transitional Duty: An agreement in writing drawn up between the employee and TDOT, with input from the treating physician, to include details for restricted, light, or modified duty and should be written to get the employee back to full potential as soon as possible. A copy of the signed task inventory will be placed in the employee's confidential section of the Human Resources file in the section with the appropriate type of leave.
6. Safety Management Team: is a team comprised of a HQ Safety Division Officer, HQ HR staff, Regional HR, Regional Safety Office, District Engineer/Manager and WC/RTW liaison or any other individual in a

leadership position within TDOT to evaluate limitations and restrictions imposed by an employee's treating healthcare provider to determine feasibility of a temporary transitional duty assignment.

7. Transitional or Modified Work Assignment: Temporary modification of an employee's work schedule and/or job duties, or temporary transitional job tasks in order to accommodate restrictions imposed by the employee's treating physician, medical provider.
8. Third Party Administrator (TPA): The company contracted by the Division of Claims Administration to handle verification, approval/denial, and payment of compensable claims (medical bills and lost time pay).
9. Workers' Compensation/Return to Work Liaison (WC/RTW liaison): Individual designated to coordinate TDOT employees' case management activity in relation to their Workers' Compensation Claim and in accordance with the Return to Work program.

POLICY: It is the policy of the Tennessee Department of Transportation (TDOT) to return TDOT employees to their jobs within fourteen (14) calendar days after an employee receives a doctor's release with medical restrictions, or as quickly as possible, following a work-related or non-work-related personal injury or illness. The objective follows to place TDOT employees who are unable to return to their normal duties into a temporary or transitional work assignment.

PROCEDURES:

A. The Return to Work program applies to all TDOT employees who are injured while performing their work-related responsibilities, and may also apply when employees are off from work as a result of injury or illness that is non-work related:
   1. This policy shall be a part of annual training and communicated to all staff. Employees shall sign the Notice of Employee Rights and Responsibilities In The Event of a Workplace Accident, Injury, or Illness (see *Appendix A*), which shall be placed in their Human Resources file.
   2. Additional annual training sessions shall be provided for supervisors and HR personnel and conducted by Human Resources staff as required.
   3. This policy shall be included in new employee orientation.
   4. Posters shall be displayed throughout the Department, Regional/District offices, and HQ Divisions denoting the return to work policy statement and shall be accessible to all employees.
   5. All employees shall have access to return to work procedures and statement of employee responsibilities.

B. In the case of a work-related injury or illness, if the employee believes they are unable to return to work during or after their authorized time away from work has expired, the employee shall immediately notify their supervisor beforehand or the day that the employee is scheduled to return to full duty. In these cases, the supervisor shall notify the WC/RTW liaison. The liaison shall notify the TPA to schedule a re-evaluation with the initial treating physician.

C. In the case of a work-related injury or illness the WC/RTW liaison in each TDOT Region/location will contact the injured employee within 24 hours or the next business day after the accident and at least once a month until the employee returns to work.

D. For work-related or non-work-related injury or illness, if the approved treating physician believes the employee can return to work with certain defined restrictions, the employee shall forward immediately the defined restrictions to their WC/RTW liaison. If the supervisor receives the defined restrictions, they shall forward it immediately the same day to the WC/RTW liaison and shall not retain a copy.

E. The WC/RTW liaison will then schedule a return-to work meeting within five (5) days with the Safety Management Team and the supervisor to review the medical restrictions for the purpose of designing the

Task Inventory for Modified/Transitional Duty (see *Appendix B*) that will outline a modified/temporary transitional work assignment for the employee.

F. Temporary Work Assignments: In all assignment options listed below, the following shall apply:
   1. The employee remains in his/her regular position and job classification and continues to receive regular wages and accrued benefits as usual.
   2. Wage and benefits are pro-rated if applicable, based upon actual hours worked.
   3. Assignments are offered when there is documentation that the employee cannot perform his/her regular job duties but is expected to recover from the injury or illness within a reasonable period of time. The temporary assignment shall be limited to ninety (90) days in most cases.
   4. In the case of a work-related injury or illness, the employee shall be required to communicate to and coordinate all activities (i.e., medical care, psychological care, physical therapy, restricted duty, return to work, medical status, doctor, mental health provider appointments) with their WC/RTW liaison, Human Resources department, and the State's TPA. In the case of a non-work-related injury or illness, the employee shall be required to communicate to their WC/RTW liaison all medical and/or mental health provider appointments, restricted duty, and return to work status. All employees shall follow standard procedures to communicate return-to-work status with their supervisor. Failure to follow proper procedures may result in disciplinary action.
      i. Modified Work Assignment: An employee remains assigned to his/her regular job with some key tasks or functions temporarily altered or suspended or hours temporarily reduced. If the employee is performing at least 51% of the essential functions of their position, there will not be a classification issue and this modified duty will not necessarily need to be limited to ninety (90) days as is required with the other options. Modified assignments will be reviewed every thirty days. Clarification shall be requested from the medical/mental health provider if the injured employee has not been released for regular duties, and

         a. No measureable progress towards release has been noted.
            or
         b. No specific prognosis relative to recovery and return to full duty has been provided.

         If the medical provider will not provide the information above, the TPA claim adjuster shall be contacted immediately for assistance. If the injured employee is making satisfactory progress towards recovery or a release for full duty is anticipated within a reasonable period of time, the agency may consider extending the modified assignment for another 30 days. If there is no progress or no clarification from the medical/mental health provider, TDOT may end the modified assignment. If the prognosis indicates long-term limitations or permanent restrictions, TDOT shall consider other options.
      ii. Transitional Work Assignment: Defined restrictions prevent the employee from performing significant portions of the regular job tasks. Supplemental tasks not usually done by the employee, but within defined restrictions are identified. Supplemental tasks are assigned to fill employee's allowed work time and shall be meaningful in that the tasks contribute to the operational functions of the department. Theses duties may be in the employee's home unit or another unit within the department.
      iii. Task Inventory for Modified/Transitional Duty (*see Appendix B*): Shall be used to document the assigned task(s) developed for the modified/transitional work assignment.

G. The special assignments described in Section F.4.i-ii above will terminate when one of the following occurs:

5. Ninety (90) consecutive calendar days have elapsed from the day the employee accepts the assignment or the WC/RTW liaison, supervisor, and/or TDOT HR Director/designee has determined based on the progress of the recovery that the employee is unable to perform the work assigned due to his/her medical condition.
6. The employee is released to regular full duty.
7. Permanent, defined restrictions that prevent the employee from performing the essential functions of his/her regular position and for which reasonable accommodations cannot be made is documented.
8. The temporary assignment is no longer available or other conditions require the facility or other State department to stop the temporary assignment.

H. Changes in modified/transitional work assignments as described in Section F.4.i-ii above are based on the treating physician's documented restrictions. The employee must provide an updated restrictions form to the WC/RTW liaison after each appointment to evaluate the possibility of changes or increase in duties.

I. If an employee is not released for work by a treating physician or mental health provider, or modified/transitional work is not available, or the physician or mental health provider has delayed in providing information on restrictions, the following should be applied:
   1. Employee must maintain weekly contact with his/her supervisor or the WC/RTW liaison. Contact may be by phone, in person, or by other pre-arranged method.
   2. In the case of work-related injury or illness, the WC/RTW liaison shall contact the TPA for the purpose of assisting the Department with obtaining information from treating physicians or mental health providers. If there continues to be difficulty getting information or finding modified/transitional work, please contact TDOT HQ Human Resources for assistance.
   3. While absent from work, the employee should provide an updated physician's report at least monthly. Failure to do so may result in denial of return to work or dismissal from service.

J. In the event of a permanent disability that prevents an employee from performing the essential functions of his/her regular position and for which reasonable accommodations cannot be made, Human Resources staff shall assist the employee to ensure compliance with the American with Disabilities Act Amendments Act of 2008 (ADAAA) and FMLA federal requirements.

K. An injured employee may engage in secondary employment while on light duty, only if approved by the Safety Management Team and in compliance with TDOT Policy 230-17: Outside Employment Disclosure. Documentation of this approval shall be maintained by TDOT Human Resources. Prior approval for outside employment is revoked during an employee's temporary total disability or limited duty status. Strict adherence to this rule is required or employee will be subject to disciplinary action, which may include termination. If you have a question about this policy, contact TDOT Human Resources.

L. The responsibilities of the WC/RTW liaison shall include, but not be limited to, the following:
   1. Facilitating all case management activity.
   2. Preparing or assisting with the preparation of the required forms as defined in this policy.
   3. Informing the injured worker of the State of Tennessee's workers' compensation process and the return to work program.
   4. Maintaining contact with TPA adjusters/nurses, Human Resources, Safety division staff, supervisors, and injured employees.
   5. Seeking assistance from the TPA with scheduling medical appointments.
   6. Maintaining a thorough knowledge of workers' compensation laws.
   7. Conducting annual RTW training for all TDOT staff as applicable or assigned.

M. If an employee hesitates to return to a modified or transitional duty:

1. Supervisors should contact their WC/RTW liaison for immediate assistance.
2. The employee shall not return to work until written releases are signed and approved. The initial contact can be made in person or by phone. This contact must be followed by written documentation. Copies must be submitted to the State of Tennessee TPA, the regional Human Resources office (if applicable), and TDOT HQ Human Resources.
3. In order to ensure compliance with changes in the Workers' Compensation Law, supervisors must notify TDOT HQ Human Resources if they have any questions regarding this process. If an employee has received defined restrictions from the approved workers' compensation treating physician and the employee refuses modified/transitional employment, the WC/RTW liaison shall notify the State of Tennessee's TPA to schedule another evaluation with the treating physician or mental health provider.
4. The WC/RTW liaison shall submit the Task Inventory for Modified/Transitional Duty (see *Appendix B*) to the TPA, treating physician, or mental health provider for review. The treating physician should review the modified/transitional assignment to determine if the restrictions need to be changed. This process can repeat itself until the employee returns to full duty.
5. The RTW process shall be exhausted if the physician, medical provider, or mental health provider determines that the injured employee should not return to work by providing a medical statement that does not allow the employee to perform a modified or temporary transitional assignment during the employee's recovery.

N. In the case of a work-related injury or illness, if the employee's work performance is unacceptable due to reasons that are NOT related to their work restrictions (attendance, conduct, etc.), then the employee may not be eligible to receive temporary total disability benefits.

O. The supervisor should monitor the employee's work performance to determine if the modified/transitional work assignment is meaningful and the employee is contributing successfully to the operational functions of the Department. If the supervisor determines the employee's work performance is deficient, and the deficiency is NOT the result of their condition resulting from injury or illness, then the employee may receive progressive discipline, up to and including termination of employment.

P. In the case of a work-related injury, the WC/RTW liaison shall submit the First Letter to Treating Physician (see *Appendix C*) and Medical Release to Return to Work (see *Appendix D*) to the employee's medical or mental health provider within fourteen (14) calendar days of the date of claim.

Q. In the case of a non-work-related injury, the WC/RTW liaison may submit a Medical Release to Return to Work (see *Appendix D*) to the employee's medical or mental health provider.

POLICY VIOLATION GUIDELINES:

1. Supervisors and/or employees who violate this policy may be subject to appropriate disciplinary action as described in Rules of the Tennessee Department of Human Resources 1120-10.
2. Supervisors and managers are responsible for maintaining the proper performance level, conduct and discipline of employees under their supervision. When corrective action is necessary resulting from violation of policy, the supervisor must take the appropriate disciplinary action.
3. Supervisors are encouraged to seek technical assistance by calling TDOT Human Resources at 615-741-3461, or with regard to time recording, TDOT Payroll at 615-741-2261.
4. Violations of this policy unresolved through the normal interaction of employee and supervisor should be referred to the TDOT Human Resources at 615-741-3461.

TDOT RETURN TO WORK & WORKERS' COMPENSATION POLICY AND PROCEDURES ACKNOWELDGEMENT

As an employee with the TN Department of Transportation, I acknowledge and agree to do the following:

1. Report **all** on-the-job incidents to your supervisor and/or the Workers' Compensation/ Return to Work Coordinator immediately, even if no one is injured. If it is not possible the report the incident immediately, do so no later than the end of the work shift/day.
2. Regardless of intent to seek medical attention, all employees **must** call the Workplace Injury & First Notice of Loss Call Center (nurse triage line) at 1-866-245-8588, option #1, immediately after the occurrence of an incident.
    a. Except in the case of serious bodily injury or life-threatening injuries, no employee shall seek medical attention prior to calling the 24/7 nurse triage line above.
3. If you are injured on the job and want to see a doctor, you must also have your workers' compensation medical provider complete the Release to Return to Work form for authorized leave or modified/transitional work at the time of your first visit.
    a. Give the Release to Return to Work form completed by your medical provider to your Workers' Compensation/Return to Work Coordinator immediately after the doctor's visit, but no later than twenty-four (24) hours following the visit.
4. If you are not able to immediately return to your regular job, the Safety Management Team will design a temporary special-duty assignment for you, provided we can accommodate the medical restrictions. You will receive regular wages and benefits for this temporary assignment. This assignment is available immediately upon receipt of the Release to Return to Work from your medical provider. This assignment will last until whichever of the following occurs first:
    a. Thirty-day review indicates you are not progressing to release to regular work.
    b. Your doctor indicates you have permanent restrictions that will prevent you from returning to your regular job.
    c. Appropriate modified/transitional-duty tasks are no longer available.
    d. Your doctor releases you for regular work with no restrictions.
5. If your doctor does not release you immediately for any work or your temporary-modified/transitional duty has expired, you must:
    a. Maintain regular contact with your supervisor as assigned, but at least weekly.
    b. Provide Release to Return to Work form completed by your doctor after each visit to your Workers' Compensation/Return to Work Coordinator. This will constitute your medical leave authorization. ONLY THIS FORM, OR ONE WITH SIMILAR INFORMATION FROM YOUR DOCTOR, WILL BE ACCEPTED AS DOCUMENTATION OF AUTHORIZED MEDICAL LEAVE.

c. Select leave choice option, use accrued leave or apply for loss time benefits, if injury is work-related.
d. Provide the agency with a current address and phone number at all times.

6. When your doctor releases you for any work, you must notify your Workers' Compensation/Return to Work Coordinator immediately, but no later than the twenty-four hours before your next regular workday following the release.
7. If once you are released to work (medically stationary), but are not able to return to your job due to injury, you must provide the Workers' Compensation/Return to Work Coordinator with a complete work history and skills inventory sheet. The RTW Safety Management Team will work with you to identify other suitable work which may be available and which you are qualified to perform

It is the responsibility of each employee and supervisor to follow the requirements of the TDOT Return to Work Policy and State workers' compensation procedures. Any failure to follow the prescribed guidelines and/or not participate in the return-to-work process may result in disciplinary action, up to and including dismissal from State service. Failure to follow workers' compensation guidelines and requirements may also result in the denial of workers' compensation benefits.

Employee Signature*	Employee ID	Date

* By acknowledging this policy via the Edison system, I agree that my acknowledgement is the equivalent to my handwritten signature.

TASK INVENTORY FOR MODIFIED/TRANSITIONAL DUTY

TASK _____ WORK AREA _____

SUPERVISOR _____ PHONE NUMBER _____

PHYSICAL REQUIREMENTS:

TASK _____ WORK AREA _____

SUPERVISOR _____ PHONE NUMBER _____

PHYSICAL REQUIREMENTS:

TASK _____ WORK AREA _____

SUPERVISOR _____ PHONE NUMBER _____

PHYSICAL REQUIREMENTS:

TASK _____ WORK AREA _____

SUPERVISOR _____ PHONE NUMBER _____

PHYSICAL REQUIREMENTS:

Employee Signature _____ Date _____

Employee Supervisor _____ Date _____

Reg. RTW Coordinator _____ Date _____

Safety Officer _____ Date _____

HQ RTW Coordinator _____ Date _____

The individual tasks are the actual work the returning worker will be required to perform while assigned to temporary modified or transitional duty. This last sheet is the actual agreement with the employee based upon the Medical Release Form to Return to Work completed by the employee's treating medical professional and the Job Description.

FIRST LETTER TO TREATING PHYSICIAN

Date.
Treating Doctor's Name
Address
Address
City State Zip Code

RE: [Employee Name] [Date of Injury]

Dear Dr. [Treating Doctor's Name],

Thank you for your prompt treatment of our employee, [Employee name]. We want you to know that the Tennessee Department of Transportation has a well-developed return-to-work policy. We can provide a variety of modified/transitional tasks while our employee is recovering from a work related injury. [Employee name] will continue to receive the same wage and benefits while working in this temporary modified/transitional assignment.

1. We would appreciate your assistance by completing the enclosed Release to Return to Work form, which will help us identify appropriate job tasks.

2. We would appreciate your assistance by reviewing the attached (modified/transitional job description/job analysis) for your approval.

With regular updates, our agency is usually able to continue early return to work temporary assignments while our employee progresses toward return to their regular job.

If you have any questions, feel free to contact me at the number below.

Sincerely,
[Name] and [Title]
[Telephone number]
[Fax number]
[Email]

Enclosures:
TDOT Medical Release to Return to Work form
Job description

TN TDOT

MEDICAL RELEASE TO RETURN TO WORK

Name of worker	Claim number

Please complete the following information and return to us at the address indicated above.

1. Is the worker medically stationary? ☐ Yes ☐ No Date _____ (Provide closing information and complete Form SCF.)
   Next scheduled appointment date _____
2. Worker is released to:
   ☐ full duty without limitations Date _____ (Do not complete lines 3 through 11. Sign below.)
   ☐ modified duty from (date) _____ through (date) _____
   ☐ modified hours — specify _____ from (date) _____ through (date) _____ (specify limitations below.)

	Hours: No limitations	1	2	3	4	5	6	7	8
3. In an eight-hour workday, worker can stand/walk a total of	☐	☐	☐	☐	☐	☐	☐	☐	☐
4. At one time, worker can stand/walk	☐	☐	☐	☐	☐	☐	☐	☐	☐
5. In an eight-hour workday, worker can sit a total of	☐	☐	☐	☐	☐	☐	☐	☐	☐
6. At one time, worker can sit	☐	☐	☐	☐	☐	☐	☐	☐	☐

7. The worker is released to return to work in the following range for lifting, carrying, pushing/pulling:

Pounds	<10	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	>100
Occasionally	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Frequently	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

8. Worker can use hands for repetitive:

	Right	Left
a. Fine manipulation	☐ Yes ☐ No	☐ Yes ☐ No
b. Pushing and pulling	☐ Yes ☐ No	☐ Yes ☐ No
c. Simple grasping	☐ Yes ☐ No	☐ Yes ☐ No
d. Keyboarding	Yes No	Yes ☐ No

Dominant hand ☐ Right ☐ Left

9. Worker can use feet for repetitive raising and pushing (as in operating foot controls): Yes No

10. Worker is able to:

	Continuous 67-100% of the day	Frequently 34-66% of the day	Occasionally 6-33% of the day	Intermittently 1-5% of the day	Not at all
a. Stoop/bend	☐	☐	☐	☐	☐
b. Crouch	☐	☐	☐	☐	☐
c. Crawl	☐	☐	☐	☐	☐
d. Kneel	☐	☐	☐	☐	☐
e. Twist	☐	☐	☐	☐	☐
f. Climb	☐	☐	☐	☐	☐
g. Balance	☐	☐	☐	☐	☐
h. Reach	☐	☐	☐	☐	☐
i. Push/pull	☐	☐	☐	☐	☐

11. Other functional limitations or modifications necessary in worker's employment:

Additional comments may be written on back of form.

Signature of physician	Physician's typed name	Date

JOB DESCRIPTION REGULAR ☐ MODIFIED ☐

EMPLOYER: _____ WORKER: _____
ADDRESS: _____ ADDRESS: _____
_____ _____
PHONE/FAX NOS _____ PHONE NUMBER: _____
CONTACT PERSON: _____ CLAIM NUMBER: _____
_____
JOB TITLE OF WORKER: _____ DURATION: _____
LOCATION OF JOB _____
JOB DUTIES _____
_____

ENDURANCE

	Hours at one time	Total hours in an 8-hour day
Sit		
Stand		
Walk		

PHYSICAL

Lift	Never 0%	Occas. 33%	Freq. 45-66%	Cont. 67-100%
1 to 10 pounds				
11 to 20 pounds				
21 to 50 pounds				
51 to 75 pounds				
76 to 100 pounds				

Carry	Never 0%	Occas. 33%	Freq. 45-66%	Cont. 67-100%
1 to 10 pounds				
11 to 20 pounds				
21 to 50 pounds				
51 to 75 pounds				
76 to 100 pounds				

Push	Never 0%	Occas. 33%	Freq. 45-66%	Cont. 67-100%
1 to 10 pounds				
11 to 20 pounds				
21 to 50 pounds				
51 to 75 pounds				
76 to 100 pounds				

Pull	Never 0%	Occas. 33%	Freq. 45-66%	Cont. 67-100%
1 to 10 pounds				
11 to 20 pounds				
21 to 50 pounds				
51 to 75 pounds				
76 to 100 pounds				

	Never 0%	Occas 33%	Freq 45-66%	Cont 67-100%
Bend				
Twist				
Crouch				
Kneel				
Crawl				
Walk-Level Surface				
Walk-Uneven Surface				
Climb Stairs				
Climb Ladder				
Reach Above Shoulder				
Repetitive Use Arms				
Repetitive Use Wrist				
Repetitive Use Hands				
Grasping				
Squeezing				
Operate Foot Control				

Environment				
Inside				
Outside				
Heat				
Cold				
Dusty ☐ ☐				
Noisy				
Other:				

FOR PHYSICIAN TO COMPLETE **(Please address both questions):**

1. The commute to this job is within the physical capacities of the worker? Yes No

By commute we mean: can worker tolerate either: 1) driving a car, OR 2) being a passenger in a car OR 3) utilizing public transportation (to and from home to work location)?

2. Job Appropriate? Yes No **Date of Release:** _____

EMPLOYER SIGNATURE DATE

PHYSICIAN'S SIGNATURE DATE

DAMAGE NOTIFICATION

The State of Tennessee is providing you this notification relative to damage that occurred to your vehicle while it was unoccupied. To obtain information about this incident, please contact the State of TN Auto Accident Call Center using the phone number below.

The Call Center works on behalf of the State to obtain information, investigate, and provide claim services. The owner of the damaged property/vehicle may call the State of TN Auto Accident Call Center toll-free for assistance at:

(855) 253-0629

Provide the following information when calling:

Date: _____ Time: _____

State Agency: _____

State of Tennessee Treasury Department
Division of Claims and Risk Management

Receipt of this notification is not an admission of liability or a promise that damages will be paid.

Tennessee Department of Treasury; July 2018; Authorization #309401; 10,000 copies. This public document was promulgated at a cost of $0.02 each.

Occupational Health & Safety Division: Safety Written Program		
Hot Work Program OHS-010	**Issued: 01/31/2023**	**Revised:**

I. Introduction

Anytime you work with equipment that produces a **spark or an open flame**, or a **process that generates excessive heat**, there is a risk of fire. Work involving electric or gas welding, torch cutting or use of cut off devices, brazing, grinding that produces sparks, or similar flame and spark producing operations is known as hot work. Hot work can produce various hazards such as:

- Fire- resulting in property or personal loss
- Explosion of compressed gases
- Flammable or combustible vapors, solids, liquids near the area of the hot work
- Processes involving oxyfuel, sharp blades, flames on torches
- Metal splatter and electric shock
- Confined space issues
- Transportation of gas cylinders

Hazards with hot work are most frequently related to fire and explosion hazards and welding, cutting, brazing and grinding hazards; but be aware that exposure to welding arcs and welding fumes can result in serious and disabling long-term health injuries.

The Headquarters Occupational Health and Safety Division coordinates this program and is responsible for reviewing and updating the program, as necessary. Copies of the written program may be obtained from the OHS SharePoint site, Regional Safety Managers, or the Headquarters Occupational Health and Safety Division.

II. Hot Work

Hot work is any work that involves burning, welding, using fire- or spark-producing tools, or that produces a source of ignition.

A. Physical Hazards of Hot Work

1. Fire and Explosion Hazards

Because of the extreme temperatures associated with any hot work, the potential of fire or explosion exists.

The heat of the welding arc can reach temperatures of 10,000°F, but this heat in itself is not generally a fire hazard. The danger of fire actually results from the effects of this intense heat upon your work and in the form of sparks and molten metals. Because these can spray up to 35 feet from your work, you must recognize and protect combustible materials from the welding arc, sparks and spatter. It is also important to be sure the work is not in contact with any combustible which it may ignite when heated.

These combustible materials fall into three categories:

1. Liquid (gasoline, oil, paints, and thinners)
2. Solid (wood, cardboard, and paper)
3. Gaseous (acetylene and hydrogen)

2. Burns

- Sparks, slag, from hot work can cause burns to skin, if not properly covered.
- Welding arc rays release ultraviolet light which can cause burns to unprotected skin similar to sunburn.
- Watching the arc without appropriate eye protection can cause burns to the eye, called arc flash burn.

3. Respiratory Hazards

Welding and cutting can also produce smoke and fumes which can cause sickness. Symptoms usually will be similar to 24-hour flu, and they usually occur within 4 -8 hours of exposure.

Workers must be protected from exposures through ventilation or the use of fume and smoke capture devices to remove them from the work environment.

Hot work such as cutting and welding can expose workers to cadmium, fluorides, zinc, lead, beryllium, and other hazardous by-products depending on the materials we are working with or on.

WARNING: When welding or cutting, especially stainless steel and galvanized materials including guardrail, truck parts, and snow removal equipment, workers can be potentially exposed to hexavalent chromium. OSHA requires the use of engineering and work practice controls to reduce exposures to below the permissible exposure limit of 5 µg/m3.

To help mitigate respiratory hazards:

- Reduce duration of active welding activities
- Keep fumes and gases from your breathing zone and general area.
- Keep your head out of the fumes and/or plume.
- Use enough ventilation or exhaust at the arc, or both, to keep fumes and gases from your breathing zone and general area.

4. Electric Shock

The hazard of electric shock is one of the most serious and immediate risks facing an employee who is welding.

Contact with metal parts which are “electrically hot” can cause injury or death because of the effect of the shock upon your body or a fall which may result from your reaction to the shock.

The electric shock hazard associated with arc welding may be divided into two categories which are quite different:

a. Primary Voltage Shock (i.e., 230, 460 volts); and
b. Secondary Voltage Shock (i.e., 20-100 volts)

The electrode and work (or ground) circuits are electrically “hot” when the welder is on. Do not touch these “hot” parts with your bare skin or wet clothing. Wear dry, hole-free gloves to insulate hands.

Insulate yourself from work and ground using dry insulation. Make certain the insulation is large enough to cover your full area of physical contact with work and ground.

B. General Requirements for Hot Work

1. Authorization

- Before hot work welding and cutting is permitted, the area shall be inspected by the individual responsible for authorizing hot work operations. They must designate precautions to be followed in granting authorization to proceed in the form of a written **hot work permit**.

  Exception for Designated Hot Work Areas - Hot work may be performed without a permit only when the hot work is performed in a designated area for hot work and adheres to all required precautions for fire prevention under the standard. The Regional Safety office must pre-approve the designated hot work area.

For example: A mechanic in a District garage needs to grind burrs off a truck bed part so they take the part over to the bench grinder in the designated hot work area – no permit required. However, if a portable grinder is used to perform the same task while the part is still attached to the truck, adjacent to a fuel tank – permit is required.

See Appendix A for the Hot Work Permit form.

- Employees responsible and designated to authorize hot work must be deemed competent within the requirements of OHS-010 Hot Work written safety program.
- A copy of the active permit will be posted at the hot work location and the authorizer of the Hot Work Permit shall retain a photo/scan/email copy of active permit during performance of hot work. Once work and fire watch is finalized a copy of the completed permit shall be retained electronically or within a hard copy file for review and program auditing by the authorizer or other designated filing area established by the location.

- All employees performing hot work must be properly trained and deemed competent to perform hot work and operate hot work-related equipment per the TDOT Hot Work Training requirements.
- Copies of hot work permits shall be retained for program and auditing purposes, indefinitely. The HQ OHS Division will notify affected parties if changes in document retention requirements change.

Hot Work will NOT be conducted in the following:

- Sprinklered buildings where the system is not functioning properly- if equipped with sprinklers.
- The presence of explosive atmospheres (mixtures of flammable gases, vapors, liquids, or dusts with air), or explosive atmospheres that may develop inside uncleaned or improperly prepared tanks or equipment which have previously contained such materials, or that may develop in areas with an accumulation of combustible dusts.
- Areas near the storage of large quantities of exposed, readily ignitable materials such as cardboard, wood, paper, shop rags, etc.
- Areas that contain floor openings or cracks in the flooring that cannot be closed.
    - Precautions shall be taken so that no readily combustible materials on the floor below will be exposed to sparks which might drop through the floor. The same precautions must be taken with regard to cracks or holes in walls, open doorways and open or broken windows.

2. Fire Prevention and Protection

- All moveable fire hazards and combustibles must be moved to **at least 35 feet** away from areas or objects before hot work begins.

- When hot work tasks are performed within 35 feet of combustible materials or floor, ceiling, or wall openings- guards, barriers, or other precautions used to confine heat sparks and slag must be present.

    - Note: If all fire hazards cannot be removed or when the floor, ceiling, or wall has openings, special precautions listed in 1910.252(a)(2) may be necessary (i.e., fire watch, relocating combustibles).

- Hot work is prohibited where flammable materials are used (such as paints) or where heavy dust concentrations are present.

- Suitable fire extinguishing equipment must be kept where hot work is performed and fire extinguishing equipment must be ready for use before work begins.

- When employees perform hot work on containers such as barrels or tanks, the containers must be thoroughly cleaned to remove materials that, when heated, may cause fire, explosion, or release of toxic materials.

    - Before performing hot work, all hollow spaces and cavities must be vented to release trapped air or gases. Note: Purging with inert gas is recommended.

- Hot work being performed in field settings (outside of garage or shop facilities) shall include evaluation of the potential combustibles located within the immediate area.

- When practical, it is recommended to relocate equipment or materials to a facility or more suitable area, prior to performance of the hot work activity.

- When performing field repairs and hot work activities, be aware of the presence of combustibles including grasses, plastics, liquids, vapors and wood materials that may be present.

- Make every attempt to avoid performing hot work in grass areas that may be susceptible to ignition of materials (i.e. dry grasses in certain seasons). These tend to spread rapidly and uncontrollably to other areas that may contain other ignition sources including fuels, oils, vapors, etc.

3. Fire Watchers

Fire watchers must be required whenever welding or cutting is performed in locations where other than a minor fire might develop, or any of the following conditions exist:

- ☐ Appreciable combustible material, in building construction or contents, closer than 35 feet to the point of operation.
- ☐ Wall or floor openings within a 35-foot radius expose combustible material in adjacent areas including concealed spaces in walls or floors.
- ☐ Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation.
- ☐ Fire watchers shall have fire extinguishing equipment readily available and be trained in its use. They shall be familiar with facilities for sounding an alarm in the event of a fire. They shall watch for fires in all exposed areas, try to extinguish them only when obviously within the capacity of the equipment available, or otherwise sound the alarm. A fire watch shall be maintained for **at least 1 hour** after completion of welding or cutting operations to detect and extinguish possible smoldering fires.
- ☐ Fire watchers, as previously described, are required for performance of hot work activities in a field setting or any setting outside of a facility without all standard controls available. Performance of hot work, in these settings should be conducted as a last resort and every attempt shall be made to relocate the equipment to a facility with adequate controls.

4. Maintenance of Hot Work Equipment

- ☐ Periodic inspections of welding and torch cutting equipment must be performed by qualified maintenance personnel.
  - Daily/Prior to use visual inspection of welding equipment shall be performed each time the equipment is used by welding operator
  - Annual inspection of welding machine, equipment by qualified maintenance personnel
- ☐ A certification record of periodically inspected welding equipment must be maintained.
- ☐ The certification record of annually inspected welding equipment shall include the date of inspection, signature of the inspector, and equipment serial number or another identifier.
- ☐ Welding machine operators must be required to report any equipment defect to their supervisor.
- ☐ Defective equipment must be tagged and taken out of service until repairs have been completed.

5. First Aid

- First aid supplies shall be available at all times, and all injuries, no matter how minor are to be reported as soon as possible. Eye wash supplies and burn relief gels or kits should be available in addition to typical first aid supplies for cuts and lacerations, when hot work is being performed.

III. Personal Protective Equipment (PPE)

Those performing cutting and welding operations require special PPE. The type and amount of PPE will vary with the individual jobs, but in general, will include:

A. Skin Protection

Protect your body parts and skin from welding spatter and arc flash with the following protective clothing:

- Woolen clothing (possibly cotton) — never synthetic fabrics

ATTENTION: TDOT high-viz clothing and garage uniforms shall not be worn without full skin coverage welding PPE while performing cutting and welding Hot Work.

- Welding jackets, Flame-proof apron, fire resistant cape or shoulder covers for overhead work
- Gloves designed for welding and cutting
    - **REMOVE metal containing wedding rings and jewelry prior to welding-even with the use of gloves due to conductive properties.**
- Properly fitted clothing that is not frayed or worn
- Long-sleeve shirts
- Straight-leg trousers that cover shoes paired with leathers to protect specific body parts or areas

Check protective clothing equipment before each use. Make sure it is in good condition. Protectors shall meet the following minimum requirements:

- They shall provide adequate protection against the particular hot work hazards for which they are designed.
- They shall be reasonably comfortable when worn under the designated conditions.
- They shall fit snugly and shall not unduly interfere with the movements of the wearer.
- They shall be durable.
- They must be capable of being disinfected and easily cleanable.
- Keep clothes free of grease and oil.

See Appendix B for a General Visual Guide to PPE.

B. Eye and Face Protection

Eye injuries account for one-quarter of all welding and cutting injuries. Proper selection and use of eye protection is the best way to control injuries.

Welding-related eye injuries come from a number of sources, including:

- Mechanical damage from being struck by flying particles and chipped slag
- Radiation and photochemical burns from ultraviolet radiation (UVR)
- Infrared radiation, and intense blue light
- Irritation and chemical burns from fumes and chemicals

ANSI Z87.1 Safety glasses AND welding helmet with proper shaded lenses for welding ARE REQUIRED when welding or torch cutting.

Appendix C- Eye Protection Shading for Filter Lenses must be used as a guide for the selection of the proper shade numbers of filter lenses or plates used in welding. Shades denser than those listed may be used to suit the individual's needs.

IV. Welding and Cutting

A. General

1. Protection of Personnel

- Welding cables and hoses must be kept clear of passageways, ladders, and stairways.
- Welders, cutters, brazers and helpers must wear suitable face, neck and ear protection to prevent direct radiant energy from the arc.
- Welders, cutters brazers and helpers must wear suitable eye protection with proper filter lens shade numbers. (Refer to Appendix C.)
- Any employees welding at heights greater than 4 feet must be protected from falls by railings or other means or personal fall protection systems must be used.
- When the work permits, hot work shall be enclosed in an individual non-combustible booth or screened in area with internal, non-reflective surfaces.
    - Booths or screened areas must provide air circulation at floor level with 2 feet clearance at bottom.
- Nearby workers and employees must be protected by arc welding rays by screens, booths, or shields. Employees working adjacent to any hot work producing arc rays where screens or shielding devices are not present, must wear ANSI Z87 rated safety glasses with side shields as they have UV protection built into the lenses and must be instructed NOT to look directly at the welding arc.

2. Health Protection and Ventilation

- First aid equipment must be present for immediate use when hot work is being performed.

- Suppliers of fluxes, coatings, coverings, and filler metals supply information about the hazardous releases associated with these materials. Refer to SDS's for information.

3 Types of Ventilation

1. Natural Ventilation is the movement of air through the workplace caused by natural forces. Outside, this is usually the wind. Inside, this may be the flow of air through open windows and doors.
2. Mechanical Ventilation is the movement of air through the workplace caused by an electrical device such as a portable fan or permanently mounted fan in the ceiling or wall.
3. Source Extraction (Local Exhaust) is a mechanical device used to capture welding fume at or near the arc and filter contaminants out of the air – or otherwise remove them from the work environment.

The ventilation or exhaust needed for the application depends upon many factors such as:

- Workspace volume and configuration
- Number of welders
- Welding process and current
- Welding consumables used (mild steel, hardfacing, stainless, etc.)
- Allowable exposure levels (NIOSH Threshold Limit Value, TLV or OSHA Permissible Exposure Limit, PEL, etc.)
- Material welded (including paint or plating)
- Natural airflow

Adequate ventilation must be in place when welding in confined areas or where there are barriers to air movement. Natural drafts, fans, and positioning of the head can help keep fumes away from the worker's face. Contaminated air exhaust from the workspace must be discharged to open air and away from the fresh air intake source of the building.

Ventilation Is Sufficient If the following criteria is met:

- The room or welding area contains at least 10,000 cubic feet for each welder.
- The ceiling height is not less than 16 feet.
- Cross-ventilation is not blocked by partitions, equipment, or other structural barriers.
- Welding is not done in a confined space.

If these space requirements are not met, mechanical ventilating equipment must be used. Equipment must exhaust at least 2,000 cubic feet of air per minute for each welder, except where local exhaust hoods or booths are used.

Refer to Appendix D for a Welding Hazard Checklist.

B. Oxygen Fuel Gas Welding and Cutting

1. General

- Acetylene generated, piped, or used at pressures is no greater than 15 psig (pounds per square inch, gauge) or 30 psia (pounds per square inch, absolute).
- All gas welding and cutting equipment (torches, regulators pressure reducing valves, acetylene generators, and manifolds must be supplied from reputable dealers to ensure safety of equipment and proper standards.
- Employees must be trained and judged competent in the use of gas welding and cutting equipment.

2. Markings/Labeling

- All compressed gas cylinders must be legibly marked on their shoulders (by stenciling, stamping, or permanent labeling) with the chemical or trade name of the gas.
- Gauges on oxygen regulators must be marked with "USE NO OIL"

3. Cylinder Requirements during Oxy-Fuel Gas Welding and Cutting

- Oxygen and acetylene cylinders must be kept away from radiators and other sources of heat.
- Empty cylinders must have the valves closed and protective cap installed.
- Cylinders, cylinder valves, couplings, regulators, hoses and equipment must be kept free from oily and greasy substances.
- Care must be taken to ensure that cylinders are not dropped, struck, handled roughly or permitted to strike each other violently.
- Cylinders must be kept far enough way from welding or cutting that sparks, hot slag, or flames will not reach them, or a fire-resistant shield must be used.
- Cylinders must be places where they cannot become part of an electrical circuit.
- Cylinders shall NEVER be used as rollers or supports.
- Cylinder valves shall not be opened using a hammer or wrench.
- Fuel Gas cylinders must be placed with valve end up whenever in use.
- All compressed gas cylinders must be secured by a protective strap or chain in an upright position to help prevent falling or being knocked over.

4. Cylinder Storage Requirements for Oxy Fuel Gas Welding and Cutting

- Inside buildings, cylinders must be stored in well-protected, well-ventilated, dry locations at least **20 feet** from highly combustible material such as oil.
- Cylinders must be stored in designated spaces where they will not be knocked over, damaged by passing or falling objects, or subjected to tampering by unauthorized people.
- Storage of fuel gas cylinders inside a building is limited to a total gas capacity of 2,000 cubic feet or 300 pounds of liquefied petroleum gas (except for those being used or attached and ready to use).
    - A separate, specially constructed room or compartment must be provided to store cylinders that have more than 2,000 cubic feet total gas capacity or 300 pounds of liquefied petroleum gas.
- Stored oxygen cylinders must be separated from fuel-gas cylinders or combustible materials (especially oil or grease) by at least 20 feet, or by a noncombustible barrier at least 5 feet high with a fire-resistance rating of at least one-half hour.

5. Cylinder Valves and Caps for Oxy-Fuel Gas Welding and Cutting

- Valve protection caps must be in place on cylinders that are not in use and using.
- It is prohibited to use the valve protection cap to lift the cylinder from one vertical position to another.
- Unless cylinders are secured on a special truck, the regulators must be removed, and valve-protection caps installed before cylinders are moved.
- Cylinders without fixed hand wheels must have keys, handles, or nonadjustable wrenches on the valve stems while the cylinders are in service.
- Cylinder valves must be closed when work is finished and before cylinders are moved.

- Cylinder valves must always be opened slowly.

6. Regulator and Flashback Protection for Oxy- Fuel Gas Welding and Cutting

- Before connecting a regulator to a cylinder valve, operators must open the valve slightly and close it immediately.
- Before a regulator is removed, the cylinder valve must be closed, and the gas released from the regulator.
- Flash back protection must be provided by an approved device that will prevent flame from passing into the fuel-gas system.

7. Inspection and Maintenance for Oxy Fuel Gas Welding and Cutting

- Hoses must be inspected at the beginning of each work shift or prior to hot work being performed.
- Leaking defected, burned or worn hoses must be removed from service and replaced.
- Clogged torch tip openings must be cleaned with suitable cleaning wires, drills, or other devices designed for this purpose.
- Torches must be inspected at the beginning of each shift or prior to hot work being performed for leaking shut off valves, hose couplings and tip connections.
- Defective torches must be removed from service.
- Regulators including gauges must only be repaired by competent persons, otherwise they must be replaced.
- Union nuts and connections on regulators must be inspected before use, to detect faulty seats.

8. Transport of Torch Cutting Cylinders

- Ensure the cylinder contents are clearly labeled.
- Ensure the cylinder valve is in the fully closed position.
- Use valve protection caps before moving.
- A pressure relief device must be in communication with the vapor space of the cylinder.
- Use cylinder dollies or other mechanical lifting devices to move the cylinders to the vehicle.
- Never drop the cylinders or allow things to bang into them.
- Transporting the cylinders in an upright position.
- Cylinders should be placed only on flat floors or platforms.
- Secure the cylinders in the vehicle or trailer to prevent movement during transit. Cylinders should not be allowed to shift relative to each other or the supporting structure.

C. Arc Welding

Arc welding is a type of welding process using an electric arc to create heat to melt and join metals. A power supply creates an electric arc between a consumable or non-consumable electrode and the base material using either direct (DC) or alternating (AC) currents. Arc welding is a fusion process used to join metals. An electric arc from an AC or DC power supply creates an intense heat of around 6500°F which melts the metal at the join between two work pieces.

1. Typical types of Arc Welding we do at TDOT are the following:

a. **Shielded Metal Arc Welding (Stick Welding)**
Stick Welding, also known as Shielded Metal Arc Welding (SMAW) or Covered Electrode, the most widely used of the various arc welding processes, utilizes a fixed length electrode and an electric power source to join a variety of different metals. The core of the covered electrode consists of a solid metal rod that is surrounded by a covering of mineral compounds and metal powders mixed with a binding agent to help

them adhere to the surface of the electrode. The core rod conducts electric current to the arc and provides filler metal for the joint

b. **Gas Metal Arc Welding (MIG Welding)**
In MIG welding, a filler metal is fed through the welding machine. This filler metal is a kind of wire that acts as both a current supplier and a heat supplier. The current from the filler metal wire maintains the welding arc. The welding machine produces an inert gas that protects the arc from reacting to outside elements in the air around it.

c. **Gas Tungsten Arc Welding (TIG Welding)**
TIG Welding, also known as Gas Tungsten Arc Welding (GTAW), is a process that joins metals by heating them with an arc between a tungsten electrode (non-consumable) and the work piece. The process is used with a shielding gas and may also be used with or without the addition of filler metal. The primary variables in TIG Welding are arc voltage (arc length), welding current, travel speed and shielding gas composition.

2. Equipment Requirements for Arc Welding

- Arc-welding machines must be constructed to operate under their anticipated environmental conditions.
- Alternating-current **manual** arc-welding and cutting machines are limited to 80 volts.
- Alternating-current **automatic** arc-welding and cutting machines limited to 100 volts.
- Manual or automatic direct-current (DC) arc-welding and cutting machines limited to 100 volts
- Terminals for welding leads are protected from contact.
- When manual electrode holders are used, they must be designed specifically for arc welding and cutting.
- Manual electrode holders must be of a capacity capable of safely handling the maximum rated current required by the electrodes.
- Arc-welding and cutting cables must be completely insulated, flexible, and capable of handling the maximum current requirement of the work in progress.

3. Equipment Installation Requirements for Arc Welding

- Arc-welding machine frames or cases must be electrically grounded.
- Chains, wire ropes, cranes, hoists, elevators, and conduits containing electrical conductors are prohibited
- from being used to complete work-lead circuits.
- All grounding connections must be checked to determine that they are mechanically strong and electrically adequate for the required current.
- A disconnecting switch with overcurrent protection must be located at or near each arc-welding machine that does not have such a switch.
- A disconnecting switch with overcurrent protection must be provided for each outlet intended for connection to a portable welding machine.
- For individual welding machines, the rated current-carrying capacity of the supply conductors must not be less than the rated primary current of the welding machine.
- All DC arc-welding machines must be connected with the same polarity.
- All AC arc-welding machines must be connected to the same phase of the supply circuit and with the same instantaneous polarity.

4. Operation and Maintenance for Arc Welding

- Arc-welding machine hookups must be checked before starting operations.
- Coiled welding cable must be spread out before use to avoid serious overheating and damage to insulation.
- The grounding of the welding machine frame must be checked before operations are started.
- Arc-welding machines must be checked for leaks of cooling water, shielding gas, or engine fuel before operations are started.
- Proper switching equipment must be provided for shutting down the machine.
- The manufacturer's printed rules and instructions covering operation of the equipment must be followed.
- When not in use for any substantial period (such as during lunch hour or overnight)
    - electrodes must be removed from the holders;
    - the holders must be safely placed so they cannot make contact with people, conductive objects, fuel or compressed gas tanks; and
    - the machines must be disconnected from the power source.
- Electrode cables must be free from splices within 10 feet from holders.
- The operator must be required to report any equipment defects or safety hazards and to discontinue use until safety has been assured.
- Arc-welding machines must be repaired only by qualified personnel.
- If arc-welding machines become wet, they must be thoroughly dried and tested before use.
- Cables with damaged insulation or exposed bare conductors must be replaced.
- When metal-arc welding with inert gas, special precautions must be taken for hazards associated with chlorinated solvents.

V. Spark Producing Tools and Equipment

When using **ANY** tool or equipment on materials that produce a spark or flame, we must meet the requirements of this hot work written program.

At TDOT we use spark producing tools such as but not limited to the following:

- Abrasive wheel grinding tools-handheld and bench type
- Wire wheel grinding tools- hand held and bench type
- Cut off tools to include chop saws- hand held (gas and electric), some with abrasive saw blades
- Handheld power saws with metal cutting blades
- Bandsaws, vertical and horizontal
- Some drilling functions, hand- held or drill press machines may also cause sparks depending on the materials involved in the task.

VI. Training

All hot work supervisors and operators must receive hot work training before starting any hot work activities. The training must include the requirements of TDOT's hot work written program. Hot work program training must be repeated at least every two years. The completion of additional training may also be required based on the job specific hazards.

- ☐ Review of requirements listed in OSHA 1910.252
- ☐ Review and understand requirements under the OHS-010 Hot Work Program, including Hot Work Permits
- ☐ Competent Hot Work Supervisor Responsibilities
- ☐ Hot Work Operator Responsibilities
- ☐ Fire Watch Responsibilities - specifically, the fire watch must know:
    - That their ONLY duty is Fire Watch.
    - When they can terminate the watch.
    - How to use the provided fire extinguisher.
    - How to activate fire alarm if fire is beyond the incipient stage.
- ☐ Safe operation and maintenance of the equipment per manufacturer's instructions and the hazards associated with the use of this equipment.
- ☐ Fire Extinguisher training
- ☐ Understand and carry out proper fire prevention before hot work is performed.
- ☐ Ensure the safety of other employees adjacent to or in the area planned for hot work prior to the hot work being performed.
- ☐ Documentation requirements (permits)

*All training completed must be documented in writing.

Appendix A

HOT WORK PERMIT

All temporary operations involving open flames or producing heat and/or sparks require a Hot Work Permit. This includes, but is not limited to, Brazing, Cutting, Grinding, Soldering, Thawing, and Welding.

PART A

INSTRUCTIONS FOR FIRE SAFETY SUPERVISOR

1. **Verify precautions listed at right (or do not proceed with the work).**
2. **Complete Page 1 and retain for job files.**
3. **Post Page 2 in vicinity of hot work.**

DATE | JOB NO.

LOCATION/BUILDING & FLOOR (Be Specific)

DESCRIPTION OF WORK BEING PERFORMED

NAME OF PERSON DOING HOT WORK

The above location has been examined, the precautions checked on the Hot Work Checklist have been taken to prevent fire, and permission is authorized for this work.

SIGNED:

_____
(Fire Safety Supervisor)

SIGNED:

_____
(Person doing Hot Work)

SIGNED:

_____
(Fire Watch)

TIME
STARTED: Date: _____ Time: _____ AM/PM

PERMIT
EXPIRES: Date: _____ Time: _____ AM/PM

FILL OUT EMERGENCY INFORMATION ON PAGE 2.

HOT WORK CHECKLIST

- ☐ Sprinklers and hose streams in service/operable- if applicable
- ☐ Hot Work Equipment in good condition (e.g., power source, welding leads, torches, etc.)
- ☐ Multi-purpose fire extinguisher and/or water pump can.

REQUIREMENTS WITHIN 35 FEET OF WORK

- ☐ Dust, Lint, Debris, Flammable Liquids and oily deposits removed.
- ☐ Explosive atmosphere in area eliminated.
- ☐ Combustible floors (e.g., wood, tile, carpeting) wet down, covered with damp sand or fire blankets.
- ☐ Remove flammable and combustible material where possible. Otherwise protect with fire blankets, guards, or metal shields.
- ☐ All wall and floor openings covered.
- ☐ Walkways protected beneath hot work.

WORK ON WALLS OR CEILINGS

- ☐ Combustibles moved away from other side of wall.

FIRE WATCH/HOT WORK AREA MONITORING

- ☐ Fire watch will be provided during and for **1 hour** after work, including any coffee or lunch breaks.
- ☐ Fire watch is supplied with an extinguisher, and/or water pump can, also making use of other extinguishers located throughout work area.
- ☐ Fire watch is trained in use of this equipment and familiar with location of sounding alarm.
- ☐ Fire watch may be required for opposite side of walls, above, and below floors and ceilings.

OTHER PRECAUTIONS TAKEN

- ☐ ____

WARNING!

HOT WORK IN PROGRESS

WATCH FOR FIRE!

IN CASE OF AN EMERGENCY:

CALL: _____

AT:

WARNING!

Permit Page 2

Appendix B- Visual Guide to PPE

Appendix C- Eye Protection Shading for Filter Lenses

Filter Lens Shade Numbers for Protection Against Radiant Energy	
Welding operation	**Shade number**
Shielded metal-arc welding 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	**10**
Gas-shielded arc welding (nonferrous) 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	**11**
Gas-shielded arc welding (ferrous) 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	**12**
Shielded metal-arc welding 3/16-, 7/32-, 1/4-inch diameter electrodes	**12**
5/16-, 3/8-inch diameter electrodes	**14**
Atomic hydrogen welding	**10-14**
Carbon-arc welding	**14**
Soldering	**2**
Torch brazing	**3 or 4**
Light cutting, up to 1 inch	**3 or 4**
Medium cutting, 1 inch to 6 inches	**4 or 5**
Heavy cutting, over 6 inches	**5 or 6**
Gas welding (light), up to 1/8-inch	**4 or 5**
Gas welding (medium), 1/8-inch to 1/2-inch	**5 or 6**
Gas welding (heavy), over 1/2-inch	**6 or 8**

Appendix D- Welding Hazard Checklist

WELDING SAFETY CHECKLIST

HAZARD	FACTORS TO CONSIDER	PRECAUTION SUMMARY
Electric shock can kill 	• Wetness • Welder in or on workpiece • Confined space • Electrode holder and cable insulation	• Insulate welder from workpiece and ground using dry insulation. Rubber mat or dry wood. • Wear dry, hole-free gloves. (Change as necessary to keep dry.) • Do not touch electrically "hot" parts or electrode with bare skin or wet clothing. • If wet area and welder cannot be insulated from workpiece with dry insulation, use a semiautomatic, constant voltage welder or stick welder with voltage reducing device. • Keep electrode holder and cable insulation in good condition. Do not use if insulation is damaged or missing.
Fumes and gases can be dangerous 	• Confined area • Positioning of welder's head • Lack of general ventilation • Electrode types, i.e., manganese, chromium, etc. See SDS • Base metal coatings, galvanize, paint	• Use ventilation or exhaust to keep air breathing zone clear, comfortable. • Use helmet and positioning of head to minimize fume in breathing zone. • Read warnings on electrode container and Safety Data Sheet (SDS) for electrode. • Provide additional ventilation/exhaust where necessary to maintain exposures below applicable limits. • Use special care when welding in a confined area. • Do not weld unless ventilation is adequate.
Welding sparks can cause fire or explosion 	• Containers which have held combustibles • Flammable materials	• Do not weld on containers which have held combustible materials (unless strict AWS F4.1 procedures are followed). Check before welding. • Remove flammable materials from welding area or shield from sparks, heat. • Keep a fire watch in area during and after welding. • Keep a fire extinguisher in the welding area. • Wear fire retardant clothing and hat. Use earplugs when welding overhead.
Arc rays can burn eyes and skin 	• Process: gas-shielded arc most severe	• Select a filter lens which is comfortable for you while welding. • Always use helmet when welding. • Provide non-flammable shielding to protect others. • Wear clothing which protects skin while welding.
Confined space 	• Metal enclosure • Wetness • Restricted entry • Heavier than air gas • Welder inside or on workpiece	• Carefully evaluate adequacy of ventilation especially where gas may displace breathing air. • If basic electric shock precautions cannot be followed to insulate welder from work and electrode, use semiautomatic, constant voltage equipment with cold electrode or stick welder with voltage reducing device. • Provide welder helper and method of welder retrieval from outside enclosure.
General work area hazards   	• Cluttered area	• Keep cables, materials, tools neatly organized.
	• Indirect work (welding ground) connection	• Connect work cable as close as possible to area where welding is being performed. Do not allow alternate circuits through scaffold cables, hoist chains, ground leads.
	• Electrical equipment	• Use only double insulated or properly grounded equipment. • Always disconnect power to equipment before servicing.
	• Engine-driven equipment	• Use in only open, well ventilated areas. • Keep enclosure complete and guards in place. • See Lincoln Electric Service Shop if guards are missing. • Refuel with engine off. • Is using auxiliary power, OSHA may require GFI protection or assured grounding program (or isolated windings if less than 5kW).
	• Gas cylinders	• Never touch cylinder with the electrode. • Never lift a machine with cylinder attached. • Keep cylinder upright and chained to support.

OHS-011 MATERIALS AND TESTS LABORATORY SAFETY MANUAL

TN TDOT Department of Transportation

TABLE OF CONTENTS

INTRODUCTION

This program establishes uniform requirements designed to ensure that laboratory safety practices are communicated to and understood by affected employees. These requirements are also designed to ensure that procedures are in place to protect the health and safety of all employees and visitors. The intent of this program is to describe practices that comply with all applicable Federal, State, Departmental, and Divisional regulations, policies, and procedures.

Materials and Test Laboratories are involved in testing the quality of a variety of materials including, but not limited to the following: hot mix asphalt, asphalt cement and emulsified asphalt, hydraulic cement, Portland cement concrete, aggregates, metal, and soils.

RESPONSIBILITIES

All employees shall understand and abide by this program.

All supervisors shall be responsible for ensuring employee compliance to this program.

GENERAL DEFINITIONS

Designated Area – an area that may be used for work with particularly hazardous substances. May be the entire laboratory, a section of the laboratory, or a device such as a laboratory fume hood.

Hazardous Chemical – any chemical which is classified as a health hazard or simple asphyxiant.

Permissible Exposure Level (PEL) – the maximum permitted eight-hour time-weighted average concentration of an airborne contaminant.

Physical Hazard – a simple hazard that can cause physical harm. Physical hazards include ergonomic hazards, radiation, heat and cold stress, electrical hazards, vibration hazards, cuts and punctures, crush and noise hazards.

Chemical Hazard – a chemical for which there is scientifically valid evidence that it is a combustible liquid, a compressed gas, explosive, flammable, an organic peroxide, and oxidizer, pyrophoric, unstable (reactive), or water-reactive.

Protective Laboratory Practices – those laboratory procedures, practices, and equipment accepted by laboratory health and safety experts and effect, or that the employer can show to be effective, in minimizing the potential for employee exposure to hazardous chemicals.

Reproductive Toxins – chemicals that affect the reproductive capabilities including chromosomal damage (mutagens) and effects on fetuses (teratogenesis).

Safety Data Sheet (SDS) - The SDS includes information such as the properties of each chemical; the physical, health, and environmental health hazards; protective measures; and safety precautions for handling, storing, and transporting the chemical.

Compressed Gas Related

Compressed gas: A gas which when under pressure is entirely gaseous at -50°C (-58°F), including all gases with a critical temperature ≤ 50°C (-58°F).

Gases under pressure: are gases which are contained in a receptacle at a pressure of 200 kPa (29 psi) (gauge) or more, or which are liquefied or liquefied and refrigerated. They comprise compressed gases, liquefied gases, dissolved gases and refrigerated liquefied gases.

Inert gas: is a gas which does not undergo a chemical reaction in a given situation. Argon and nitrogen are two common examples. Inert gases can still create a hazard by displacing oxygen in confined spaces.

Flammable gas: means a gas having a flammable range with air at 20°C (68°F) and a standard pressure of 101.3 kPa (14.7 psi).

Oxidizing gas: means any gas which may, generally by providing oxygen, cause or contribute to the combustion of other material more than air does.

GENERAL FOR ALL EMPLOYEES AND VISITORS

AT NO TIMES SHALL UNAUTHORIZED PERSONNEL OR VISITORS BE ALLOWED IN THE LABORATORY.

Visitors must check in with a laboratory supervisor immediately upon entering the lab area. Visitors must be escorted unless authorized to be there unescorted. **When in the Materials and Tests Laboratories, TDOT Employees will:**

- Wear the appropriate attire at all times (close-toed shoes, long pants, and no loose clothing)
- Wear appropriate PPE at all times (i.e. eye protection, face protection when necessary, lab coats, and aprons).
- Ensure visitors are escorted and meet clothing and PPE requirements, applicable to the lab area they are visiting.
- Know the location of the Safety Data Sheets (SDSs).
- Ensure that they maintain good housekeeping in their work area.
- Know the location of all emergency aids, safety showers, eye was stations, emergency exits, and fire alarms.
- Not eat, or store food in designated areas.
- Not directly smell or taste chemicals.
- Keep all containers closed when not in use.
- Label all containers holding hazardous chemicals in accordance with the Hazard Communication Program

HOUSEKEEPING

All laboratories and work areas shall be kept free of all clutter and shall be thoroughly cleaned at the end of each operation as well as daily use.

Floors shall also be kept clean and free of any tripping hazards. Containers that are old, compromised, or otherwise defective and all chemical wastes shall be disposed of by Hazardous Waste Program as soon as possible.

Laboratory sample carts shall be kept orderly and contents of the cart shall not extrude in such a way to become a hazard (such as fence, sheet metal, rebar, wire).

There shall not be accumulation of trash, debris, cardboard or unused chemicals in the laboratory.

Eating, drinking, smoking, gum chewing, applying cosmetics, and taking medicine in laboratories where hazardous chemicals are used or stored should be strictly prohibited.

Food, beverages, cups, and other drinking and eating utensils should not be stored in areas where hazardous chemicals are handled or stored.

Laboratory refrigerators, ice chests, cold rooms, and ovens should not be used for food storage or preparation.

EMERGENCY PLAN

Each laboratory shall have a known emergency plan that outlines procedures for chemical spill clean-up, fire procedures, and emergency exit procedures as well as lists the emergency contacts in the order in which they should be contacted.

- The plan shall be reviewed, and updated if needed, at least once annually.
- A sign or conspicuous notice shall be posted on or near equipment or experiments with the following information:
    1. Names of individuals to contact in case of emergency;
    2. Contact information for individuals to contact in case of an emergency;
    3. Emergency shutdown procedures.
- Employees shall know the location of all emergency aids including showers, eyewashes, first aid kits, emergency exits, spill kits, and fire alarm pulls.
- Emergency eyewashes and safety showers shall be provided in areas where there is the possibility that corrosives, strong irritants, or toxic chemicals may be spilled or splashed on parts of the body.

Chemical Spills

Refer and adhere to the TDOT Environmental Facility Compliance Standard Environmental Procedure (SEP) for Spill Prevention and Response at TDOT Facilities ED.FC.001-Spill Response_2022rev1.pdf.

Emergency Eyewashes and Showers

When employees could be exposed to hazardous chemicals, they must be provided suitable facilities to flush the chemical from their eyes and/or body. This must take the form of a properly designed eyewash and/or shower.

Eyewash and Showers must meet the following criteria:

- Must be located within 10 seconds of the hazard.
- Deliver a minimum of .4 gallons of flushing fluid per minute for 15 minutes.
- Ensure showers can deliver a minimum of 20 gallons of flushing fluid per minute for 15 minutes.
- Must be Inspected and maintained per manufacturer's specifications and instructions.

Monthly Inspections of Emergency Eyewashes and Showers

The following procedure refers to the steps necessary in the monthly testing of the eyewash stations and the shower / rinse stations to ensure proper operation and to keep the movement of fresh water flowing through the system.

Eye Wash Stations: Each eye wash station will be inspected and checked **monthly** for fitness and operation.

1. Check the area around the station. Is it accessible for use, free of obstacles and obstructions? Overhead or tripping hazards present?
2. Are the spray caps in-place and free to move? If caps are missing, new caps must be ordered. **Do not** use an eye wash station without spray caps because of the possibility of containments entering the eye. Are operating handles or foot petals working?
3. Operate the eyewash station for a short time (generally one to two minutes) to allow fresh water to flush the piping system and to check that the drain is functioning. If no drain is in place or if the drain does not flow, use a 5-gal bucket to capture any water. Mop up any spills that occur. Report drain clogs to maintenance department for repair. Sign off on the monthly check list (by Lab).

Shower / Rinse Station: Each shower station will be inspected **monthly** for fitness and operation.

1. Check the area around the station. Is it accessible for use, free of obstacles and obstructions? Overhead or tripping hazards present?
2. Is the operating chain and ring present? Are all supply valves to shower head open? Are electrical switches, plugs or wiring outside of, or blocked from the spray area?
3. Place a 5-gal bucket under the shower head if no drain available. Pull operating chain down to start the water flow. Continue to hold the chain down until sufficient water has flowed through the system (generally one to two minutes). Mop up any spills that may occur. Sign off on the monthly check list (by Lab).

PERSONAL PROTECTIVE EQUIPMENT AND CLOTHING

All labs require a minimum of safety eyewear, safety shoes and nitrile chemical or heat resistant gloves when performing test methods.

The following tests have additional PPE requirements during specific portions of the test methods:

Lab	Test Method	Test Name	Additional PPE
Mix Design	**T164**	Standard Method of Test for Quantitative Extraction of Asphalt Binder from Hot Mix Asphalt (HMA)	
Mix Design	**T308**	Standard Method of Test for Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method	
Binder	**T48**	Standard Method of Test for Flash and Fire Points by Cleveland Open Cup	
Physical	**T96**	Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine	
Chemical	**C25**	Standard Test Methods for Chemical Analysis of Limestone, Quicklime, and Hydrated Lime	
Mix Design	**T340**	Standard Method of Test for Determining Rutting Susceptibility of Hot Mix Asphalt (HMA) Using the Asphalt Pavement Analyzer (APA)	
Physical	**PP89-10 (2020)**	Grinding the end of Cylindrical Concrete specimens	
Mix Design	**407.03.E.3**	LOI (Asphalt) (chemical)	

Voluntary Respirator Usage (Dust Masks)

Employees who voluntarily request to wear a dust mask/N95 respirator during dust producing tasks, must adhere to the guidelines provided in the Guidance for Voluntary Respirator Use- General.pdf document located in the OHS SharePoint Site.

CHEMICAL MANAGEMENT

HAZARD COMMUNICATION (HAZCOM)

The Materials and Tests Laboratory will maintain an updated Workplace Chemical List (WCL). Refer to OHS 002- Hazard Communication Program for all other Hazcom Program requirements.

OHS-002 Hazard Communication Program.pdf

MEANEST AND MOST HAZARDOUS- WATCH OUT				
Chemical Name	Lab Area	General Task	Hazard Info	Required PPE
Mercury - Glass Thermometer	Binder Emulsion	T48 T59	Fatal if Inhaled, May Damage Fertility or the Unborn Child, Organ Damage, Toxic to Aquatic Life	Safety Glasses, Face Shield, Nitrile/Latex Free Gloves
Talc	Binder	T313	Combustible, May Cause Cancer, May Cause Respiratory Irritation, May Cause Damage to Organs	Safety Glasses, Nitrile/Latex Free Gloves, Well Vented Area
Trichloroethylene	Asphalt (All)	T164	Fatal if Swallowed and Enters Airways, Causes Skin Irritation, Causes Serious Eye Irritation, Harmful if Inhaled, Suspected of Causing Genetic Defects, May Cause Cancer, May Damage Fertility or Harm Unborn Child, Cause Damage to Organs, Toxic to Aquatic Life	Safety Glasses, Nitrile/Latex Free Gloves, Well Vented Area
Hydrochloric Acid	Chemical	C114	Eye and Skin burns, oral and inhalation acute toxicity	Safety Glasses, Nitrile/Latex Free Gloves, Well Vented Area
Nitric Acid	Chemical	C1152 Modified	Severe skin burns and eye damage. May intensify fire, May be corrosive to metals.	Safety Glasses, Nitrile/Latex Free Gloves, Well Vented Area
Barium Chloride	Chemical	C114 Sulfide and Sulfate Determ.	Oral, skin and inhalation acute toxicity	Safety Glasses, Nitrile/Latex Free Gloves, Well Vented Area
Sodium Hydroxide	Chemical	C114 Acid Insolubles	Causes skin and Eye burns. May cause deep penetrating skin ulcers, blindness, and permanent damage to digestive tract.	Safety Glasses, Nitrile/Latex Free Gloves, Well Vented Area

CHEMICAL PROCUREMENT

All procured or distributed chemicals shall meet the following guidelines:

- When a chemical or substance is received, all involved and affected personnel shall be notified of the proper handling, storage, and disposal.
- Only containers with adequate labeling shall be accepted.
- Any shipment with broken or leaking containers shall be refused or opened in a chemical hood.
- Only the minimum amount needed of chemicals or substances shall be procured at once.
- Proper personal protective equipment and storage procedures shall be in place prior to receiving a shipment.

CHEMICAL STORAGE

General

To ensure that incompatible chemicals are not stored together, all chemicals shall be classified, and sub classified, as follows:

Solids – oxidizers, flammable solids (red phosphorus, magnesium, lithium), water reactive

Liquids – acids, oxidizers, flammables/combustibles, caustics and perchloric acid

Gases – toxic, inert and oxidizers, and flammables

Storage shall be provided for all chemicals that meets the following guidelines:

- Shelving shall be of sturdy construction with all appropriate lips and edges to prevent chemicals from falling or spilling.
- Chemicals shall be arranged in a logical manner to prevent combustion, explosions, or other hazardous events;
- Containers shall be arranged in a manner that allows for labels to be clearly visible;
- Chemicals shall not be stored on the countertop or floor where they can be easily knocked over;
- Flammable liquids shall be stored in a flammable liquids cabinet that is kept separate of oxidizers, strong acids, or water reactive chemicals;
- Materials sensitive to light shall be stored in containers intentionally designed to protect the chemicals from exposure to light.
- Corrosive materials shall be stored as low as possible and shall not be stored under sinks.

CHEMICAL WASTE COLLECTION

Refer and adhere to the TDOT Environmental Facility Compliance Standard and instructions in the TDOT The Yellow Book-2019.pdf for Chemical Waste Collection and Disposal.

General Requirements

Chemical wastes shall be collected for recycling or disposal near the point of creation with the following guidelines:

- Waste containers shall be clearly labeled
- Only compatible containers shall be used for each type of waste
- Incompatible types of waste shall be stored in separate containers
- Waste containers shall be segregated by the intended use

Periodic chemical inventories shall be conducted to find and dispose of chemicals that have been stored past their effective dates. Manufacturer specifications shall be used to determine the effective dates of chemicals and they shall be disposed of as necessary to prevent chemicals from decomposing.

Protection from Hazardous Substances

- A designated area shall be assigned for experiments or procedures involving particularly hazardous substances such as select carcinogens, reproductive toxins, or substances with a high degree of acute toxicity. All activities involving particularly hazardous substances shall be restricted to the designated area.
- Containment devices such as fume hoods, a glove box, or a closed system to limit exposure to hazardous gasses, airborne particulates, or other vapors, dusts, and mists shall be used to prevent employee exposure.
- Mechanical pipetting aids shall be used. Pipetting with the mouth shall be strictly prohibited.
- Employees working in the designated area shall remove protective equipment and wash their hands and forearms with soap and water before engaging in other activities or eating, drinking, smoking, or using the restroom.
- Working surfaces that may become contaminated from contact with hazardous substances shall be protected from such contamination.
- Wastes from particularly hazardous substances shall be placed in an impervious container that is compatible with the type of waste being discarded.
- Waste containers for particularly hazardous substances shall be labeled with the contaminant and the label “Cancer-suspect Agent” for carcinogens (note the most recent SDS and/or contact HQ OHS Division with questions).
- After working with particularly hazardous substances, employees shall decontaminate themselves and all PPE worn during work with the substance.

CHEMICAL WASTE DISPOSAL

All chemical waste shall be disposed of according to government regulations and manufacturer specifications. Drains and lab hoods shall not be used for chemical disposal; instead, use a designated storage area for chemical waste and dispose of all waste in a timely manner. All waste containers must be labeled in accordance with TDOT Environmental Department specifications.

Liquid Wastes

- The liquid waste shall be collected only into a compatible storage container.
- Only compatible materials shall be placed in the same container.
- All containers containing liquid waste shall be clearly and visibly labeled.

Employees shall ensure that all chemical reactions are complete before placing waste in a container.

- Containers shall remain closed unless new waste is being added.
- Secondary containment shall be available for all liquid wastes.

Solid Wastes

- Solid wastes shall only be collected in compatible containers.
- Only compatible materials shall be placed in the same container.
- All sharps and broken glass that may be contaminated by a hazardous chemical shall be placed in a puncture resistant container and properly sealed.

Gaseous Wastes

- Gasses shall be kept in cylinders or the original shipping containers.
- All gas cylinders shall be equipped with a valve or be empty with the valve removed.
- Containers shall be clearly and visibly labeled.

Proper Disposal Method for Acid and Basic Products Used in the HQ Material & Testing Labs

NOTE: Report any spills to the Lab Supervisor.

The following procedure will outline the general disposal method for the Acid and Base Solutions used in the Labs. The purpose is to ensure the acid has been neutralized to a proper PH level (between 5 and 8) before release. This process will be noted on the Laboratory Acid Disposal Log in Appendix "A".

PPE shall be worn at all time when handling an Acid or Base Solution. The PPE should include but not limit to gloves, apron and face shield or googles. Care should be taken around other chemicals and spill or slip hazards. A neutralizer should be added to any spill before clean-up to prevent disposal of the Acid or Base into the waste stream.

Determining the Existing and Final PH Level

1. First fill in the date, Lab location, type of acid or base solution present and an approximate volume of the solution in the Laboratory Acid Disposal Log.
2. The determination of the existing PH level of a solution will be by the use of a paper PH strip. One end of the strip is to be dipped into the solution and the strip color compared to the scale. This value is to be noted in the Laboratory Acid Disposal Log.

3. Once the existing PH level of the solution is determined, then a neutralizing agent will be added in amounts to change the PH level to a neutral level between values of 5 to 8. The final PH level is to be noted in the Acid Disposal Log along with the type of neutralizing agent used.

Disposal of the Neutral Solution in the Lab Sink Drain

1. Once the solution is in a neutral state (not acid or base), then the solution may be disposed of by pouring down the lab sink drain. During the disposal in the sink, the tap water shall be on and left flowing throughout the process. Let the tap water run until any solution has been flushed through the piping system.
2. Prior to disposal, remove any items from the sink and check that there is no under-sink attachments (disposals, grease traps, filters etc.) that may come in contact with the solution.
3. Care should be taken when pouring the solution into the sink to avoid any splash-out of the solution. The rate of entering the solution down the drain should not be more that the flow rate of tap water in the sink.

Proper Disposal Method for both Contaminated and Non-Contaminated Vinyl Lab Gloves Used in the HQ Material & Testing Labs

The following procedure will outline the general disposal method for the used vinyl lab gloves. The purpose is to insure possibly contaminated or oily material does not enter the general waste stream. The procedure is broken into two general parts. One for Labs routinely using possible contaminants. The second for those labs where the likelihood of being subjected to contamination would be unlikely.

Please note that under this procedure all gloves will be disposed of in a sealed trash bag.

Glove Disposal in Binder, Emulations and Chemical Labs

1. ALL vinyl gloves used in the above three labs will be disposed of into the **RED** disposal cans marked **"Vinyl Glove Disposal Only"** located within each lab.
2. Once the can is filled, the bagged gloves will be tied and placed in the 55 gallon metal container located in the Bulk Collection Area within Receiving.

Glove Disposal in Aggregate, Cement, Physical and Soils Labs

These labs, in their daily lab work, do not generate any contaminated, chemical or oily film on their vinyl gloves. Primarily these gloves only contact soil, dirt, rock dust, concrete dust or other such types of dusty material. For the most part these gloves will be disposed of in the normal waste cans (bagged). Again, no loose set or single glove will be disposed of where they are not within a sealed (tied) waste bag.

However, when the cleaning of equipment, greasing or bearings, applying glycine / graphite mixture or other similar work, those gloves will be disposed under the same requirements noted under the previous section.

VENTILATION

GENERAL

Proper ventilation shall be in place for each laboratory.

- There shall be a minimum of five air changes an hour.
- Operations that involve the use of toxic of flammable reagents shall be conducted under a properly designed chemical exhaust hood.
- Laboratory Chemical Hoods shall be inspected periodically to ensure proper functionality and face velocity.

CHEMICAL HOODS

The chemical hood is often the primary control device for protecting laboratory workers when working with flammable and/or toxic chemicals. OSHA's Laboratory standard (29 CFR 1910.1450) requires that fume hoods be maintained and function properly when used.

Before using a fume hood:

Read the hood labeling and do not use for chemicals if hood area is deemed for "Storage Only".

- Make sure that you understand how the hood works.
- You should be trained to use it properly.
- Know the hazards of the chemical you are working with; refer to the chemical's Safety Data Sheet if you are unsure.
- Ensure that the hood is on and functioning properly.
- Make sure that the sash is open to the proper operating level.
- Make sure that the air gauge indicates that the air flow is within the required range.

When using a Chemical Hood:

Workers should to do the following when using hoods.

- Remove unnecessary supplies from the work area.
- Keep all materials inside the hood at least six inches from the sash opening. Perform all work 6 inches inside the hood.
- When not working in the hood, close the sash. Do not permanently store any chemicals inside the hood.
- Position work supplies in their order of use, with those most frequently used near the front of the hood, but not closer than 6 inches from the face of the hood.
- Place equipment on approved elevated turntables for easy retrieval.
- Use diffused lighting to limit glare.
- Never allow your head to enter the plane of the hood opening. For example, for vertical rising sashes, keep the sash below your face; for horizontal sliding sashes, keep the sash positioned in front of you and work around the side of the sash.
- Use appropriate eye and face protection.

- Be sure that nothing blocks the airflow through the baffles or through the baffle exhaust slots.
- Elevate large equipment (e.g., a centrifuge) at least two inches off the base of the hood interior.
- Promptly report any hood that is not functioning properly to your supervisor. The sash should be closed and the hood “tagged” and taken out of service until repairs can be completed.
- When using extremely hazardous chemicals, understand your laboratory’s action plan in case an emergency, such as a power failure, occurs.

Periodic Inspections and testing of Hoods

Perform visual inspections before use. Operators should check the fume hood for visible airflow blockage such as large items or containers near the slot opening. Other daily inspections include holding a tissue at the opening to observe inward airflow, maintaining clean surfaces inside the hood, and keeping the sash at an appropriate height when working and not working in the hood.

Outside Vendor Inspections of Chemical Hood Systems- Periodic Checks

Items of immediate interest to lab personnel that are addressed in the codes and standards include:

1. Air flow
2. Monitoring/Alarms.
3. Maintenance/Inspection.
4. Exhaust.

1. Air Flow- Proper air flow at the face of the hood is probably the most common cause of confusion regarding fume hood operation. Here are what the codes and standards say:

OSHA: “General air flow should not be turbulent and should be relatively uniform throughout the laboratory, with no high velocity or static areas; air flow into and within the hood should not be excessively turbulent; hood face velocity should be adequate. (Typically 60-110 fpm.)”

ANSI/AIHA Z9.5: “Each hood shall maintain an average face velocity of 80-120 fpm with no face velocity measurement more than plus or minus 20% of average.”

SEFA: “Face velocities of laboratory fume hoods may be established on the basis of the toxicity or hazard of the materials used or the operations conducted within the fume hood. Note: Governmental codes rules and regulation may require specific face velocities. A fume hood face velocity of 100 fpm is considered acceptable in standard practice. In certain situations face velocity of up to 125 fpm or as low as 75 fpm may be acceptable to meet required capture velocities of the fume hood.”

2. Monitoring/Alarms- Many older labs are equipped with fume hoods that do not have air flow monitoring devices. The type of device is not specified, but according t the following codes and standards if you’re putting in a hood or remodeling an older one they are now a requirement.

OSHA: "….each hood should have a continuous monitoring device to allow convenient confirmation of adequate hood performance before use. If this is not possible, work with substances of unknown toxicity should be avoided or other types of local ventilation devices should be provided."

ANSI/AIHA Z9.5: "New and remodeled hoods shall be equipped with a flow-measuring device."

NFPA 45: "New and remodeled hoods shall be equipped with a flow-measuring device.

3. Maintenance/Inspection

As with all equipment maintenance is important to proper operation.

OSHA: "Quality and quantity of ventilation should be evaluated on installation, regularly monitored (at least every 3 months), and re-evaluated whenever a change in local ventilation devices is made."

ANSI/AIHA Z9.5: "A routing performance test shall be conducted on every fume hood at least annually or whenever a significant change has been made to the operational characteristics of the system"

NFPA 45: "When installed or modified and as at least annually thereafter, laboratory hoods, laboratory hood exhaust systems, and laboratory special exhaust systems shall be inspected and tested."

NFPA 45: "Special use laboratory hoods and special use local exhaust systems shall be identified to indicate their intended use." "A sign shall be affixed to each hood containing the following information from the last inspection: Inspection interval, Last inspection date, Average face velocity, location of fan that serves hood, Inspector's name. Exception: In lieu of a sign, a properly maintained log of all hoods giving the above information shall be deemed acceptable."

4. Exhaust- Knowing what the standards, rules and codes have to say on the exhaust can come in handy if you're experiencing odors in the lab or if you're considering a renovation or new facility.

ANSI/AIHA Z9.5: "Discharged in manner and location to avoid re-entry into the laboratory building or adjacent buildings at concentrations above 20% of the allowable concentrations inside the laboratory under any wind or atmospheric conditions." Exhaust stack: "Be in a vertical up direction at a minimum of 10 feet above the adjacent roof line as so located with respect to opening and air intakes of the laboratory or adjacent buildings to avoid re-entry."

NFPA 45: "Air exhausted from laboratory hoods and other special local exhaust systems shall not be re-circulated." "Air from laboratory units and laboratory work areas in which chemicals are present shall be continuously discharged throughout systems maintained at a negative pressure relative to the pressure of normally occupied areas of the building.

http://www.laboratorydesign.com/2017/02/17/a-guide-to-fume-hood-codes-and-standards/

DUST MITIGATION

Utilize dust collection hoods and devices whenever possible when producing dust during tests. When material samples must be cut in the preparation of test specimens, the wet cutting process shall be utilized to reduce dust generation.

MACHINE AND EQUIPMENT SAFETY

COMPRESSED GASES AND CYLINDERS

Compressed gases are a pressurized material or mixture in a cylinder, portable tank, or standing tank used in a variety of applications, including welding, refrigeration, heating, surgery, etc. Hazards associated with compressed gases include oxygen displacement, fires, explosions, and toxic gas exposures, as well as the physical hazards associated with high pressure systems. Special storage, use, and handling precautions are necessary in order to control these hazards. The following are compressed gases used in the Materials and Tests Lab.

- **Helium/Argon Mix**
- **Helium Only**
- **P-10 (Argon/Methane mix)**
- **CO2**
- **Compressed Air**
- **Nitrogen**

- Ensure all cylinders are inspected before use. Inspect cylinders to determine if they are in a safe condition to the extent that it can be determined by visual inspection.
- Only trained, authorized workers should use/handle compressed gases.
- Only trained, authorized vendor should conduct maintenance on a cylinder.
- Labels and markings must be present and not defaced. Do not accept, or use, containers whose content labels are not legible. Segregate these containers and return them to the supplier.
- Report leaks immediately and follow proper safe procedures.
- Prevent temperatures in the storage area from exceeding 125 degrees F.
- Separate cylinder storage from combustibles as specified by federal, state, and local regulations.
- Secure cylinders to prevent from tipping or falling over.
- Protect cylinders from cuts, punctures, or other abrasions of the metal, and keep heavy objects from striking or falling on them.
- Do Not store cylinders near walkways, elevators, stairs, unprotected platform edges.

- Prevent unauthorized persons from tampering with the cylinders.
- Only move compressed gas cylinders with a protective cap in place, unless the cylinder is mounted on a special truck and the cylinder is moved in an erect or nearly erect position.

RADIATION

- Only authorized personnel in the area.
- Technicians shall not operate radioactive devices without wearing their personal radiation dosimeter.
- Only authorized repair technicians will perform maintenance on radioactive devices.
- Additional questions regarding radiation safety should be directed to the HQ Radiation Safety Officer.

ELECTRICAL HAZARDS

Workers may be exposed to electrical hazards including electric shock, arc blasts, electrocutions, fires and explosions. Potential exposures to electrical hazards can result from faulty electrical equipment/instrumentation or wiring, damaged receptacles and connectors, or unsafe work practices.

- Always follow manufacturer's recommendations for using electrical equipment.
- Do not use electrical equipment to perform a task for which it is not designed.
- Most equipment includes either a 3-pronged plug or double insulation. Equipment with neither of these features is less safe but may meet electrical codes. You will not be protected from electric shock if a 3-pronged plug is not inserted into a 3-prong outlet.
- If you plug more than two pieces of low demand equipment into a standard outlet, use a fused power strip that will shut off if too much power is used.
- Make sure that any outlet near a sink or other water source is Ground-Fault Circuit Interrupter (GFCI) protected. If you have a GFCI, periodically test it by plugging something into it and pushing the "test" button. Once the equipment shuts off just turn it back on.
- NEVER disable any electrical safety feature.
- Before turning equipment on, check that all power cords are in good condition.
- Do not use extension cords as a substitute for permanent wiring.

If you see a person being electrocuted, **DO NOT TOUCH THEM**. The electricity can go through you, too. If possible, turn off the power (pull the plug or trip the circuit breaker), or use an item made of non-conductive material (e.g., wooden broom handle) to pry him or her away from the contact. Call 911 immediately.

HOT WORK

Hot work is any work that involves burning, welding, using fire- or spark-producing tools, or that produces a source of ignition.

Adhere to written safety program for Hot Work OHS-010 Hot Work Program.pdf for full requirements whenever spark producing tools/equipment and ignition sources are used within the lab environment.

POWERED INDUSTRIAL TRUCKS (PITs)

All employees operating a PIT working for the Materials and Tests Lab must meet all requirements in the safety written program OHS-007 Powered Industrial Truck Operation Program.pdf.

Employees must meet the following criteria before operating a powered industrial truck:

1. Be properly trained, and that training must be documented including the hands-on operator evaluation.
2. Perform the Daily Pre-Operational Inspection Checklist (or prior to the next use).
3. Wear seatbelt.

PORTABLE LADDERS AND WORK PLATFORMS

Refer to Section C for ladders in OHS-008 Walking Working Surfaces.pdf for full ladder usage requirements.

OSHA defines a “ladder” as a device with rungs, steps, or cleats used to gain access to a different elevation. Ladders come in three general types: (1) portable ladders, (2) fixed ladders, and (3) mobile ladder stands and stand platforms.

“Portable ladders” can be readily moved or carried, and usually consist of side rails jointed at intervals by steps, rungs, or cleats. Stepladders, straight ladders, and extension ladders are examples of portable ladders.

No modifications or alterations that affect the capacity, stability, safe operation, intended use, or structural integrity of the ladder may be made without the manufacturer’s written approval. If such modifications or alterations are made, the capacity, operation, and maintenance instruction plates, tags, or decals must be changed accordingly. In no case may the original safety factor of the ladder be reduced.

Pre-Use Inspection

Inspect equipment prior to use, take out of service any equipment with damages or issues.

Pre-Use Checklist			
Condition	**Y**	**N**	**Comments**
1. Is the ladder free of sharp edges and burrs?			
2. Ladder is free from corrosion and decay?			
3. Joints between rungs or steps and side rails tight?			
4. Side rails and rungs free of excessive dents or bends?			
5. Hardware and fittings in good condition?			
6. Safety feet and other auxiliary equipment in good condition?			
7. Free from oil, grease, or other slippery materials?			
Set-Up			
8. Ladder is used for the purpose it is designed?			
9. Ladder is on stable and level surface?			
10. Metal spreader and locking device is in place while open?			
11. Ladder is not loaded beyond the maximum intended load?			
Storage			
12. Is ladder stored in a secured manner preventing damage?			
Maintenance			
13. If ladder is damaged, is it tagged out and removed from service?			

Using the Ladder or Work Platform

When ascending or descending a ladder or rolling work platform, employees must maintain three points of contact at all times by:

- Facing the ladder,
- Using at least one hand to firmly grasp the ladder or handrail, and
- Not carrying any object or load that could cause them to lose balance and fall.

MACHINE GUARDING

One or more methods of machine guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by point of operation, ongoing nip points, rotating parts, flying chips and sparks. Examples of guarding methods are—barrier guards, two-hand tripping devices, electronic safety devices, etc.

General Requirements

Guards shall be affixed to the machine where possible and secured elsewhere if for any reason attachment to the machine is not possible. The guard shall be such that it does not offer an accident hazard in itself.

Point of operation guarding

Point of operation is the area on a machine where work is actually performed upon the material being processed. The point of operation of machines whose operation exposes an employee to injury, shall be guarded. The guarding device shall be in conformity with any appropriate standards therefore, or, in the absence of applicable specific standards, shall be so designed and constructed as to prevent the operator from having any part of his body in the danger zone during the operating cycle.
Special hand tools for placing and removing material shall be such as to permit easy handling of material without the operator placing a hand in the danger zone. Such tools shall not be in lieu of other guarding.

Typical tools and Machines that require point of operation guarding

Guillotine cutters, shears, alligator shears, power presses, and milling machines such as power saws, jointers, portable power tools, forming rolls and calendar barrels, containers, and drums. Revolving drums, barrels, and containers shall be guarded by an enclosure which is interlocked with the drive mechanism, so that the barrel, drum, or container cannot revolve unless the guard enclosure is in place.

Exposure of blades

When the periphery of the blades of a fan is less than seven (7) feet above the floor or working level, the blades shall be guarded. The guard shall have openings no larger than one-half ($^1/_2$) inch.

Anchoring fixed machinery

Machines designed for a fixed location shall be securely anchored to prevent walking or moving.

HAND AND POWER TOOLS

GENERAL FOR ALL TOOLS

Do not use hand and power tools unless you have been trained to do so.

1. Keep all tools in good condition with regular maintenance.
2. Use the right tool for the job.
3. Inspect each tool for damage **before use** and do not use damaged tools- report it to leadership, tag the tool and take the tool out of service.
    - No bends, cracks, breaks, mushroomed heads
    - Wooden handles are free of splinters and cracks, handles wedged tightly to tool head, cutting edges are sharp
2. Operate tools according to the manufacturers' instructions and training.
3. Use the proper PPE for the tool being used.
    - Eye and face protection
    - Gloves (must not pose an additional hazard- it depends on the tool being used)

UTILITY KNIVES

Utility knives have to be extremely sharp to do their job, utility knives are also extremely dangerous if not handled and stored properly.

- As many as one-third of all manual tool injuries have been attributed to utility knives like box cutters.
- Because blades need to be sharp to work effectively, they can also deliver dangerous cuts.
- It only takes a moment of inattention for a blade to slip and an employee to be injured.
- Co-workers can be injured, too, if a blade worker leaves a knife lying around with an open blade.

Choose the right blade for the job.

Utility knives come in many different shapes and forms, each designed for a specific purpose. Selecting the correct blade for the job is essential to ensure that the job can be completed correctly and safely. When selecting a utility knife consider the following:

1. **What type of material is being cut?**

   Cardboard, plastic, wood, etc.

2. **What type of edge is best for the purpose?**

   Fine-edged blades produce a smooth, clean cut. Serrated blades are better for cutting cardboard cartons and similar packing materials.

3. **Is the handle large enough to provide a secure grip?**

   This prevents the hand from slipping forwards over the blade and reduces the force required to hold the knife, which helps prevent musculoskeletal disorders (MSDs) (ergonomic related injuries).

4. **Is the handle designed to reduce excessive wrist bending?**

   The knife should be designed to do the job without undue pressure (which also helps prevent MSDs).

While using a utility knife, do the following:

- **Always cut in a motion away from the body, and away from other people.**

  This way, if the knife slips, it won't cut the worker or a person standing next to the worker.

- **Keep the other hand, fingers, and thumbs out of the way when cutting.**

  If you have to grip the object you are cutting, cut away from the hand and other body parts.

- **Stay focused on the cutting job.**

It only takes a second of inattention with a sharp blade to produce a serious cut. Letting the mind wander or talking with others while using a knife greatly increases the risk of an accident and injury. If you are interrupted while working with a utility knife:

1. Stop cutting
2. Retract the blade
3. Place the knife down on a secure surface before dealing with the interruption

Store utility knives safely by doing the following:

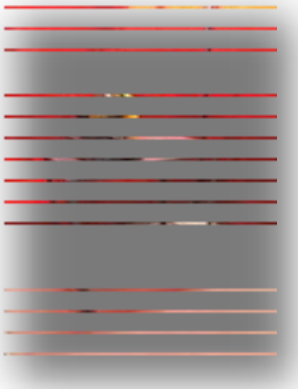
- Retract the blade or sheath an open blade before storing.
- Never leave a knife with the blade exposed on the floor, on a pallet, on a work surface, or in a drawer or cabinet.

DRILL PRESSES

Electric drill presses use a rotating bit to drill or cut holes in wood or metal. The holes may be cut to a desired preset depth or completely through the stock. Drill presses pose amputation hazards from direct contact with the bit, or clothing getting caught in the rotating parts.

- Stay away from the rotating chuck and swarf (shavings) that is produced by the drill bit. This can be accomplished in many ways, including using telescoping shielding that retracts as the drill bit contacts the piece.
- Install guarding over the motor, belts, and pulleys.
- Install an adjustable guard to cover the unused portion of the bit and chuck above the material being worked.
- Develop and implement safe work (operating) practices, such as removing the chuck immediately after each use, for drill press operations and conduct periodic inspections to ensure compliance.
- Train and supervise all operators until they can work safely on their own.
- Do not to wear gloves, jewelry, or loose-fitting clothing while operating a drill press and to secure long hair.
- Make sure that operators secure material to the drill press bed with clamps (work-holding equipment) before drilling, so that the material will not spin and strike the operator. The operator should not manually secure the work to the drill press bed while drilling holes.
- Replace projecting chucks and set screws with non-projecting safety-bit chucks and set screws.
- Anchor the machinery so it will not walk or tip during operation.

CHOP SAWS



A chop saw is essentially a lightweight circular saw mounted on a spring-loaded pivoting arm and supported by a metal base. Chop saws are considered the best saw to get very exact, square cuts.
The chop saw is operated by the user lining the saw blade with the user's mark. The user then positions the hands properly, clamping the wood to the fence with one hand and working the saw with the other. A trigger is depressed to activate the blade and the blade is pulled through the work piece. The left hand secures the material and the right hand stays firmly on the handle. Once the blade has been guided through the cut, the user guides the saw back to the upright position.

- DO NOT contact with the turning blade.
- Ensure that all guards are in place and working. If a guard seems slow to return to its normal position, adjust or repair it immediately.
- Use only recommended size and RPM rated blades.
- Maintain sharp blades.
- Always wear eye and face and hearing protection.

When Operating chop saws on rebar and other materials within the lab, a welding screen must be used due to sparking which results in Hot Work. Adhere to written safety program for Hot Work OHS-010 Hot Work Program.pdf for full requirements.

HORIZONTAL BAND SAW

A horizontal band saw uses a thin, flexible, continuous steel strip with cutting teeth on one edge. Horizontal band saws are used primarily for cutting metal stock, such as angle iron and other round and flat stock. The blade runs horizontally on two pulleys through two separate guides.

The operator secures the stock on the table and manually assists the saw as it cuts.

Serious cuts or amputations can occur if the operator contacts the blade. Extreme caution is necessary because the operator's hands may come close to the saw blade, and the entire run of the blade cannot be fully guarded.

Guard the entire blade except at the point of operation (the working portion of the blade between the two guides). Band saw wheels must be fully encased.

Make sure the saw includes a tension-control device to indicate proper blade tension.

HANDHELD DRILLS

A handheld drill uses a multiple-cutting-edged rotating tool to remove wood and produce a hole in the stock. Normally, drills have variable speeds and feeds.

The drill operator may or may not be a skilled worker. The common drill is often used by anyone in the shop and injuries can occur because of carelessness. The operator must position the stock, install the drill, operate the drill, and maintain housekeeping. The operator also must also change speeds and feeds when required.

One of the most common causes of accidents involving a drill is poor operator judgment. Often the operator will attempt to hand-hold the stock while drilling. When the drill enters the work, it can catch and twist the stock from the operator, which results in an uncontrolled rotating piece of wood or other material. Other point-of-operation hazards include the rotating drill, which is rarely guarded, and hot chip generation.

Guarding at the point of operation is difficult because of the nature of the drilling process. The drill gradually feeds into the work, it is changed very often, chips must be able to escape, and the stock must be moved around. All of these factors reduce the possibility of using guards on the drill. If guards are used, they probably will have to be removed during the actual drilling process. Whenever possible, a hold-down fixture should be used rather than the hands.

WET CUT SAW

- Wear eye protection at a minimum.
- Ensure the saw is connected to a GFCI outlet.
- Ensure all guards are in place while in use.
- Wear hearing protection while using saw.
- Do not wear loose clothing or jewelry that could be pulled into the saw.

OCCUPATIONAL ILLNESS PREVENTION

HEARING CONSERVATION AND NOISE

Use double hearing protection (ear plugs and earmuffs) when using concrete wet saw in the Physical Lab.

Ensure that closet doors are closed when conducting noise producing tests like the following examples:

- Mechanical Shakers
- Marshall hammer compaction
- LA Abrasion Testing
- Pellet Grinder for pressed pellet making
- Paint Shaker

Use hearing protection when operating tools like the following:

- Power tools such as saws

ERGONOMICS

Laboratory workers are at risk for repetitive motion injuries during routine laboratory procedures such as pipetting, using various lab instruments and keyboarding at computer workstations. Repetitive motion injuries develop over time and occur when muscles and joints are stressed, tendons are inflamed, and nerves are pinched, and blood flow is restricted. Working in awkward positions in laboratory hoods and cabinets can also present ergonomic problems.

A worker's back is composed of three natural curves that form an S-shape. When the three natural curves are properly aligned, ears, shoulders and hips are in the same plane. Poor posture may lead to pain and serious injury.

To avoid ergonomic-related risk factors:

- Use a chair that provides good back support and sit against the back of the chair.
- Lower the chair or adjust the foot ring or get a footrest, if their feet dangle.
- Tilt the seat forward or use a seat wedge when working in a forward posture; do not jut their chin forward when working. Adjust the position of their work, the work surface, or the chair so that they sit in an upright, supported position.
- Always try to work at a bench cut out; cut outs can help workers get close to their work while sitting against the back of their chair.
- Use supportive shoes and cushioned mats if required to stand for long periods.
- Keep frequently used trays and supplies within close reach.

Keep Arms and Hands Relaxed

Too much tension in the body can cause ergonomic related injuries.

Keep shoulders relaxed and their elbows close to their sides when working. Avoid reaching to use instruments and work materials.

- Maintain neutral wrist and arm postures when working; work with their wrists in a neutral or straight position as if they were shaking hands with someone.

Sit close to their work area, keep objects close and adjust their chair to match the height of the bench.

Avoid repetitive or forceful twisting and turning motions (e.g., opening valves or adjusting microscopes).

Select equipment and tools that are the right size for their hands.

Use padding and tubing to reduce pressure and force when working. For example, use rubber tubing or forceps to increase diameter and reduce pinch force. Soften sharp edges on work surfaces with padding.

Use thin, flexible gloves that fit properly. Ill-fitting and poorly designed gloves increase pinch and grip forces when working.

Static Postures

Workers should be encouraged to vary activities, change their position, and take short breaks every 20 minutes to rest muscles and increase blood circulation.

Shift their weight often when standing to work. Use a stool or shelf to prop up a foot to relieve pressure on their back.

Alternate how they hold objects like forceps. To vary the task, workers can alternate holding with the thumb and index finger, and with the index and middle fingers.

Pipetting

Elevate chair rather than reaching up to pipette.

Do not twist or rotate wrist while pipetting.

Alternate hands or use both hands to pipette.

Hold the pipetter with a relaxed grip.

Use electronic pipettes or light touch models whenever possible.

Use minimal pressure while pipetting.

Use a light amount of force or two hands to change tips.

Use low profile tubes, solution containers and waste receptacles.

Select a lightweight pipetter, properly sized for their hand.

Use pipetters with finger aspirators and thumb dispensers to reduce thumb strain.

Use latch-mode or electronic pipetters for repetitive pipetting.

Take a 1-2 minute break after every 20 minutes of pipetting.

Using Computers

Use adjustable keyboard platforms under lab benches that accommodate use of the mouse beside the keyboard.

Where possible, position computer workstations in corners or other areas away from doors, entrances and passageways.

Place monitor so their viewing distance is between 18 and 30 inches.

Place monitor so the top of the screen is approximately at eye level. This allows the eyes to gravitate naturally toward the center of the screen.

Use a document holder placed adjacent to and in the same plane as the computer screen.

Use footrests, where possible, in order to allow them to change leg positions throughout the day.

Use an appropriate keyboard, mouse or other input devices if they have existing musculoskeletal problems.

Take mini-breaks of 3 to 5 minutes for every 20-30 minutes of keyboarding or mouse work. These breaks can be spent doing mild hand exercises or stretches.

Not to switch from computer keyboarding to pipetting activities (or vice versa) without an adequate break (at least 15 minutes) to allow the hands to recover.

The physical and health hazards associated with chemicals used in the work area.

Protective measures that may be taken to protect employees from exposure and other hazards.

Methods to detect the presence or release of a hazardous chemical.

Proper technique to flush the eyes or skin in the case of chemical contact.

Employees shall be instructed in these procedures upon initial assignment, periodically and whenever the procedures are revised or when:

There is reason to believe the employee lacks the skill or understanding to work safely and poses greater hazard to themselves or other employees.

There is a change in the equipment used.

OTHER REQUIRED WRITTEN SAFETY PROGRAMS AND LINKS

INCIDENT REPORTING

To access the SharePoint forms for reporting a personal injury report, property damage report, or instructions for Vehicle Accident Reports within a TDOT vehicle and member of the public click the following link.

Report an Incident (sharepoint.com)

WALKING-WORKING SURFACES

A walking-working surface is any horizontal or vertical surface on or through which an employee walks, works, or gains access to a work area or workplace location. These are areas where slips, trips, and falls can occur.

This TDOT OHS Program will include the following sections and key definitions for each topic will reside in each section:

A. **General requirements for Walking/Working Surfaces and Fall Protection under the OSHA Standards for General Industry and Construction**

B. Aisles, Walkways and Floors
C. Ladders
D. Stairways
E. Dockboards

Refer to OHS-008 Walking Working Surfaces.pdf for all requirements.

BLOODBORNE PATHOGENS (BBP) PROGRAM

Employees may be exposed to microorganisms that can cause diseases such as HIV and hepatitis B which spread through contact with infected blood or blood products.

All employees should have an awareness level understanding of BBPs with the following training:

- What is a bloodborne pathogen.
- What are the hazards of exposure and how you can be exposed.
- How we take universal precautions.
- What to do if an exposure occurs at work.

Click the following link to access the TDOT 305-02 Bloodborne Pathogens Program.pdf policy document.

ADDITIONAL LINKS TO SHAREPOINT

Occupational Health and Safety (sharepoint.com)

Environmental Division (sharepoint.com)

Appendix A

A digital copy of the log can be accessed by the following:

N:\HQM&T LABS\M&T Laboratory Safety Manual\Forms – Logs

Laboratory Acid/Base Disposal Log

NOTE: Target PH Level for Disposal is a Value Between 5 and 8

Date	Location / Lab	Type of Acid or Base Tested	Approximate Sample Volume	Neutralizer Used	Beginning Acid/Base PH	Final Acid/Base PH at Disposal

Occupational Health & Safety Division: Safety Written Program		
OHS-012 Confined Space Entry Program	**Issued: 10/01/2023**	**Revised:**

I. Introduction

Many safety hazards are present when executing confined space entries such as asphyxiation, engulfment, falls, and burns. If entry is not performed properly, injury and death can occur. Well over half the injuries and deaths occurring during confined space entry accidents happen because co-workers rushed into an unsafe space to rescue a worker in distress without the proper preparation and protection.

The purpose of this written Confined Space Entry Program is to protect the health and safety of TDOT workers who must enter and/or work close to a confined space. The following are confined spaces typically present for TDOT workers:

- ☐ Bridge Spaces
- ☐ Culverts
- ☐ Catch Basins and Manholes
- ☐ Facility, Specialty, and Vessel Spaces
- ☐ Caves
- ☐ Sinkholes

TDOT will comply with OSHA Subpart AA -- 29 CFR 1926.1200 for construction activities and 29 CFR Part 1910.146 for General Industry activities.

II. Definitions

Acceptable Entry Conditions means the conditions that must exist in a permit space before an employee may enter that space, to ensure that employees can enter and safely work in the space.

Alternate Entry Space means all physical hazards have been eliminated and the only hazard that remains existing is a possible hazardous atmosphere (potential or present). This entry method requires forced air ventilation to keep hazardous atmospheres at safe levels and required continuous monitoring. TDOT will test the atmosphere before entry and continuously monitor the atmosphere for the duration of work within the space with (4) gas meters provided by the Safety Office. **See Appendix C monitoring the form.**

Authorized Entrant means an employee who is trained in Confined Space Entry AND authorized by the entry supervisor to enter a permit space.
NOTE: For TDOT workers this would only be trained entrants entering Alternate Entry Spaces or Non-Permit confined Spaces.

Competent Person means one who is trained in Confined Space Entry under the OSHA Standards and is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, AND who has the authorization to take prompt corrective measures to eliminate them. (Competent persons possess "T.E.A." Training, Experience, and Authorization. The OHS Division will determine and track who qualifies as competent persons.)

Confined Space means ALL of the following criteria must apply to be classified:

1. The space is large enough and so configured that an employee can bodily enter it
2. The space has limited means of entry and exit
3. The space is NOT designed for continuous occupancy

Note: **Limited/Restricted means of entry/exit exists if an entrant's ability to escape in an emergency would be hindered.** For example a space with a door leading in but also has pipes, conduits, ducts, or materials and equipment that must be crawled over or squeezed around in an escape to the exit.

Entry Supervisor means the qualified and competent person responsible for determining if acceptable entry conditions are present at a permit space where entry is planned for authorizing entry and overseeing entry operations, and for terminating entry as required by the standard. Entry supervisors will be trained members of the OHS Division or trained competent persons authorized by the OHS Division to be Entry Supervisors.
NOTE: For TDOT workers this would only be entrants entering Alternate Entry Spaces or Non-Permit confined Spaces.

Hazardous Atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, and impairment of the ability to self-rescue (that is, escape unaided from a permit space), injury or acute illness from one or more of the following causes:

1. Flammable gas, vapor, or mist above 10 percent of its lower flammable limit (LFL)
2. Airborne combustible dust at a concentration that meets or exceeds its LFL; This concentration may be approximated as a condition in which the combustible dust obscures vision at a distance of 5 feet or less.
3. Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent
4. The atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in Subpart D Occupational Health and Environmental Control or in Subpart Z-Toxic and Hazardous Substances of this part and which could result in employee exposure in excess of its dose or permissible exposure limit
5. Any other atmospheric condition that is immediately dangerous to life or health.

Non-Permit Confined Space means a space that meets the criteria of a confined space but does not meet the requirements of a permit-required confined space under the standard. There are no physical hazards present and no potential for a hazardous atmosphere. TDOT will test the atmosphere before entry and continuously monitor the atmosphere for the duration of work within the space with the (4) gas meters provided by the Safety Office. **See Appendix B for the monitoring form.**

OHS Division- the TDOT OHS Division as stated within this written program is comprised of the HQ OHS Division and respective Regional Safety Staff. All members of the OHS Division have been competent persons trained under the standard for Confined Space Entry.

Permit Required Confined Space (PRCS) means a confined space that has one or more of the following characteristics:

1. A hazardous atmosphere
2. Has an internal configuration danger
3. Potential for engulfing an entrant
4. Contains any other recognized serious safety or health hazard

NOTE: TDOT workers are prohibited from entering permit-required confined spaces (PRCS).

Physical Hazard-means existing or potential hazard that can cause death or serious injury or serious physical damage. Examples include but are not limited to the following: explosives, mechanical, electrical, hydraulic and pneumatic energy; radiation, temperature extremes, engulfment, noise, or inwardly converging surfaces. It also includes chemicals that can cause death or serious physical damage through skin or eye contact (rather than inhalation- atmospheric hazard).

III. Classification of Confined Spaces

A. Non-Permit Confined Spaces and Alternate Entry Confined Spaces

All confined spaces must be classified as PRCS unless deemed **Non-Permit Confined Spaces** or **Alternate Entry Confined Spaces** by the HQ OHS Division/Regional Safety Offices or their designated competent persons under the standard.

Bridge Spaces

Typical Spaces

- Tub girders as a part of the structure
- Arches – hollow cavities or areas specific for internal access required for entry and inspection
- Concrete Box Girders
- Bridge and Dam structure combinations with internal access

- Other, completely enclosed spaces, through access hatches or portals, not intended for continuous occupancy

The following must be observed, measured, and verified, by the Entry Supervisor before entry:

- ☐ Atmospheric testing must occur before entry as well as continuous monitoring throughout the duration of the entry to inspect bridge spaces.
- ☐ Assess ventilation needs- opening hatches, forcing air in by fans or duct fans
- ☐ Observe there is no presence of dead, dying, or decaying vegetation, animals, or other organic materials
- ☐ Observe and verify there is no standing, stagnant, or visually contaminated water
- ☐ Assess any Internal bridge configuration components creating hazards
- ☐ Assess access points
- ☐ Assess the condition of the bridge deck
- ☐ Assess potential engulfment hazards
- ☐ Ensure entrants performing the work are authorized under OHS-012 and have completed CSE Training

NOTE: TDOT employees are prohibited from bodily entering into Permit Required Confined Spaces that cannot be reclassified.

B. Permit Required Confined Spaces with Non-Entry Methods

Certain spaces will remain classified as PRCS, and non-entry methods shall be utilized if TDOT is performing the work. If work inside the space must be performed, the use of an outside contractor who fully complies with the standard for PRCS will be required.

*Note: The following Confined Spaces are classified as **PRCS,** and no bodily entry shall be allowed.*

1. Catch Basins and Manholes

Taking measurements, clearing debris, cleaning sediment, or performing structure maintenance (i.e. grouting)

Non-Entry Methods (Examples)

- ☐ Taking Measurements with electronic devices, tape measures, survey/grade rods, etc.
- ☐ Clearing Debris by using mechanical means (backhoe, grapple, claw/clamp)
- ☐ Cleaning/Clearing Sediment using vacuum truck, mechanical means, and methods, flushing water (pump pressure, head pressure) long reach rods, poles, post hole diggers (Utility Company)
- ☐ Structure Maintenance (Grouting)- use an on-call contractor with CSE written program for PRCS

2. Culverts and Pipes

Box culverts and pipes (not designated National Bridge Inspection Standard, NBIS) with the following characteristics will be PRCS under TDOT standards and no bodily entry is allowed:

- ⇒ When inside dimensions (any individual barrel or interior space) are less than **5 feet height X 5 Feet wide and greater than 100 feet long**
- ⇒ Round Culverts are required to be **60 inch or greater diameter** before any consideration of entry.
- ⇒ Greater than **3 inches** of standing or moving water inside the structure or pipe requires acceptable means of mitigation for drowning including but not limited to:
  - Entering with a buddy/co-worker (buddy should be within eye distance)
  - Using boats/watercraft- refer to 1926.106 Working over or near water

Note:

- Structures with inside dimensions larger than 5 feet X 5 feet and up to 8 feet X 8 feet must still be initially classified as PRCS until deemed otherwise under section **III. A.** of this written program for Non-Permit Required Confined Spaces and Alternate Entry Confined Spaces.
- Refer to **Appendix D** for visual summaries on the *Confined Space Entry, Bridge, Box Bridge and Culvert Guidance* document AND *Confined Space Structure Entry Determination Table* for opening dimensions and culvert length requirements.

Non-Entry Methods (Examples)

- Visual Observations were taken from the inlet and outlet
- Measurements are taken from outside the culvert
- Internal measurements and observations made by a camera, remote control units made for the exploration of cavities, or other technology allowing for visual observation

3. Facility, Specialty, and Vessel Spaces

Typical spaces

- Air handling systems including cooling towers
- Roof and false ceiling access areas
- Closets (electrical or other types- depending on the nature of the hazard)
- Crawl spaces
- Oil Water Separator Pits/drainage sewers
- Brine tanks, paint tanks, and vessels
- Vehicle and equipment-related spaces

Non-Entry Methods (Examples)

- Use outside contractor/vendor with Confined Space Safety Program
- Inspect visually from outside space
- Use camera technology, if applicable

IV. Confined Space Entry Planning Requirements

1. Work Crews check schedules for upcoming potential work within a confined space.
2. Supervisor/Manager notifies Regional Safety Office or designated competent person or HQ OHS Division (if applicable) to facilitate the pre-job CSE planning for spaces reasonably expected to be reclassified to Non-Permit Required Spaces or Alternate Entry Spaces.
3. Safety Office or designated competent person submits a plan to HQ OHS Division for review *prior* to entry for TDOT employees or PRCS contracted work using the Confined Space Entry Planning template document in **Appendix A** for the following spaces**:**
    - ☐ Bridge Spaces
    - ☐ Facility, Specialty, and Vessel Spaces

NOTE: No Confined Space Entry will occur until signed off by the OHS Division or designated competent person(s).

Appendix A

Printable version can be downloaded from TDOT Safety Manual or OHS SharePoint Written Programs, Policies, and Guidance.

Confined Space Entry (CSE) Planning

Planned Inspection Date:		**Bridge, Facility, Specialty or Vessel Confined Space Location:**	
Latest/Relevant Bridge Inspection Packet Received and Reviewed?	*Y or N*	**Planned Entrant(s)** *(training confirmed)* **Contractor Name** *if applicable*	
4-Gas Meter(s) Available and Ready?		**Meter(s) Planned for Use** (Model, Assigned Crew or Safety Office etc.)	
Air Monitoring Forms		*Non-Permit Required or Alternate Entry*	
Potential Hazards and Considerations		**Notes/Planned Actions for Safe Entry**	
Internal Configuration Hazards *Bridge Spaces Facility, Specialty, and Vessels (with Outside Contractor Entry)*			
Access Points Assessed			
Condition of Bridge Deck *If applicable*			
Ventilation Needs Assessed and recommended actions for space			
Animal presence assessed			
Potential Engulfment Hazards			
Rescue Planning (if applicable)			
Additional Notes			

DT-1983 RDA SW25

Appendix B

Printable version can be downloaded from TDOT Safety Manual or OHS SharePoint Written Programs, Policies, and Guidance.

Confined Space Non-Permit Required

This non-permit certificate may be used for confined spaces that pose no actual or potential atmospheric hazard above safe levels and if all non-atmospheric hazards can be eliminated without entry into the space. If the space must be entered to eliminate non-atmospheric hazards, the initial entry must be done in full compliance with the requirements of the confined space entry permit. If an atmospheric or non-atmospheric hazards is observed, personnel must exit the space immediately and the space must be reevaluated.

Date/Time:	Certification Expires Date/Time:

Space Location Description:

Purpose of Entry:

Certificate Requirements

- ☐ Actual or potential atmospheric hazard above acceptable safe levels do not exist in this space.
- ☐ Non-Atmospheric hazards do not exist in this space or have been eliminated without entry.
- ☐ Entrants are informed to exit the space if any hazard is observed.

Atmospheric Testing Required (Prior to Entry)

Record applicable readings	Oxygen 19.5%-23.5%	CO2 <5000 PPM or .50%	LEL<10%	H2S <5 PPM	CO <25 PPM
Time	Reading	Reading	Reading	Reading	Reading

Tests Performed By: _____

Certification

I hereby certify that based on the foregoing test results, the confined space described in this certification is classified as a non-permit space.

- ☐ Non-Permit Confined Space: the foregoing results indicate that all permit regulated atmospheric hazards have been permanently removed.

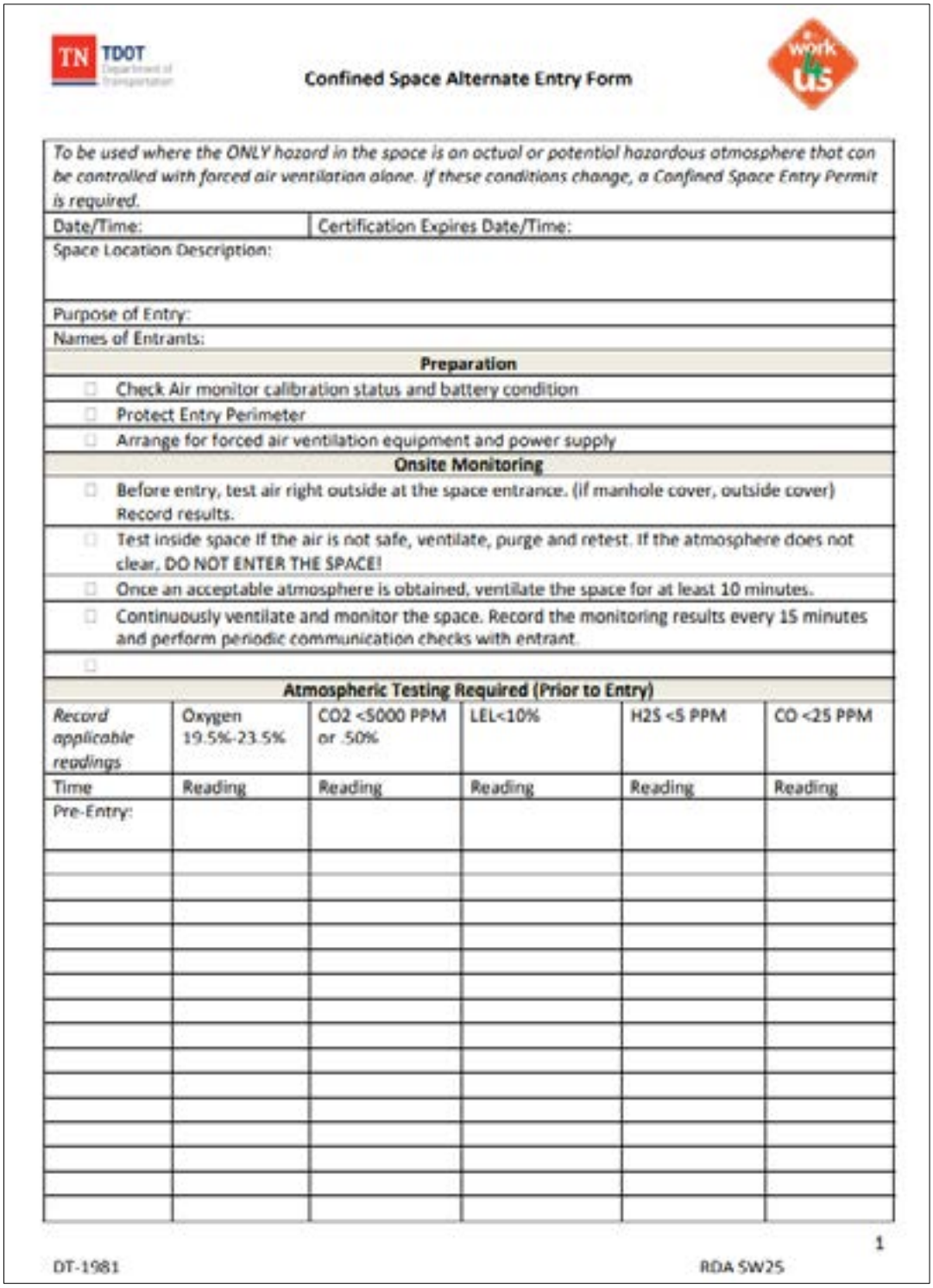
_____

Entry Supervisor Date

DT-1980 RDA SW25

Appendix C

Printable version can be downloaded from TDOT Safety Manual or OHS SharePoint Written Programs, Policies, and Guidance.



TN TDOT Department of Transportation

Confined Space Alternate Entry Form

To be used where the ONLY hazard in the space is an actual or potential hazardous atmosphere that can be controlled with forced air ventilation alone. If these conditions change, a Confined Space Entry Permit is required.	
Date/Time:	Certification Expires Date/Time:
Space Location Description:	
Purpose of Entry:	
Names of Entrants:	
Preparation	
☐ Check Air monitor calibration status and battery condition	
☐ Protect Entry Perimeter	
☐ Arrange for forced air ventilation equipment and power supply	
Onsite Monitoring	
☐ Before entry, test air right outside at the space entrance. (if manhole cover, outside cover) Record results.	
☐ Test inside space If the air is not safe, ventilate, purge and retest. If the atmosphere does not clear, DO NOT ENTER THE SPACE!	
☐ Once an acceptable atmosphere is obtained, ventilate the space for at least 10 minutes.	
☐ Continuously ventilate and monitor the space. Record the monitoring results every 15 minutes and perform periodic communication checks with entrant.	
☐	

Atmospheric Testing Required (Prior to Entry)					
Record applicable readings	Oxygen 19.5%-23.5%	CO2 <5000 PPM or .50%	LEL<10%	H2S <5 PPM	CO <25 PPM
Time	Reading	Reading	Reading	Reading	Reading
Pre-Entry:					

1

DT-1981 RDA SW25

Appendix C
Continued

Record applicable readings	Oxygen 19.5%-23.5%	CO2 <5000 PPM or .50%	LEL<10%	H2S <5 PPM	CO <25 PPM
Time	Reading	Reading	Reading	Reading	Reading

Tests Performed By: _____

Certification

I hereby certify that based on the foregoing test results, the confined space described in this certification is classified as a non-permit space.

☐ Non-Permit Confined Space: the foregoing results indicate that all permit regulated atmospheric hazards have been permanently removed.

_____

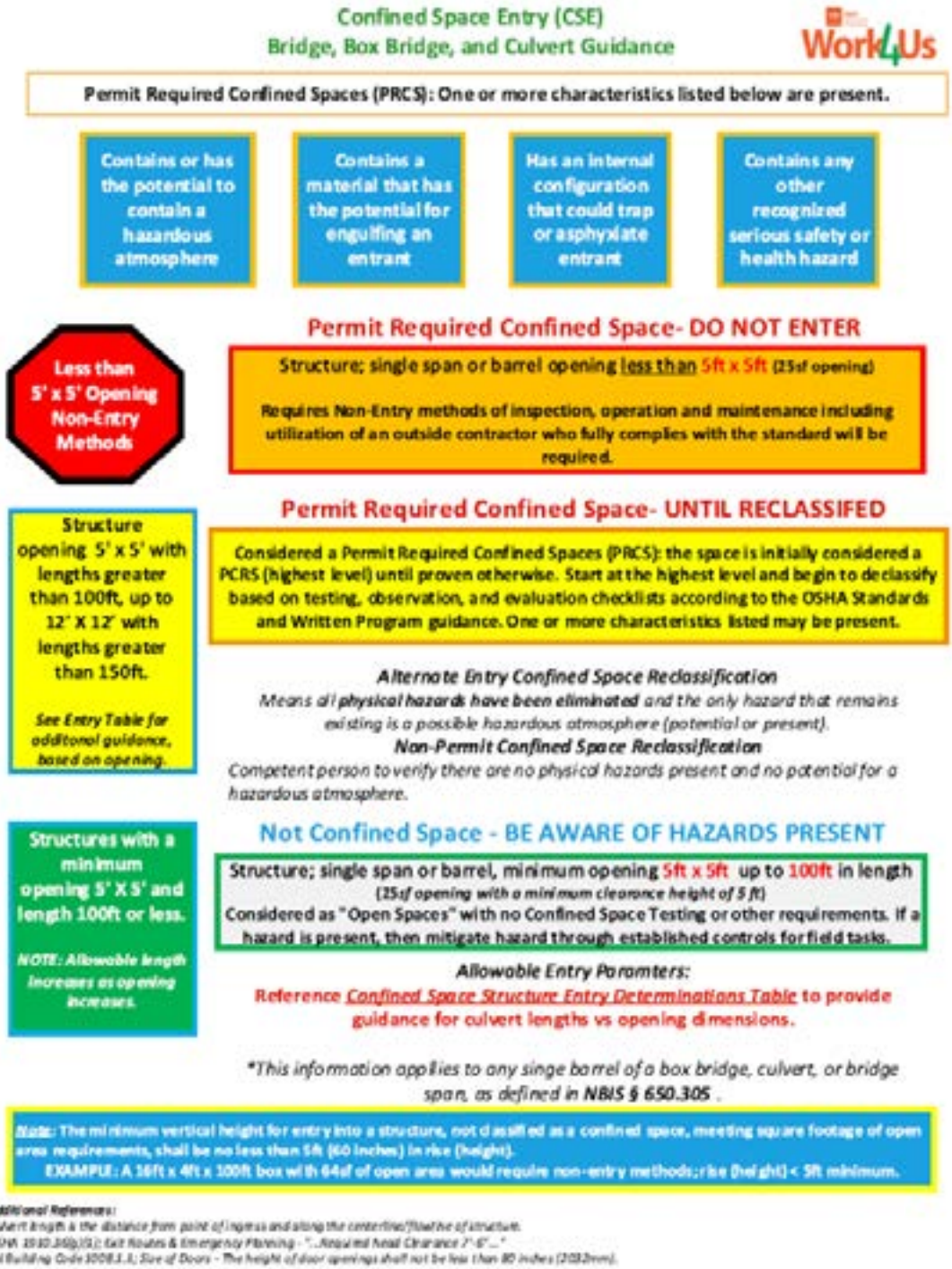
Entry Supervisor Date

2

DT-1981 RDA SW25

Appendix D

Printable version can be downloaded from TDOT Safety Manual or OHS SharePoint Written Programs, Policies, and Guidance.



Appendix D Continued

Printable version can be downloaded from TDOT Safety Manual or OHS SharePoint Written Programs, Policies, and Guidance.

Confined Space; Structure Entry Determinations

*The allowances within this table are to be used as pre-work planning guidance. Any changes in conditions or hazards present require consultation of written program requirements.

Applies to any single barrel of a box bridge, culvert, or bridge span, as defined in NBIS, 650.305.

1. Regardless of span, the rise (height) must be 5ft or greater to enter structure.
2. It is recommended to conduct work from inlet and outlet end of structures and culverts 100ft or greater in length.

Round Culverts require a 60 inch (5ft) or greater diameter before any consideration of entry.

Legend:
- Red: *Non-entry methods required*
- Yellow: *Non-Permit Required with hazard elimination and declassification prior to entry. Monitor Air, at a minimum.*
- Green: *Not considered a PRCS. Work task hazards mitigated with established controls.*

Revised 9-29-23

Confined Space Entry (CSE)
Bridge, Box Bridge, and Culvert Guidance

Permit Required Confined Spaces (PRCS): One or more characteristics listed below are present.

- Contains or has the potential to contain a hazardous atmosphere
- Contains a material that has the potential for engulfing an entrant
- Has an internal configuration that could trap or asphyxiate entrant
- Contains any other recognized serious safety or health hazard

Less than 5' x 5' Opening Non-Entry Methods

Permit Required Confined Space- DO NOT ENTER

Structure; single span or barrel opening less than 5ft x 5ft (25sf opening)

Requires Non-Entry methods of inspection, operation and maintenance including utilization of an outside contractor who fully complies with the standard will be required.

Structure opening 5' x 5' with lengths greater than 100ft, up to 12' X 12' with lengths greater than 150ft.

See Entry Table for additonal guidance, based on opening.

Permit Required Confined Space- UNTIL RECLASSIFED

Considered a Permit Required Confined Spaces (PRCS): the space is initially considered a PCRS (highest level) until proven otherwise. Start at the highest level and begin to declassify based on testing, observation, and evaluation checklists according to the OSHA Standards and Written Program guidance. One or more characteristics listed may be present.

Alternate Entry Confined Space Reclassification

*Means all **physical hazards have been eliminated** and the only hazard that remains existing is a possible hazardous atmosphere (potential or present).*

Non-Permit Confined Space Reclassification

Competent person to verify there are no physical hazards present and no potential for a hazardous atmosphere.

Structures with a minimum opening 5' X 5' and length 100ft or less.

NOTE: Allowable length increases as opening increases.

Not Confined Space - BE AWARE OF HAZARDS PRESENT

Structure; single span or barrel, minimum opening 5ft x 5ft up to 100ft in length
(25*sf opening with a minimum clearance height of 5 ft*)
Considered as "Open Spaces" with no Confined Space Testing or other requirements. If a hazard is present, then mitigate hazard through established controls for field tasks.

Allowable Entry Paramters:

Reference *Confined Space Structure Entry Determinations Table* to provide guidance for culvert lengths vs opening dimensions.

This information appllies to any singe barrel of a box bridge, culvert, or bridge span, as defined in **NBIS § 650.305 .*

Note: **The minimum vertical height for entry into a structure, not classified as a confined space, meeting square footage of open area requirements, shall be no less than 5ft (60 inches) in rise (height).**
EXAMPLE: A 16ft x 4ft x 100ft box with 64sf of open area would require non-entry methods; rise (height) < 5ft minimum.

Additional References:

Culvert length is the distance from point of ingress and along the centerline/flowline of structure.
OSHA 1910.36(g)(1); Exit Routes & Emergency Planning - "...Required head Clearance 7'-6"..."
TN Building Code 1008.1.1; Size of Doors - The height of door openings shall not be less than 80 inches (2032mm).

Confined Space; Structure Entry Determinations

***The allowances within this table are to be used as pre-work planning guidance. Any changes in conditions or hazards present require consultation of written program requirements.**

Applies to any single barrel of a box bridge, culvert, or bridge span, as defined in NBIS, 650.305.

1. Regardless of span, the rise (height) must be 5ft or greater to enter structure.
2. It is recommended to conduct work from inlet and outlet end of structures and culverts 100ft or greater in length.

- *Non-entry methods required*
- *Non-Permit Required with hazard elimination and declassification prior to entry. Monitor Air, at a minimum.*
- *Not considered a PRCS. Work task hazards mitigated with established controls.*

Round Culverts require a 60 inch (5ft) or greater diameter before any consideration of entry.

Distance from Point of Ingress (ft)

Structure Opening (ft) span x rise	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-110	111-120	121-130	131-140	141-150	>150ft
1x1																
2x2																
3x3																
4x4																
5x5																
6x6																
7x7																
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16x16																
17x17																
18x18																
19x19																
20x20																
>20ft																

TN TDOT Department of Transportation **DEPARTMENTAL POLICY** **State of Tennessee** **Department of Transportation**	**Policy Number: 305-01** **Effective Date: June 1, 2018**
Approved By:	**Supersedes: Policy No. 101-03, March 1, 2012**
SUBJECT: Personal Protective Equipment	

RESPONSIBLE OFFICE: Occupational Health and Safety Division

AUTHORITY: T.C.A. § 4-3-2303; T.C.A. § 50-3-101, et seq., Occupational Safety and Health Act of 1972; 29 CFR 1910.132, Occupational Safety and Health Standards for General Industry, Subpart I, Personal Protective Equipment; 29 CFR 1926.95, Occupational Safety and Health Standards for the Construction Industry, Subpart E, Personal Protective and Life Saving Equipment; Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition, Chapter 6D. If any portion of this policy conflicts with applicable state or federal laws or regulations, that portion shall be considered void. The remainder of this policy shall not be affected thereby and shall remain in full force and effect.

PURPOSE: To provide a policy for the use of personal protective equipment (PPE) by Tennessee Department of Transportation (TDOT) employees when there is potential for exposure to hazardous conditions.

APPLICATION: TDOT employees who are exposed to workplace hazards requiring the use of PPE in order to protect them from injury are covered under this policy.

DEFINITIONS: Personal Protective Equipment (PPE) Equipment intended to keep employees safe from recognized hazards that are causing, or are likely to cause, harm, serious injury, or death that cannot be eliminated through administrative and engineering controls.

POLICY: It shall be the policy of the Tennessee Department of Transportation to adhere to the following requirements regarding the use of Personal Protective Equipment. It shall be the responsibility of the individual employee to abide by this policy and the responsibility of supervisors to administer this policy. Failure to adhere to this policy may result in the denial of Worker's Compensation benefits in accordance with T.C.A. § 50-6-110

A. PERSONAL PROTECTIVE EQUIPMENT (PPE) REQUIREMENTS

In general, the following PPE shall be required for the Department activities listed in Table A. For any activity not listed, it is the responsibility of the employee to contact their Supervisor and, if needed, Regional Safety Manager for a PPE assessment to be completed.

1. **Protective footwear.** When there is a danger of foot injuries including those caused by falling or rolling objects, employees shall wear protective footwear in accordance with ASTM F2413-17 with the following requirements:

    a. Compressive rated (C) for a minimum of 75 foot-lbs.
    b. Impact rated (I) for a minimum of 2,000 lbs.

2. **Hard hats.** Employees shall wear a hard hat[1] meeting American National Standards Institute (ANSI) Z89.1-Industrial Head Protection Type 1, Class C, to prevent potential for injury due to falling and/or flying objects. In the event that an employee is exposed to an overhead electrical hazard, either a class E or G hard hat shall be required.

3. **High visibility clothing.**

    a. Employees exposed to highway traffic or other moving vehicles and/or power equipment outside of TDOT garage facilities shall wear a high-visibility, yellow-green ANSI/International Safety Equipment Association (ISEA) 107-2015 Class 3R vest, shirt, or jacket as their outermost garment.

    b. When working at night, employees shall wear either high-visibility ANSI/ISEA 107-2015 Class 3R pants, pants with a reflective stripe, gaiters or leggings with reflective stripes as their outermost garment.

4. **Hearing protection.** Employees shall wear hearing protection when performing a task and it is not feasible to reduce noise levels or duration.

5. **Eye protection.** Eye protection shall meet the requirements of ANSI/ISEA Z87.1-2010 standards and shall appropriately address the specific task(s) being performed.

6. **Hand protection.** Employees shall wear hand protection when performing a task that could expose the hand to injury.

7. **Life jackets.** Employees shall wear a U.S. Coast Guard-approved life jacket or buoyant work vest when drowning hazard is present.

8. **Third-Party Requirements.** When visiting suppliers, concrete plants, asphalt plants or quarries, employees shall wear the PPE in Table A or managing company policy, whichever is more stringent.

B. EMPLOYEE RESPONSIBILITIES

Employees are responsible for:

1. Assess hazards daily or as work activities change and understand what appropriate PPE is required.
2. Properly using appropriate PPE as required;
3. Maintaining their PPE in good working condition and notifying their supervisors when PPE is broken, contaminated, lost, or otherwise compromised;

[1] New employees shall wear a green hard hat throughout their first twelve (12) months of service. In addition, employees that routinely work in an office environment and do not routinely work in the field shall wear yellow-green hard hats

4. Participating in required training on the appropriate use, limitations, maintenance and fitting of PPE; **and**
5. Ensuring that their PPE is readily accessible for performing normal job duties.

C. SUPERVISOR RESPONSIBILITIES

Supervisors are responsible for:

1. Reviewing work activities to determine if hazards are present, or are likely to be present, that will require the use of PPE;
2. Ensuring their employees have the appropriate PPE and requiring that it be used by all employees affected by the hazard(s);
3. Ensuring that all PPE fits each employee properly;
4. Ensuring that defective and damaged PPE is replaced with new PPE immediately;
5. Ensuring that employees provided with PPE are adequately trained and instructed in its fitting, use, limitations and maintenance; **and**
6. Ensuring that employees are made aware of this policy.

POLICY VIOLATION GUIDELINES

1. Employees who violate this policy may be subject to disciplinary action under the authority of the T.C.A. §§8-30-202, 203, and 326 and as described in Rules of the Tennessee Department of Human Resources 1120-10-.03, Examples of Disciplinary Offenses.
2. The supervisor is responsible for maintaining the proper performance level and conduct discipline of employees under his/her supervision. When corrective action is necessary resulting from violation of policy, the supervisor shall take the appropriate disciplinary action.

General	If an employee chooses to wear a dust mask or an N95 filtering mask, they must first review and understand the requirements of the Voluntary Use Program and sign the Employee Acknowledgment Form before wearing a mask in the workplace. 
Appendix D to Sec. 1910.134 (Mandatory) Information for Employees Using Respirators When Not Required Under the Standard	**In dusty environments, when *voluntarily* using N95 particulate filtering facepiece respirators or dust masks, you need to take certain precautions to be sure that the respirator itself does not present a hazard.** 1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations. 2. Choose respirators certified for use to protect against the contaminant of concern. NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services, certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you. 3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator such as a filtering facepiece designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke. 4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.
Donning Procedure **(Putting On)**	**Before fitting device, ensure hands are clean.** All respirator components should be inspected for damage prior to each use.

1. With reverse side up and using the tab, separate top and bottom panels to form a cup shape. Bend slightly at center of the nose clip.

2. Ensure panels are fully unfolded.

3. Cup respirator in one hand with open side towards face. Take both straps in other hand. Hold respirator under chin, with nosepiece up, and pull straps over the head.

4. Locate the upper strap across the crown of the head and the lower strap below the ears. *Straps must not be twisted.*

Adjust top and bottom panels for a comfortable fit, ensuring panels and chin tab are not folded in. If equipped with ear loops, please ear loops around ears one at a time.

5. Using both hands, mold nose clip to the shape of the lower part of the nose to ensure a close fit and good seal. *NOTE: Pinching the nose clip using only one hand may result in less effective respirator performance.* ***USE BOTH HANDS SHOWN IN FIGURE 5, ABOVE.***

A good fit means the respirator will seal to your skin.

A respirator can only work when air passes through the filter. Air will take the path of least resistance, so if the seal to the face isn't secure, the air will go around rather than through the respirator. Therefore, it is essential to ensure a proper fit when wearing tight-fitting respirators.

6. The seal of the respirator on the face should be fit-checked before entering the workplace. Follow the 4 steps for Fit Check below.

	Fit Check 1. Cover the front of the respirator with both hands being careful not to disturb the fit of the respirator.  2. EXHALE sharply 3. If air leaks around the nose, re-adjust the nose clip to eliminate leakage. Repeat the above fit check. 4. If air leaks at the respirator edges, work the straps back along the sides of the head to eliminate leakage. Repeat the above fit check.
Doffing Procedure **(Taking Off)**	1. Bend forward slightly and carefully remove the mask from your face by touching only the ties or elastic bands.  2. Start with the bottom tie, then remove the top tie. If you have ear loops, remove one ear loop at a time.  3. Throw the mask in the garbage. 
Limitations and Warnings	○ These filtering facepieces do not protect against gases/vapors. ○ Do not use in atmospheres containing less than 19.5% oxygen deficiency ○ Do not use with beards or other facial hair that may inhibit contact between the face and the product thus preventing a good seal. ○ Leave the contaminated area immediately if: a) Breathing becomes difficult. b) Dizziness or other distress occurs. ○ Discard and replace the respirator if it becomes damaged, breathing resistance becomes excessive or at the end of the shift. ○ Do not alter, modify, clean or repair this disposable respirator.

Employee Acknowledgement Form

I have reviewed the Voluntary Use Guidelines for N95 filtering facepiece devices and Dust Masks.

I understand the steps to take for proper wear, disposal, storage and limitations during voluntary use of the N95 filtering facepiece device and/or dust mask.

Employee Name:_____ Employee ID:_____

Employee Signature:_____ Date: _____

NOTE: Supervisor must retain a copy of this signed form for tracking and review.

TN TDOT Department of Transportation **DEPARTMENTAL POLICY** **State of Tennessee** **Department of Transportation**	**Policy Number: 305-02** **Effective Date:** **January 15, 2021**
Approved By: **Signature:** Clay Bright (Jan 7, 2021 13:35 CST) **Email:** TDOT.Commissioners.Office@tn.gov	**Supersedes:**
SUBJECT: Bloodborne Pathogens Program	

RESPONSIBLE OFFICE: Occupational Health and Safety **(OHS) Division**

AUTHORITY: T.C.A. §4-3-2303; 29 C.F.R. §1910.1030. If any portion of this policy conflicts with applicable state or federal laws or regulations, that portion shall be considered void. The remainder of this policy shall not be affected thereby and shall remain in full force and effect.

PURPOSE: The Department has established an exposure-control plan, in accordance with U.S. Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.1030, for all employees who handle, store, use, process or dispose of potentially infected blood and blood products. This program includes requirements for personal protective equipment, engineering controls, housekeeping procedures, training, exposure reporting and recordkeeping.

APPLICATION: All TDOT employees in the titles listed in Appendix B of this policy.

DEFINITIONS:

1. Biological hazard: Any viable infectious agent that presents a potential risk to human health.
2. Bloodborne pathogens (BBP): Microorganisms that can cause diseases such as human immunodeficiency virus (HIV) and hepatitis B (HBV), which are spread through contact with infected blood or blood products.
3. Medical wastes/Infectious wastes: Blood, blood products, bodily fluids, any waste from human and animal tissues.
4. Universal precautions: Preventing exposure to bloodborne pathogens by assuming all blood and bodily fluids to be potentially infectious and taking appropriate protective measures.
5. Engineering Controls: Engineering and work practice controls shall be the primary means used to reduce employee exposure to blood borne pathogens, as far as feasible, and personal protective equipment is required to be used when engineering or work practice controls are infeasible or while they are being implemented.

POLICY: The headquarters OHS Division and the Regional Safety Staff will manage the bloodborne pathogens exposure control program, and maintain all records pertaining to the written program. TDOT Human Resources Division will handle all post exposure records. TDOT Occupational Health and Safety Division will ensure proper adherence to the program

through periodic audits. The exposure-control plan will be reviewed and updated at least annually. The review process will include soliciting input from non-managerial employees.

I. Training

TDOT Occupational Health and Safety Division will provide training on bloodborne pathogen exposures to employees whose positions are listed in Appendix B of this policy upon initial hire and on an annual basis thereafter. The training will include:

- TDOT Bloodborne Pathogens Policy
- Types and transmission of bloodborne pathogens
- General safety rules
- Universal precautions
- Use of personal protective equipment (PPE)
- Medical waste/infectious waste disposal procedures
- Post-exposure treatment and procedures
- HBV vaccinations

All employees, at a minimum, will be provided an awareness level training upon hire and annually thereafter on basic BBP program information such as:

- What is a bloodborne pathogen?
- What are the hazards to being exposed and how can you encounter exposure?
- How do we take universal precautions?
- What to do if an exposure occurs at work.

II. Department Responsibilities

- The Department will provide resuscitation equipment such as mouth barriers and other ventilation equipment to eliminate the need for direct mouth-to-mouth contact for employees whose jobs would require them to perform resuscitation.
- The Department will provide Engineering Controls as described in other parts of this policy.
- Awareness training will be provided to all employees and affected training will be provided to the employee positions listed in Appendix B.
  TDOT will offer hepatitis B vaccinations to employees covered under this program (See list of titles in Appendix B).

III. Supervisor Responsibilities

- Supervisors of affected employees whose positions are listed in Appendix B of this policy must ensure that their employees are trained in proper work practices, universal precautions, the use of personal protective equipment, and proper cleanup and disposal techniques, if applicable in their assigned job duties
- Supervisors of affected employees whose positions are listed in Appendix B of this policy will ensure that engineering controls will be implemented whenever possible to

reduce the risk of exposure and that those controls will be examined and maintained on a regular schedule to ensure their effectiveness.

IV. Employee Responsibilities (Applicable to Positions Listed in Appendix B)

A. General Precautions

- Do not eat, drink, smoke, handle contact lenses, or apply cosmetics in areas where exposure to bloodborne pathogens is possible.
- Wear disposable nitrile gloves when:
  - You have cuts, abrasions, chapped hands, dermatitis or similar conditions
  - You are providing first aid in any situation
  - You are potentially handling blood, blood products or body secretions, medical or infectious wastes
- Cover any exposed skin whenever there is a possibility that bodily fluids could splash on an employee
- When performing procedures involving blood and other potentially infectious materials, do so in a manner that prevents spreading, splashing, or spraying
- Wash hands as soon as possible after handling potentially infectious materials and after removing protective clothing and equipment.
- Remove all protective equipment when leaving the work area (prior to entering any TDOT vehicles or equipment) and, if the protective equipment is contaminated, place it in a proper storage container for washing, decontamination or disposal. Remove contaminated clothing before entering other areas of the building or leaving the building.

B. Medical Wastes and Disposal Procedures

- Separate all medical/infectious waste from other waste at the point of origin and place it all (with the exception of sharp objects) in double, disposable red bags with appropriate "Biohazard" or "Infectious Waste" labels.
- Place all sharp objects, such as needles, scalpels, razor blades, or broken glass, in puncture-proof, leak-proof, labeled or color-coded containers for proper disposal. Place all infectious waste in leak-proof bins or barrels marked "Biohazard" and "Infectious Waste." These will be collected by a licensed infectious waste removal company.
- Disinfect contaminated reusable equipment before washing for re-use. Decontaminate reusable glassware in a 1-to-9 bleach solution before rinsing and acid washing, and then sterilize the glassware in an autoclave.
- Decontaminate floors and other surfaces with a 1-to-9 bleach solution as well.

V. Hepatitis B (HBV) Vaccinations

TDOT will provide, at the expense of the Department, hepatitis B vaccinations to employees covered under this program (see titles listed in *Appendix B*) and those employees who may

encounter exposure and choose to be vaccinated. The Department will document that it offered the vaccine, as well as the employees' decision to accept or decline, and the date of vaccination (see *Appendix A* for Declination form).

VI. Reporting (Applicable to All TDOT Employees)

- Any employee who has suffered a cut, needle stick or mucous membrane exposure to another person's bodily fluids, or who has been exposed to human blood and blood products, must report the incident immediately to their person in charge. An employee covered under this program, or an employee acting as a "Good Samaritan," who has potentially been exposed on the job to HIV, HAV, HBV or HCV will be tested at the time of exposure to determine if the virus has been transmitted. The employee will be re-tested at six weeks, 12 weeks and six months after exposure. All testing will be performed at TDOT's expense.
- TDOT will also contact the exposure source and request that that person to be tested, at the Department's expense. The testing for this person is not mandatory, however, and refusal will not affect his or her employment.
- Test results will be provided to source and exposed employees within five business days of their receipt.
- Confidentiality will be maintained for both the exposed employee and the exposure source during all phases of the post-exposure program.

VII. Recordkeeping

The Occupational Health & Safety Division will maintain all exposure reports, training records, and HBV vaccination records. OSHA requires that records be kept for the duration of employment, plus 30 years, except training records which must be kept for 3 years. Hepatitis B or HIV contracted on the job will be recorded on the OSHA 300 log as an illness.

POLICY VIOLATIONS GUIDELINES:

1. Employees who violate this policy may be subject to appropriate disciplinary action as described in Rules of the Tennessee Department of Human Resources, Chapter 1120-10.
2. In addition to potential disciplinary action, employees in violation of dress or appearance standards may be required to go home and use their accumulated leave until returning in appropriate dress and appearance.
3. The supervisor is responsible for maintaining the proper performance level, conduct and discipline of employees under his/or her supervision. When corrective action is necessary resulting from violation of policy, the supervisor must take the appropriate disciplinary action.
4. Violations of this policy unresolved through the normal interaction of employee and supervisor should be referred to the TDOT Human Resources Office at 615-741-3461.

Hepatitis B Vaccine Declination Form

I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself.

However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination at no charge to me.

_____ _____

Signature of employee Date

_____

Print name of employee

_____ _____

Witness signature Position

Please mark if applicable:

☐ I am declining because I have previously received the Hep B Vaccination Series prior to the implementation of this program by TDOT.

I received the full shot series on this date: _____

(Please provide year received, at a minimum.)

Job Titles Covered by OSHA's Bloodborne Pathogens Standard

Hwy Response Operator 1
Hwy Response Operator 2
Hwy Response Operator Supervisor 1
Hwy Response Operator Supervisor 2
Building Maintenance Worker 2
Building Maintenance Worker 3
Custodial Worker 2
Facilities Manager 3
Grounds Worker 2
Grounds Worker 3
Employee Volunteer First Aid/CPR Trained Responders (e.g., floor wardens)
Maintenance Carpenter 2
Maintenance Electrician 1
Right-of-Way Appraiser 2
Right-of-Way Appraiser 3
Right-of-Way Appraiser 4
TDOT ROW Agent -SR
TDOT ROW Agent-SUPV

TN TDOT Department of Transportation **DEPARTMENTAL POLICY** **State of Tennessee** **Department of Transportation**	**Policy Number : 305-03** **Effective Date:** **January 15, 2021**
Approved By: 	**Supersedes:** **Policy 220-01**
SUBJECT: Motor Vehicle Utilization	

RESPONSIBLE OFFICE: Occupational Health and Safety (OHS) Division.

AUTHORITY: T.C.A. §§ 4-3-2303, 55-8-199, and 55-10-401. If any portion of this policy conflicts with applicable state or federal laws or regulations, that portion shall be considered void. The remainder of this policy shall not be affected thereby and shall remain in full force and effect.

RELATED POLICIES: TDOT Policy 230-18: CDL and Safety-Sensitive Employees Alcohol & Drug Testing; Tennessee Department of Human Resources Policy 12-056: Operation of Motor Vehicles by State Employees; TDOT Policy 305-04: Vehicle and Equipment Incident Review Team; Tennessee Department of Finance & Administration Policy 26: Employee Fringe Benefits and Supplemental Wages.

PURPOSE: To establish policy for utilization of motor vehicles assigned to bureau and divisions of the Department or dispatched out on a temporary basis; to ensure that employees operating State-owned or private motor vehicles on State business do so legally and safely; and to assure the safe, efficient and economical utilization of State-owned motor vehicles.

APPLICATION: All employees of the Tennessee Department of Transportation. This includes full-time, part-time and seasonal employees. Exemption: Appointing Authority as allowed by General Services.

DEFINITIONS:

Wireless Telecommunications Device: A cellular telephone, a portable telephone, a text-messaging device, a personal digital assistant, a stand-alone computer, a global positioning system (GPS) receiver, or substantially similar portable wireless device that is used to initiate or receive communication, information, or data. This does not include a radio, citizens band radio, citizens band radio hybrid, commercial two-way radio communication device or its functional equivalent, subscription-based emergency communication device, prescribed medical device, amateur or ham radio device, or in-vehicle security, navigation, autonomous technology, or remote diagnostics system.

POLICY: Only State employees are authorized to operate a State-owned vehicle. Any employee operating a State or personal vehicle for State business is required to possess from the employee's domicile State, a valid driver's license for the type of vehicle being operated. Under no circumstances shall an employee whose license has been revoked, suspended, expired or otherwise invalidated, operate a motor vehicle. Any such circumstance must be reported to both the employee's immediate supervisor and either the Regional or Headquarters Safety office within five business days of occurrence.

Employees are required, at all times, to comply with any and all traffic laws when operating any motor vehicle on State business.

The Department may assign a State vehicle to an individual who has been designated to be on call twenty-four (24) hours a day, seven (7) days a week. Vehicles in this classification may be driven to and from an employee's home. Commuting mileage may be charged to the employee. Occasionally, an employee in this classification may within reason make a personal stop in the assigned vehicle as long as such stops are along the normal route from home to work.

Employees driving a state-owned vehicle shall only use a wireless telecommunications device if it can be done in a hands-free manner, as provided in T.C.A. § 55-8-199(b).

Only authorized passengers engaged in official state government business may be transported in a State-owned vehicle. Exceptions may only occur in cases of an emergency.

All employees operating or riding in a motor vehicle and authorized passengers engaged in official state government business are required to use proper safety procedures for that piece of equipment as required by the manufacturer. This includes utilization of seat belts when the unit is in motion.

Any employee who is convicted of driving under the influence of alcohol or drugs while using a State vehicle will be subject to disciplinary action up to and including dismissal

State-owned motor vehicles shall not be driven to and from an employee's home except as authorized by the Commissioner of Transportation.

Personal use of State-owned vehicles by employees is a taxable fringe benefit as outlined by the Department of Finance and Administration.

No State-owned vehicle will be altered, decorated or modified in anyway without written approval of the Commissioner of Transportation. This includes, but is not limited to, bumper stickers and decals not issued by the Department.

Alcohol and drug tests will be conducted after any critical incident involving a CDL or Safety-Sensitive employee in accordance with TDOT Policy 230-18. A critical incident is one which results in any or all of the following:

1. An incident that results in death of a human being; or
2. An incident that results in bodily injury to a person who, as a result of the injury, immediately receives medical treatment away from the scene of the accident; or
3. An incident where one of the vehicles is towed from the scene of the accident; or
4. An incident that results in the driver [TDOT employee] being issued a citation.

Any traffic law violation, which results in a ticket or other citation, being issued to the operator of a motor vehicle in the course of conducting State business will be the sole responsibility of the operator it was issued against. Any conviction of a traffic violation issued while operating a motor vehicle in the course of conducting State business must be reported to both the employee's immediate supervisor and either the Regional or Headquarters Safety office within five business days of the conviction.

Misuse of a State-owned motor vehicle may include, but is not limited to:

- Violations of traffic laws (this will include the utilization of radar detection devices in State vehicles, as well as exceeding a posted speed limit, reckless driving, illegal parking, etc.);
- Careless operation that results in damage to vehicle or injury to person; or
- Use of a State-owned vehicle for personal business.

POLICY VIOLATIONS GUIDELINES:

1. Employees who violate this policy may be subject to appropriate disciplinary action as described in Rules of the Tennessee Department of Human Resources, Chapter 1120-10.
2. Employees who violate the provisions of this policy may also be subject to the loss of the privilege of driving State-owned vehicles.
3. The supervisor is responsible for maintaining the proper performance level, conduct and discipline of employees under his/or her supervision. When corrective action is necessary resulting from violation of policy, the supervisor must take the appropriate disciplinary action.
4. Violations of this policy unresolved through the normal interaction of employee and supervisor should be referred to the TDOT Human Resources Office at 615-741-3461.

TN TDOT Department of Transportation **DEPARTMENTAL POLICY** **State of Tennessee** **Department of Transportation**	**Policy Number: 305-04** **Effective Date:** **January 15, 2021**
Signature: Clay Bright Clay Bright (Jan 5, 2021 13:34 CST) **Email:** TDOT.Commissioners.Office@tn.gov	**Supersedes:**
SUBJECT: Vehicle and Equipment Incident Review Team (VEIRT)	

RESPONSIBLE OFFICE: The Divisions of Human Resources and Occupational Health and Safety

AUTHORITY: T.C.A. §4-3-1105(9), 4-3-2303, and 55-10-401.
This policy will be a supplement to Policy 305-03. If any portion of this policy conflicts with applicable state or federal laws or regulations, that portion shall be considered void. The remainder of this policy shall not be affected thereby and shall remain in full force and effect.

RELATED POLICIES: This policy will be a supplement to Policy 305-03, Motor Vehicle Utilization

PURPOSE: This policy provides information and establishes guidelines for enhancing operator safety as well as providing a process for reviewing work-related vehicle and equipment incidents. By implementing this policy, TDOT hopes to greatly reduce the risks faced by our employees during vehicle and equipment operation, while also being fiscally responsible with our fleet management practices. Through this policy, TDOT plans to:

- Save lives and reduce risk of injuries within our workforce and the motoring public;
- Protect our Department's human and financial resources; and to
- Ensure accountability for employees involved in safety related incidents.

APPLICATION and SCOPE: Any TDOT employee that has been authorized to operate a State-owned vehicle or equipment either as part of the employee's daily job duties or to conduct State business.

DEFINITIONS:
1. VEIRT: Vehicle and Equipment Incident Review Team. A group comprised of Tennessee Department of Transportation employees tasked with reviewing and evaluating all reviewable incidents to determine any reasonable remedial measures to guide the Department in enhancing driver/operator safety and to ensure accountability for employees involved in reviewable incidents.
2. Operator: The authorized driver of a State-owned vehicle or equipment.

3. Vehicle: A motorized instrument used primarily to transport people or goods. Examples include; cars, pick-up trucks, SUVs, boats, etc.
4. Equipment: Motorized machinery not typically licensed for road use. Examples include; forklifts (all models), loaders, backhoes, skid-steers, bulldozers, etc.
5. Preventable Incident: An incident where the employee could have reasonably been expected to have avoided the incident and where the causal factors of the incident are at least partly attributable to the employee.
6. Non-Preventable Incident: An incident where the employee met all reasonable expectations to avoid the incident and where the causal factors of the incident are not attributable to the employee.
7. Reviewable Incident: Any incident that includes one or more of the following criteria:
    - The assessed costs to the Department resulting from the incident are greater than $10,000;
    - Any injury that occurs due to a vehicle or equipment incident wherein the TOSHA reporting criteria are met and a TDOT Operator is deemed at fault;
    - Any fatality that occurs due to a vehicle or equipment incident regardless of fault;
    - Any incident that is at least the second preventable incident involving the same employee within a three (3) year period; or
    - Any preventable incident requiring further review due to a request from Executive Leadership at TDOT Headquarters, the Region or HQ OHS Division.

POLICY: The Division of Human Resources and the Occupational Health and Safety Division will manage the Vehicle and Equipment Incident Review Team.

Vehicle and Equipment Incident Review Team

The Vehicle and Equipment Incident Review Team (VEIRT) will be comprised of members of the following Divisions, including at least:

- Occupational Health and Safety Division (OHS);
- Human Resources Division (HR);
- Engineering Operations Division;
- Regional Safety Staff (relevant to that Region's incidents);
- SME (Subject Matter Expert) as needed on a case-by-case basis. *Note: SMEs are to serve the review team as third-party consultants and should possess knowledge, skills, and abilities that are relevant to the incident being reviewed.*

Review Process and Procedures

- The VEIRT will meet as needed throughout the year to assess Reviewable Incidents. The Regional Safety Staff is responsible for investigating preventable incidents to initially determine whether the incidents are reviewable. OHS will be responsible for providing a report of reviewable incidents to the VEIRT at least five (5) business days prior to the VEIRT's scheduled meeting.
- The VEIRT will assess the reviewable incidents and issue its recommendation for any remedial action within 10 business days following the VEIRT's review. This period may be extended if appropriate notice is given to all involved parties.

Analysis

The VEIRT will consider at least the following factors when assessing reviewable incidents for remedial action:

- The nature of the incident;
- The amount of assessed damages and/or fines;
- Liability of the employee for the incident;
- The degree of any reckless, careless, negligent, or other inappropriate conduct;
- Any violation of safety policies, standards or guidance resulting in a serious near miss, property damage or injury;
- Repetitiveness of preventable inc dents; and
- Whether the incident is part of a systemic operator safety issue.

The typical remedial actions the VEIRT will consider following assessment of reviewable incidents include, but are not limited to;

- Documented coaching sessions;
- Supplemental operator training;
- The State's progressive disciplinary action process; and
- Revocation of driving privileges at work.

All operators must understand that revocation of operator privileges at work may put an employee's job at risk if driving or equipment operation is part of the employee's essential job functions. If the VEIRT initially recommends that revocation of operator privileges or employee discipline per DOHR or TDOT policies is the appropriate remedial action, the VEIRT will first discuss the proposed remedial action with Human Resources, as well as solicit input from the employee's appropriate director prior to the VEIRT issuing its recommendation and determination findings.

Recordkeeping

The Occupational Health & Safety Division will maintain all property damage reports as well as all VEIRT meeting documents and findings. The Division of Human Resources will maintain all disciplinary documents.

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March 2020

TDOT 4Us Daily Checklist

JOB INFORMATION	
Date:	
Location:	
Activity Number:	
Job Description:	
Crew:	
Supervisor	

4US CHECKLIST		
☐	PPE	
☐	TTC Inspection / Loading (signs, stands, cones, barrels, arrow boards, message boards, rumble strips)	
☐	Vehicle Pre-Trip Inspection	
☐	Equipment Pre-Trip Inspection	
☐	Attenuator Pre-Trip Inspection	
☐	Required Tools	
☐	Materials and Supplies	
☐	Water / First Aid	

4US HUDDLE		
☐	Google Earth	
☐	Job Hazards	
☐	Traffic Control Plan (“Flip-Book”)	
☐	Equipment Staging Plan	
☐	Expected Accomplishment	
☐	Personnel Roles and Responsibilities	
☐	Equipment/Tool Issues	
☐	PPE Matrix	
☐	I.C.E.	

Completed By: _____ Date: _____

TDOT 4 Us Daily Checklist Instructions

JOB INFORMATION

Date: Include date for work to be performed.
Job Location: State Route/Interstate and Log Mile
Activity Code: MMS Activity Code
Job Description: MMS Activity Description
Crew: List members of the crew responsible for the project.
Supervisor: List name(s) of supervisors responsible for project.

4US CHECKLIST

PPE: Crew to collect PPE per MMS Activity Number using *TDOT Policy 305-01 Table A.*
TTC Inspection/Loading: Ensure that all TTC complies with the *2009 Manual on Uniform Traffic Control Devices* and any supplemental TDOT policies or procedures.
Vehicle Pre-Trip Inspection: Perform pre-trip checklist on all vehicles.
Equipment Pre-Trip Inspection: Perform pre-trip checklist on all equipment.
Attenuator Pre-Trip Inspection: Perform pre-trip inspection on all attenuators.
Required Tools: Ensure that all tools needed for the project are loaded and are in good working condition.
Materials and Supplies: Confirm that all needed supplies for the project have been located and loaded.
Water/First Aid: Ensure that water, first aid, and preventative measures for job site conditions are available to employees at the project site.

4US HUDDLE

Google Earth: Locate project limits using Google Earth to familiarize crew with jobsite location.
Job Hazards: Using Google Earth, identify and communicate any hazards (power lines, roadway geometry, terrain) that exist inside work zone.
Traffic Control Plan: Communicate the type of work zone, temporary traffic control devices, and individual responsibilities for the project.
Equipment Staging Plan: Identify where equipment and vehicles are to be located within the work zone and discuss the movement of all equipment/vehicles for the duration of the project.
Expected Accomplishment: Communicate the intended outcome of the project with all crew members.
Personnel Roles and Responsibilities: Discuss project roles and responsibilities for each crew member.
Equipment/Tool Issues: Ensure that all needed tools are accounted for, are in good working condition, and are loaded for mobilization.
PPE Matrix: Discuss MMS Activity Codes and locate PPE requirements for the project using *Policy 305-01 Table A.*
I.C.E. (In Case of Emergency): Contact information and procedures for: employee accidents, non-employee accident, utility accidents, vehicle/equipment damage, etc.

Employee Signatures

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

March 2020

TDOT 4Us Daily Checklist

JOB INFORMATION	
Date:	
Location:	
Activity Number:	
Job Description:	
Crew:	
Supervisor	

	4US CHECKLIST	
☐	PPE	
☐	TTC Inspection / Loading (signs, stands, cones, barrels, arrow boards, message boards, rumble strips)	
☐	Vehicle Pre-Trip Inspection	
☐	Equipment Pre-Trip Inspection	
☐	Attenuator Pre-Trip Inspection	
☐	Required Tools	
☐	Materials and Supplies	
☐	Water / First Aid	

	4US HUDDLE	
☐	Google Earth	
☐	Job Hazards	
☐	Traffic Control Plan (“Flip-Book”)	
☐	Equipment Staging Plan	
☐	Expected Accomplishment	
☐	Personnel Roles and Responsibilities	
☐	Equipment/Tool Issues	
☐	PPE Matrix	
☐	I.C.E.	

Completed By: _____ Date: _____

Crew Work Report

ACTIVITY INFORMATION			
Date:		Activity Number:	
Location:		Direction:	
Begin L.M.:		End L.M.:	
Crew and Hours Worked:		Vehicle/Equipment Tag(s)	
Activity Description			
Materials			
Comments/Notes			

Employee Signatures

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

Occupational Health & Safety Division: Instructional & Informational Memorandum

TO: Bridge Inspection Employees dur ng performance of Structural Inspections

FROM: Lee Bogle, PE *Lee Bogle*
State Safety Engineer, Occupational Health & Safety Division

DATE: May 12, 2023

SUBJECT: **Improved Safety Awareness during performance of Bridge and Hydraulic Structure Inspection Activities**

Structures Division Staff have recently requested guidance and information regarding traffic control, specifically, Temporary Traffic Control procedures for their personnel while conducting inspections. In most cases, these activities are conducted in a manner and during timeframes that are addressed in the *Manual on Uniform Traffic Control Devices* (MUTCD). This document is intended to provide instructional guidance and address common activities and how they should be conducted following the guidance and requirements outlined in the current edition of the *MUTCD* and the *TDOT Work Zone Field Manual for Maintenance Operations (WZFM)*.

It is encouraged that Supervisors discuss this information with direct reports engaged in bridge and hydraulic structure inspection activities. This document does not encompass all potential hazards associated with inspection activities. However, it should be used as a discussion tool to highlight and identify potential hazards associated with these activities. Questions or requests for additional information may be directed to the Regional Safety Managers.

Application

This instructional and informational memorandum on Temporary Traffic Control procedures for **Improved Safety Awareness during performance of Bridge and Hydraulic Structure Inspection Activities;** applies to all managers, crew leaders, technicians and support personnel engaged in these activities.

Definitions

As outlined in the current edition of the *MUTCD* in *Section 6G.02, Work Duration*, the criteria for duration should be reviewed to identify the type of operation being performed. Among the terms listed, the following will most often apply to typical bridge and hydraulic structure inspection activities:

- Short-Term stationary: is daytime work that occupies a location for more than 1 hour within a single daylight period.
- Short Duration: is work that occupies a location up to 1 hour
- Mobile Operations: is work that moves intermittently or continuously. If the mobile work zone stops for more than 15 minutes, then another work zone setup should be utilized.

Portable Temporary Traffic Control (TTC) signs and sign stands should be utilized during all TTC activities. Sign sizes are shown in *Table 6F-1* of the *MUTCD*. Generally, a minimum of 36" x 36" sign should be used on State Routes with a speed ≤55 MPH and a minimum of 48" x 48" sign should be used on high-speed State Routes >55 MPH and all Interstates.

Personal Protective Equipment (PPE) should be worn in accordance with *TDOT Policy 305-01*.

Guidance for truck/trailer-mounted attenuators is provided in *TDOT's Standard Operating Guideline 477-01* and the current edition of the *TDOT Truck and Trailer Mounted Attenuators Manual*.

Guidance for lighting is provided in *TDOT's Warning Light Standardization Manual* with approved lighting packages that will satisfy criteria listed in the *Typical Applications* of *Chapter 6H* of the *MUTCD*, as sign substitutions. Check the specific *Typical Application* for guidance on appropriate substitutions.

Guidance Information

Bridge Inspection activities for Structures Division personnel are typically conducted on State ROW and Public / Private Properties. Some of the typical activities conducted include:

1. **Data collection/inspection and observation away from State owned/maintained facilities (non-State Routes).**
    a. City/County bridge and hydraulic structures – Utilize *MUTCD* and *WZFM* guidance for TTC needed for the facility, type of work activity and duration.
    b. Drainage, structural, geotechnical feature inspections - Utilize *MUTCD and WZFM* guidance for TTC needed, based on the facility and type of work activity.
    c. Site and roadway characteristics (i.e., narrow lanes, low traffic volumes, minor road traffic, and low-speed facilities) may be considered to determine appropriate device addition or reduction utilized to provide advance warning to motorists on these non-state route facilities. *MUTCD* standards must be followed for local road work zones.

2. **Data collection/inspection and observation <u>not</u> impacting traffic flow – *Work Off Shoulder***
    Refer to *WZFM, Typical Application 5.*
        i. All signs, barricades and channelizing devices may be omitted when the work occupies an isolated shoulder location for less than one hour and it has little or no interference with traffic.
        ii. Work off shoulder on high-speed multi-lane roadways require "Road Work Ahead" advanced warning sign, at a minimum.
        iii. All vehicles must follow the *TDOT Warning Light Standardization Manual* and the *TDOT Truck Conspicuity Guidance*.

3. **Data collection/inspection and observation adjacent to travel lanes – *Work on Shoulders***
    a. Identify duration of planned activity – *Short Term or Short Duration*, typical.
        i. *Short Duration (≤1hr)*: As indicated in *WZFM, Typical Application 4, Note 4; Any vehicle not displaying a flashing arrow board shall display high intensity rotating, flashing, oscillating or strobe lights.*
        ii. *Short Term (>1hr)*: TTC should be installed to include signs, cones, truck/trailer-mounted attenuator with arrow/message board, in accordance with the current edition of the *WZFM, Typical Application 5* and *Standard Operating Guidance 477-01*.
        iii. All vehicles must follow the *TDOT Warning Light Standardization Manual* and the *TDOT Truck Conspicuity Guidance*.
        iv. For shoulder closures on high speed divided highways, refer to the *MUTCD, Typical Application 5.*

4. **Data collection/inspection and observation within active travel lanes including intersections, ramps, bridges, drainage structures, and all other elements and features.**
    a. Identify duration of planned activity – *Short Term or Short Duration, typical*
        i. *Short Duration (≤1hr) & Short Term (>1hr)*: TTC should be installed to include signs, cones, truck/trailer-mounted attenuator with arrow/message board, in accordance with the *WZFM, Two-Lane, Two-Way Traffic, Typical Application 9, Multi-Lane Divided, Typical Application 28, and Partial Ramp Closure, Typical Application 48.*
        ii. *Mobile Operation* (≤15 min): Refer to *WZFM, Typical Application 25*
        iii. All vehicles must follow the *TDOT Warning Light Standardization Manual* and the *TDOT Truck Conspicuity Guidance*.
    b. Coordination and communication with Operations may be required to effectively manage TTC for these activities.
    c. Follow all Regional requirements for lane closure approvals and notifications.

***NOTE**: Depending on lane(s) impacted; Ramps, Interior Lane or Left Lane closures will likely require other configurations and setups. Refer to WZFM for additional and appropriate applications.*

Tables & Figures:

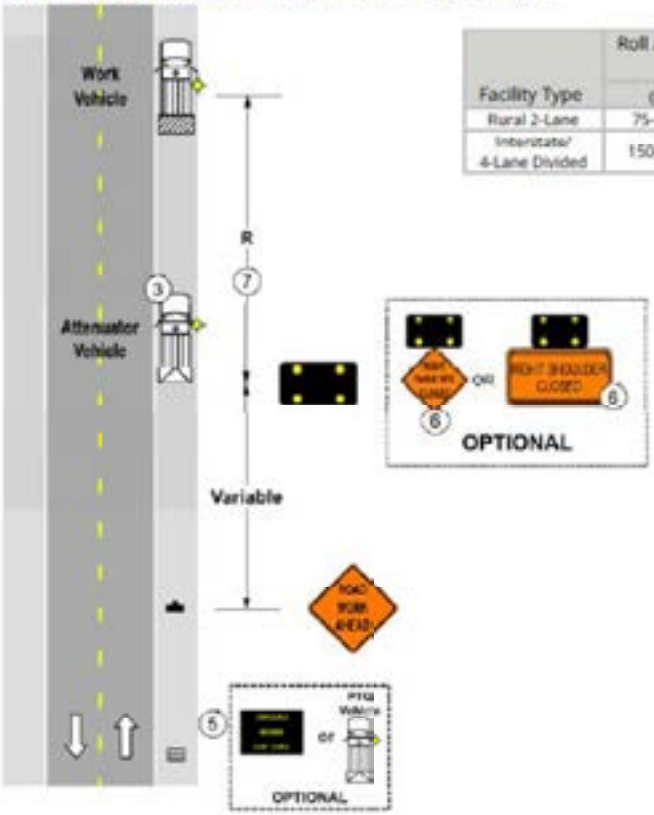
(4) Shoulder Closure – Mobile and Short Duration

Two-Lane, Two-Way

NOTES:

1. A work vehicle without a flashing arrow board shall be followed by an Attenuator vehicle at a distance of R. The Attenuator vehicle shall be equipped with a flashing arrow panel and have a truck or trailer mounted attenuator.
2. Any Attenuator vehicle or PTQ vehicle operating totally or partially in a traffic lane shall be equipped with a truck or trailer mounted attenuator following the requirements in *TDOT's SOG 477-01* and the *Truck and Trailer Mounted Attenuators Manual*.
3. The Attenuator vehicle or PTQ vehicle may encroach into the traffic lane when the shoulder is too narrow to drive on.
4. Any vehicle not displaying a flashing arrow board shall display high-intensity rotating, flashing, oscillating, or strobe lights.
5. The PCMS shall be used for nighttime operations.
6. When the PCMS is used, the RIGHT (LEFT) SHOULDER CLOSED sign becomes optional.
7. The distance between the work area and the Attenuator vehicle should be adjusted between R and F based on traffic volume and sight distance.

Facility Type	Roll Ahead Distance (R) (ft)	(skip lines)
Rural 2-Lane	75-100	3
Interstate/ 4-Lane Divided	150-175	5



(5) Shoulder Closure – Work On or Near Shoulder
Two-Lane, Two Way

NOTES:

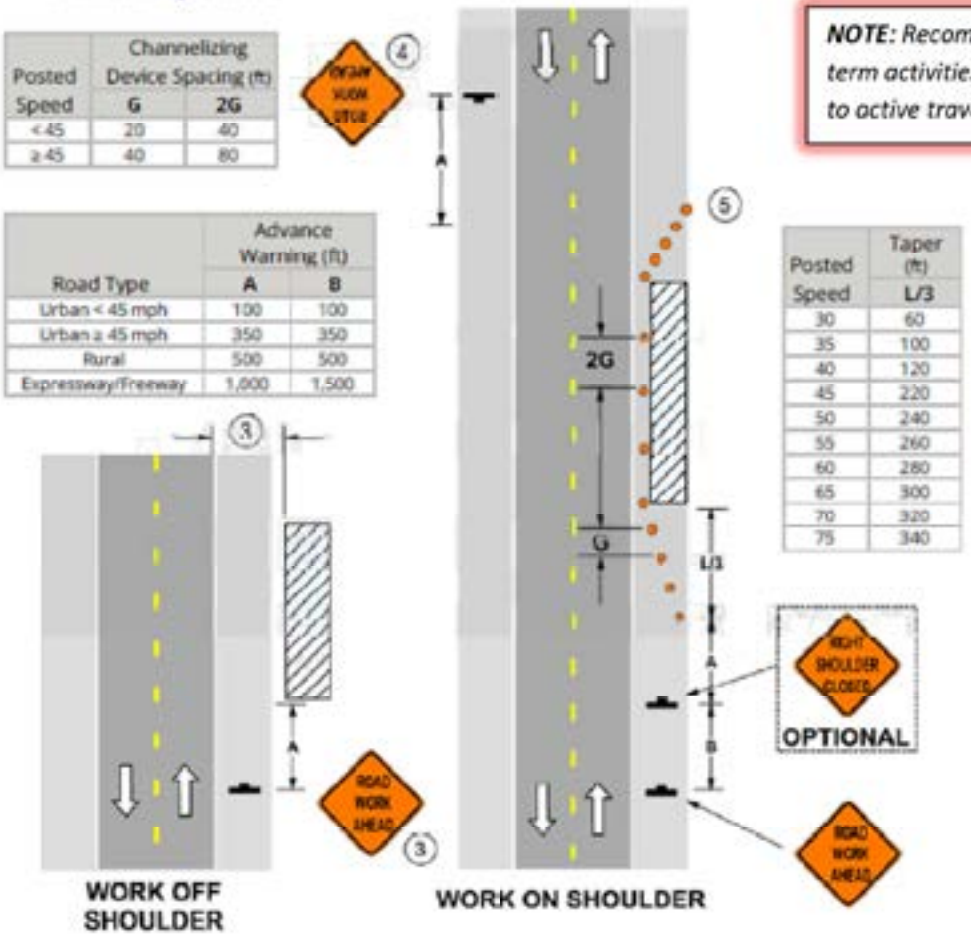
1. All signs, barricades and channelizing devices may be omitted when the work occupies an isolated shoulder location for less than one hour and it has little or no interference with traffic.
2. An operation which moves between workspaces that are less than the Decision Sight Distance along the shoulder should use a stationary or mobile shoulder closure.
3. The ROAD WORK AHEAD sign may be omitted for short term daylight operations if:
   a. the distance from curb face to the workspace is at least 2 feet, or
   b. the distance from the edge of travel way to the workspace is at least 15 feet **and** a vehicle displaying a 360-degree flashing beacon is operating.
4. The ROAD WORK AHEAD sign shall be installed on two-lane, two-way roads if traffic control devices are installed for a workspace in the opposite shoulder.
5. The downstream taper should be 50-100 feet using five equally spaced channelizing devices.

Posted Speed	Channelizing Device Spacing (ft) G	2G
< 45	20	40
≥ 45	40	80

Road Type	Advance Warning (ft) A	B
Urban < 45 mph	100	100
Urban ≥ 45 mph	350	350
Rural	500	500
Expressway/Freeway	1,000	1,500

Posted Speed	Taper (ft) L/3
30	60
35	100
40	120
45	220
50	240
55	260
60	280
65	300
70	320
75	340

NOTE: *Recommended for short-term activities located adjacent to active travel lanes.*



Notes for Figure 6H-5—Typical Application 5
Shoulder Closure on a Freeway

Guidance:

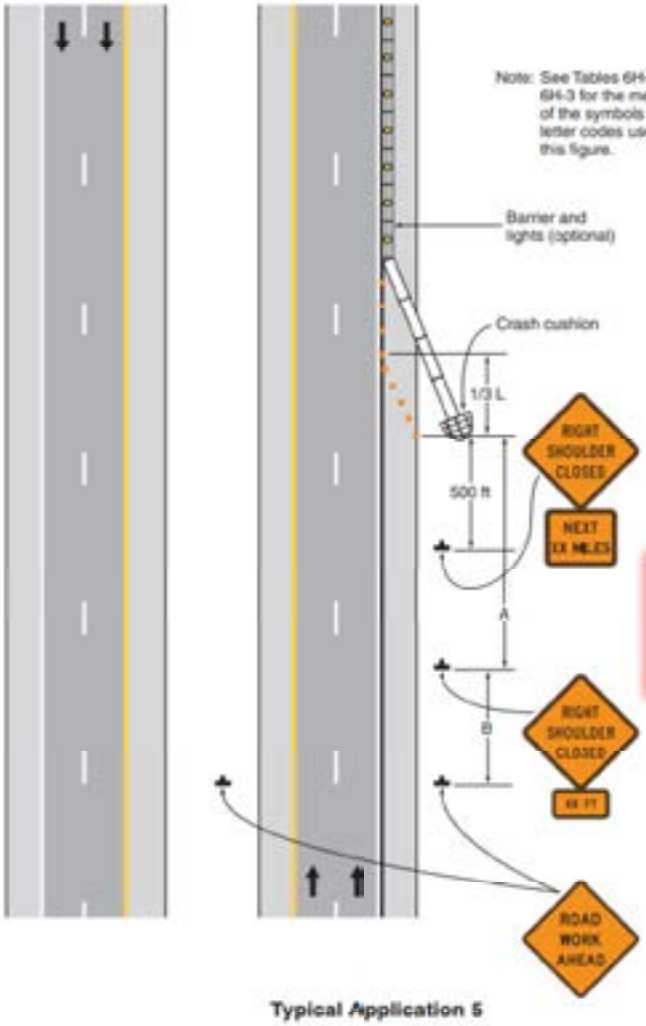
1. *SHOULDER CLOSED signs should be used on limited-access highways where there is no opportunity for disabled vehicles to pull off the roadway.*
2. *If drivers cannot see a pull-off area beyond the closed shoulder, information regarding the length of the shoulder closure should be provided in feet or miles, as appropriate.*
3. *The use of a temporary traffic barrier should be based on engineering judgment.*

Standard:

4. **Temporary traffic barriers, if used, shall comply with the provisions of Section 6F.85.**

Option:

5. The barrier shown in this typical application is an example of one method that may be used to close a shoulder of a long-term project.
6. The warning lights shown on the barrier may be used.



Typical Application 5

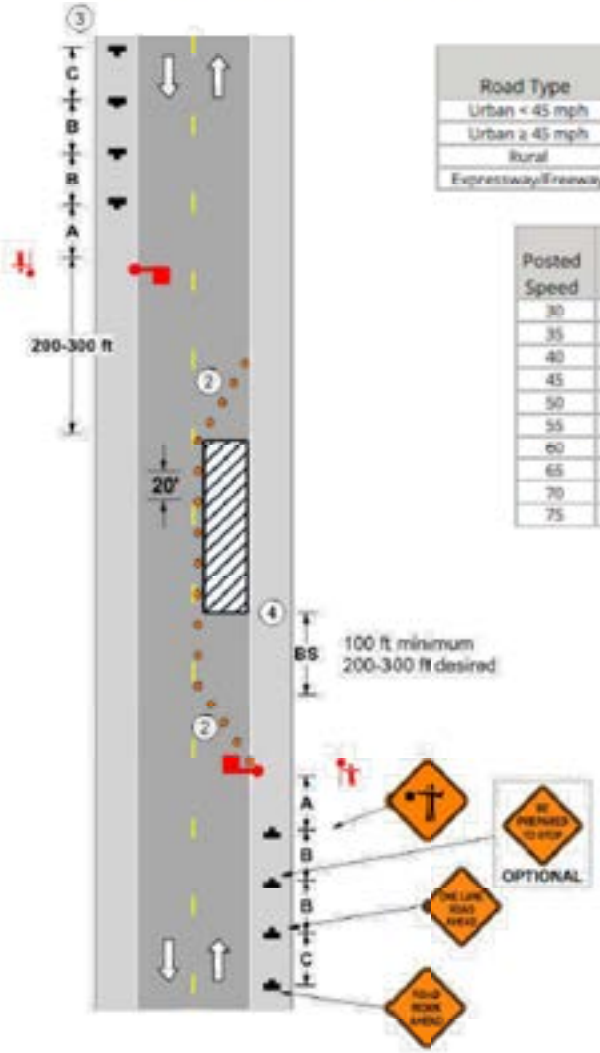
NOTES: *Advanced warning supplemental distance placards are not required for short-term work zones*

(9) Lane Closure - Two Flaggers

Two-Lane, Two Way

NOTES:

1. The approach sight distance to the flagger shall be at least the Decision Sight Distance, D, or 500 feet, whichever is greater.
2. The two-way taper should be 50 feet and the downstream taper should be 50 to 100 feet and using five equally spaced channelizing devices.
3. The advance warning sign sequence is shown for one-way direction only. The other direction shall be identical.
4. On roadways with speed limits greater than 45 mph, an Attenuator vehicle is required between Buffer Space (BS) and work zone.



Road Type	Advance Warning (ft) A	B	C
Urban < 45 mph	100	100	100
Urban ≥ 45 mph	350	350	350
Rural	500	500	500
Expressway/Freeway	1,000	1,500	2,640

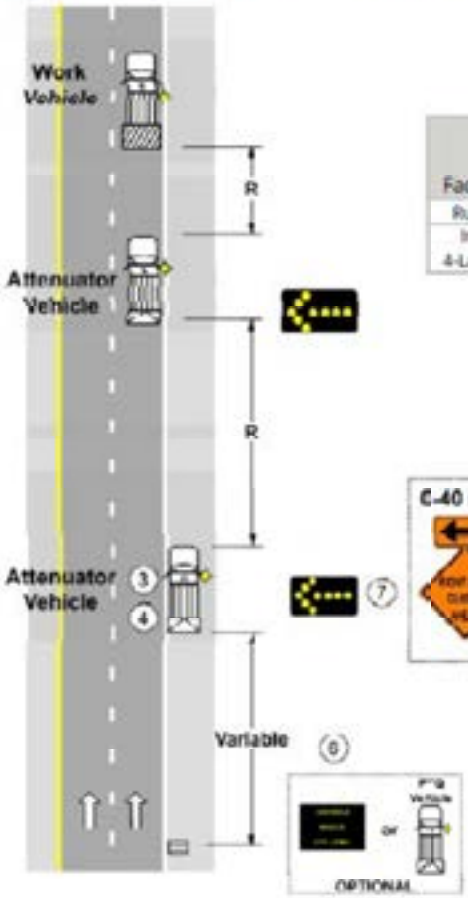
Posted Speed	Decision Sight Distance (D) (ft)
30	620
35	720
40	820
45	940
50	1040
55	1140
60	1260
65	1380
70	1480
75	1580

NOTE: *Due to the amount and types of devices needed for Temporary Traffic Control, this level of inspection work should be conducted with coordination and assistance from Operations to provide equipment and personnel managing the Work Zone and devices.*

(25) Mobile Lane Closure
Multi-Lane, Divided and Undivided

NOTES:

1. A work vehicle without a flashing arrow board shall be followed by an Attenuator vehicle at a distance of R. The Attenuator vehicle shall be equipped with a flashing arrow board and have a truck or trailer mounted attenuator.
2. Any Attenuator vehicle or PTQ vehicle operating totally or partially in a traffic lane shall be equipped with a truck or trailer mounted attenuator following the requirements in *TDOT's SOG 477-01* and the *Truck and Trailer Mounted Attenuators Manual*.
3. The lateral placement of the Attenuator vehicle may be adjusted to create a taper when an Attenuator vehicle is used.
4. The Attenuator vehicle may encroach into the traffic lane when the shoulder is too narrow to drive on.
5. If the operation does not move at least the Decision Sight Distance, D, every 15 minutes, the appropriate stationary layout should be used.
6. The PCMS shall be used for nighttime operations.
7. When the PCMS is used, the RIGHT LANE CLOSED sign becomes optional.
8. The presence of a law enforcement officer in the work zone is optional.



Facility Type	Roll Ahead Distance (R) (ft)	(skip lines)
Rural 2-Lane	75-100	3
Interstate/ 4-Lane Divided	150-175	5

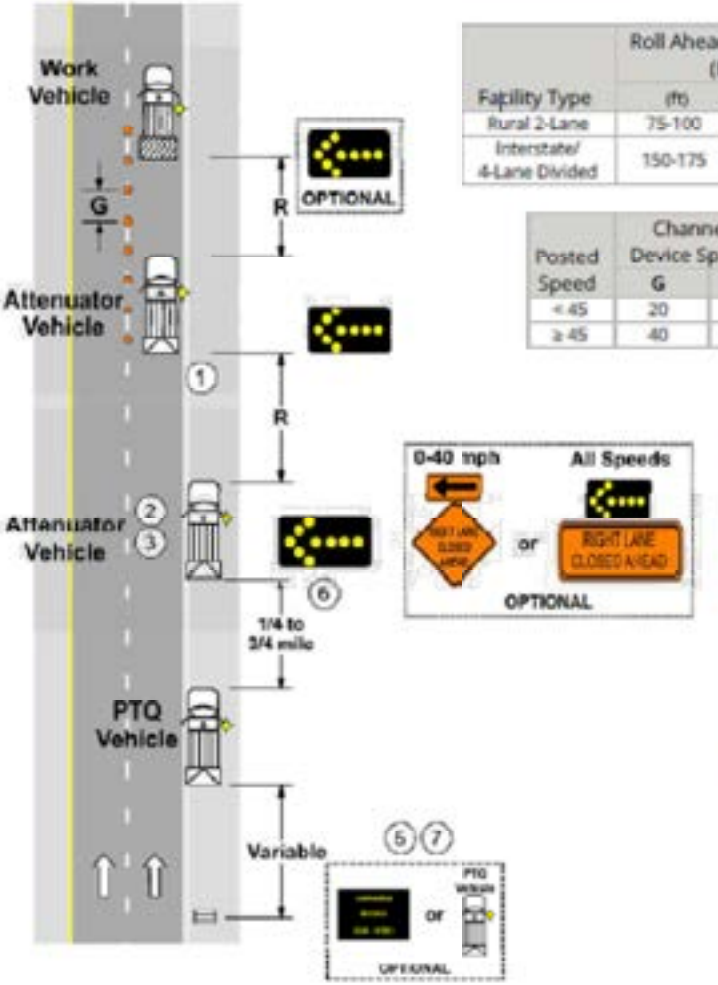
NOTE: *Due to the amount and types of devices needed for Temporary Traffic Control, this level of inspection work should be conducted with coordination and assistance from Operations to provide equipment and personnel managing the Work Zone and devices.*

(28) Short Duration Lane Closure

Multi-Lane, Divided

NOTES:

1. Any Attenuator vehicle or PTQ vehicle operating totally or partially in a traffic lane shall be equipped with a truck or trailer mounted attenuator following the requirements in *TDOT's SOG 477-01* and the *Truck and Trailer Mounted Attenuators Manual*.
2. The lateral placement of the Attenuator vehicle may be adjusted to create a taper.
3. The Attenuator vehicle may encroach into the traffic lane when the shoulder is too narrow to drive on.
4. If the operation does not move at least the Decision Sight Distance, D, once each hour, the appropriate stationary layout should be used.
5. The PCMS shall be used for nighttime operations.
6. When the PCMS is used, the RIGHT LANE CLOSED sign becomes optional.
7. A typical message should be ROAD WORK AHEAD and RIGHT LANE CLOSED.
8. The presence of a law enforcement officer in the work zone is optional.



Facility Type	Roll Ahead Distance (R) (ft)	(skip lines)
Rural 2-Lane	75-100	3
Interstate/ 4-Lane Divided	150-175	5

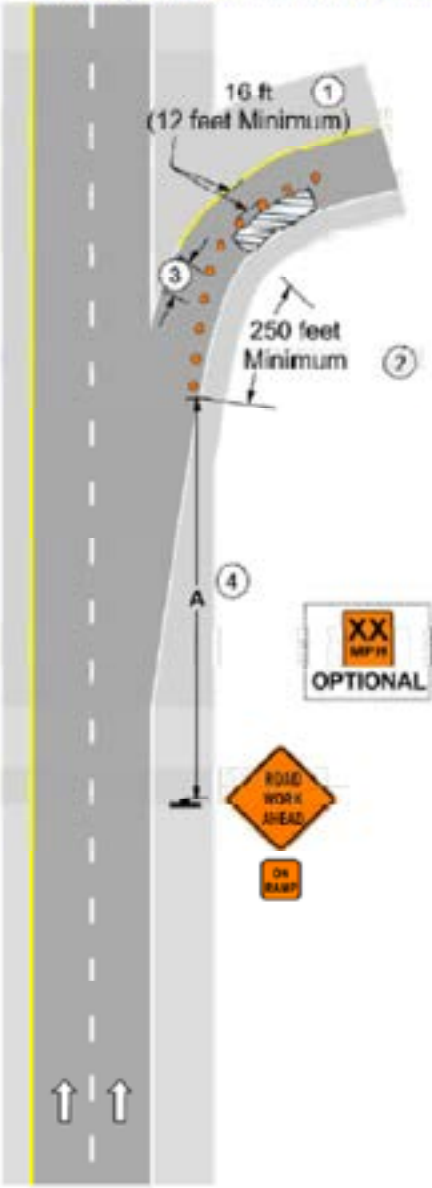
Posted Speed	Channelizing Device Spacing (ft) G	2G
< 45	20	40
≥ 45	40	80

NOTE: *Due to the amount and types of devices needed for Temporary Traffic Control, this level of inspection work should be conducted with coordination and assistance from Operations to provide equipment and personnel managing the Work Zone and devices.*

(48) Partial Ramp Closure

NOTES:

1. Truck off-tracking should be considered when determining whether the 12-foot minimum lane width is adequate, if not, 16-feet should be used.
2. Adjust buffer space and taper length as ramp length allows.
3. Use 20-foot spacing between devices.
4. The spacing for advance warning signs is dependent on the design of the interchange and the location of in place signing.



Posted Speed	Buffer Space (BS) (ft)	Taper Length (L) (ft)
30	200	180
35	260	260
40	320	320
45	360	660
50	440	720
55	500	780
60	580	840
65	660	900
70	740	960
75	820	1020

Road Type	Advance Warning (ft) A	B	C
Urban < 45 mph	100	100	100
Urban ≥ 45 mph	350	350	350
Rural	500	500	500
Expressway/Freeway	1,000	1,500	2,640

See Road Authority *for appropriate speed.*

Occupational Health & Safety Division: Instructional & Informational Memorandum

TO: All Operations Employees engaged in Temporary Traffic Control Deployment

FROM: Lee Bogle, PE, State Safety Engineer Lee Bogle (Mar 2, 2023 12:58 CST)
Jason Quicksall, PE, State Work Zone Engineer

DATE: March 3, 2023

SUBJECT: **Guidance Regarding Temporary Traffic Control; Inside Shoulder Advance Warning Signage on Multi-Lane Divided Highways**

The Department is committed to the continuous evaluation of processes with the goal minimizing risks to both employees and to the motoring public. The deployment, management, and retrieval of temporary traffic control devices has proven to be some of the most dangerous activities conducted by our workers. During recent discussions among key Departmental staff, it has become apparent that the placing of some devices in specific locations and uncer certain conditions often results in risks to both employees and motorists that far outweigh the benefit provided by the devices after installation. As a result, the following guidance has been developed to ensure that traffic control devices deployed by TDOT field staff are done so in a manner that is the safest for both employees and the motoring public. This document shall be used as a discussion and training tool to highlight and identify hazards and train in the approved procedures for efficiently and safely performing this task. Additional discussion with immediate supervisors is encouraged to identify any other hazards that may exist while conducting these operational activities. It is required that all supervisors discuss this information with direct reports who will deploy, manage, and retrieve work zone devices and specifically, temporary traffic control signs.

Guidance:

This instructional and informational memorandum for the use of **TTC; Advance Warning Signs** applies to TDOT Operations Staff working to deploy, manage, and retrieve temporary traffic control devices specific to TDOT work zones. This information will be utilized as a supplement to the current edition of the *Work Zone Field Manual for Maintenance Operations*.

Application:

The memorandum and procedures are provided for immediate discussion and implementation to improve safety, reduce risk of exposure, and decrease the likelihood of injury when working around temporary traffic control on multi-lane divided highways.

Short Duration, or Short-term Work Durations:

- For work or lane closures affecting only the right side of the road (right lane closures or right shoulder work); work signs in the median may be omitted if the median shoulder width is less than ten feet (<10') unless good engineering judgement compels inclusion per *MUTCD 6H.01-03*.

Intermediate Term – Short Duration/Short Term Night Work Activities:

- For work or lane closures affecting only the right side of the road (right lane closures or right shoulder work) for Intermediate Term Activities including Short-Duration or Short-Term nighttime work activities; work signs in the median may be omitted if the shoulder width is less than ten feet (<10') unless good engineering judgement compels inclusion per *MUTCD 6H.01-03*.

  Intermediate Term nighttime activities with the omission of median signs shall refer to the *TDOT Work Zone Field Manual for Maintenance Operations – Typical Application (29) – Lane Closure – Occupied Nighttime Workspace Multi-Lane Divided* (*Appendix A*). Median signs for nighttime work that meet Short-Term or Short-Duration requirements may be omitted if it meets the criteria listed above and the following TTC devices are used:

  1. A Portable Changeable Message Sign or truck/trailer-mounted attenuator (TMA) with a message sign is located, prior to the first outside shoulder sign encountered by motorists, with the following message: "Right Lane Closed Ahead".
  2. A Protect the Queue (PTQ) attenuator vehicle is positioned ¼ to ½ mile prior to the work zone (or the queue) with the following message: "Right Lane Closed Ahead".

Long-Term Activities:

- Median signs should not be omitted, unless good engineering judgement compels omission.

***Additional Information**:

Advance Warning Signs will be required on both sides (one direction) of the multi-lane, divided highways when:

- A Work Zone is requiring a motorist to merge to the right.
- A Work Zone involves a lane shift to either direction.
- The median paved shoulder is 10 feet or greater (≥10') in width.

Appendix A:

Median paved shoulder is 10 feet or greater (≥10') in width.

(29) Lane Closure – Occupied Nighttime Workspace Multi-Lane, Divided

NOTES:

1. In order to use this layout, two flashing arrow boards, at least one PCMS, and advance warning signs shall be used. If these devices are not available, the "Right Lane Closure, Multi-Lane Divided Road" Layout on page 82 should be used.
2. When using a combination of cones (28-inch minimum height) and Direction Indicator Barricades, every third device in the merge taper and every tenth device in the tangent area shall be a Directional Indicator Barricade.
3. Any Attenuator vehicle or PTQ vehicle operating totally or partially in a traffic lane shall be equipped with a truck or trailer mounted attenuator following the requirements in *TDOT's SOG 477-01* and the *Truck and Trailer Mounted Attenuators Manual*.
4. The presence of a law enforcement officer in the work zone is optional.

Road Type	Advance Warning (ft) A	B	C
Urban < 45 mph	100	100	100
Urban ≥ 45 mph	350	350	350
Rural	500	500	500
Expressway/Freeway	1,000	1,500	2,640

Posted Speed	Buffer Space (BS) (ft)	Taper Length (L) (ft)
30	200	180
35	260	260
40	320	320
45	360	660
50	440	720
55	500	780
60	580	840
65	660	900
70	740	960
75	820	1020

Posted Speed	Channelizing Device Spacing (ft) G	2G
< 45	20	40
≥ 45	40	80

Median paved shoulder is less than 10 feet (<10') in width.

(29) Lane Closure – Occupied Nighttime Workspace
Multi-Lane, Divided

NOTES:

1. In order to use this layout, two flashing arrow boards, at least one PCMS, and advance warning signs shall be used. If these devices are not available, the "Right Lane Closure, Multi-Lane Divided Road" Layout on page 82 should be used.
2. When using a combination of cones (28-inch minimum height) and Direction Indicator Barricades, every third device in the merge taper and every tenth device in the tangent area shall be a Directional Indicator Barricade.
3. Any Attenuator vehicle or PTQ vehicle operating totally or partially in a traffic lane shall be equipped with a truck or trailer mounted attenuator following the requirements in *TDOT's SOG 477-01* and the *Truck and Trailer Mounted Attenuators Manual*.
4. The presence of a law enforcement officer in the work zone is optional.

Road Type	Advance Warning (ft) A	B	C
Urban < 45 mph	100	100	100
Urban ≥ 45 mph	350	350	350
Rural	500	500	500
Expressway/Freeway	1,000	1,500	2,640

Posted Speed	Buffer Space (BS) (ft)	Taper Length (L) (ft)
30	200	180
35	260	260
40	320	320
45	360	660
50	440	720
55	500	780
60	580	840
65	660	900
70	740	960
75	820	1020

Posted Speed	Channelizing Device Spacing (ft) G	2G
< 45	20	40
≥ 45	40	80

Occupational Health & Safety Division: Instructional & Informational Memorandum

TO: All Operations Employees engaged in Snow & Ice Removal Activities

FROM: James C. Norris, IV, PE
Director, Occupational Health & Safety Division

DATE: January 8, 2018

SUBJECT: **Improved Safety Awareness while working around Snow & Ice Removal Equipment**

In light of recent injuries; specifically, amputations that have occurred in preparation for winter operations, it is our responsibility to bring awareness to common hazards and potential for serious injuries in an effort to prevent further occurrences associated with Departmental activities. We are notifying all operations personnel of the potential hazards and dangers associated with the Department's role in winter activities including the preparation of snow and ice removal equipment.

It is encouraged that all supervisors discuss this information with direct reports and operations personnel, engaged in winter activities. This document does not encompass all potential hazards associated with snow and ice removal equipment. However, it should be used as a discussion tool to highlight and identify common sources of danger associated with operational activities. Additional discussion points are encouraged, with immediate supervisors, to identify any other hazards that may exist during performance of these operational activities.

Application

This instructional and informational memorandum on **Improved Safety Awareness while working around Snow and Ice Removal Equipment** applies to all operators, mechanics and support personnel working in and around snow and ice removal equipment.

Purpose

The purpose of this instructional and informational memorandum is to improve the safety of operators, mechanics and support personnel when working in and around snow and ice

removal equipment and operations. Specifically, activities involving connecting, disconnecting and setup of snow removal equipment for use during winter storm events including, dump trucks, plows, spreaders (V-box and tailgate) and material loaders.

Equipment Awareness Review:

This instructional and informational memorandum is provided for immediate discussion and implementation to improve safety and decrease the likelihood of injury when working around snow and ice removal equipment:

Special Notes:

- **NEVER** use any part of the body to aid in alignment of pins (hitch, spring, roll, clevis, lynch, cotter, etc.) or to clear foreign objects from the mating parts, channels or hinges.
- **NEVER** use any part of the body in areas where there is potential for appendages to become pinched, crushed, snagged or sheared.
- **ALWAYS** use appropriate tools to align parts or clear foreign objects including crowbars, punches, chisels, pry bars and other similar tools.
- **Lock-out / Tag-out** procedures should be utilized in **all** practical applications.
    - Climbing on V-boxes and truck beds
    - While underneath Vehicles or Equipment
    - In and around the engine bay of Vehicles or Equipment

1. **Snow Plows** (front and underbody) attachment and removal from dump trucks (*See Figures A & B*). Awareness and special attention should be given to the following:
    a. Pins (hitch, spring, roll, clevis, lynch, cotter, etc.), chains, swivels and turntables, lift cylinders (front), down pressure and swivel hydraulic cylinders (underbody plow) hinges and other moving parts associated with the plow assembly.
    b. Motion of Plows; may cause crushing, shearing or other injury to body
        i. Swivel Left and Right - crushing potential with plow and truck and swivel stops
        ii. Raising and Lowering of plow – shearing or crushing potential for feet and legs

2. **V-box or Tailgate Salt Spreader** attachment and removal from dump trucks (*See Figures C, D & E*). Awareness and special attention should be given to the following:

a. Pins (hitch, spring, roll, clevis, lynch, cotter, etc.), clamps, springs, spinner attachments, hinges, augers, chute assemblies and other moving parts associated with the spreader assembly.
b. Hydraulic hoses, Stucchi Couplers and Pre-wet connections and fittings
c. Tailgate removal / installation, hinge pins and tensioning chains
d. **ALWAYS** utilize hammers, pry bars or crowbars to free stuck tailgates. **NEVER** use any part of the body in these areas where they may be pinched, crushed, snagged or sheared.
e. **NEVER** climb into a V-box spreader or reach into a tailgate spreader to repair, free clogged materials or make adjustments, unless *Lock-out / Tag-out* procedures are utilized.

3. **Dump Truck** operation, including loading, spreading salt, plowing or unloading (*See Figure F*). Awareness and special attention should be given to the following:
    a. **ALWAYS** utilize all provided steps and hand rails with three-points of contact
    b. **ALWAYS** utilize the bed mounted ladders to verify or check loads with three-points of contact. **NEVER** climb on sides, tires or any other parts of the bed or truck that is not equipped with equipment to do so safely.
    c. Plow Lift Arm Assembly with hydraulic cylinder, hitch pins, chains and roll-pins
    d. Underbody plow with hydraulic cylinders, swivel/turntable, bolts, pins and hoses
    e. Rear tailgate assembly, bed-mounted ladders, hitch connections, hoses, clamps, fittings and receiver hitch (where applicable)

4. **Wheel Loaders** and all equipment utilized in loading of bulk materials (*See Figure G*). Awareness and special attention should be given to the following:
    a. Pins (hitch, spring, roll, clevis, lynch, cotter, etc.), clamps, hinges, latches, hydraulic cylinders, hoses and *Quick-Attach* assemblies and other moving parts associated with the loader bucket assembly.
    b. **NEVER** walk around, behind or stand near an operating loader while the operator is in the process of loading materials onto a truck, especially, during night or low light operations.
    c. **ALWAYS** utilize all provided steps and hand rails with three-points of contact.

The attached photos show typical locations of common parts associated with snow and ice removal equipment. Equipment that differs from those shown below should be reviewed with

the supervisor and mechanic to identify the potential hazards associated with a particular piece of equipment. Examples of typical hazard locations are identified in *Figures A through G*:

Figure A *– Snow Plow Front (Typical)*

- Lift arm pins (cylinder and arm extension) **Pinch, Crush, Snag & Shear Potential*
- Plow lift – chain hoist (Up / Down) **Pinch & Crush Potential*
- Hydraulic Hose Connections **Pinch Potential*
- Plow Swivel Frame (Left / Right) **Crush Potential*
- Plow frame connections (both sides) **Pinch, Crush & Shear Potential*

Figure B *– Underbody Snow Plow (Typical)*

**Pinch, Crush, Snag & Shear Potential (All Locations, This Figure)*

- Frame Bolts (Typical)
- Swivel / turntable with internal cylinders for swivel Left / Right
- Plow Cylinders (2) – Blade (Up / Down) *Right side cylinder not shown.
- Blade roll (Up / Down)

Figure C *– V-Box Spreader (New Style 2017-18)*

- Ladder Assembly **Pinch, Snag & Fall Potential*
- Frame Legs Assembly **Pinch, Snag, Crush & Shear Potential*
- Material Augers **Pinch, Snag, Crush & Shear Potential*
- Material Chute **Pinch, Snag & Crush Potential*
- Spinner Assembly **Pinch, Snag, Crush & Shear Potential*

Figure D.1 *– V-Box Spinner; Hitch Assembly (New Style 2017-18)*

- Receiver Hitch (Spinner)

**Pinch, Snag & Shear Potential*

- Material Chute Hitch Pin

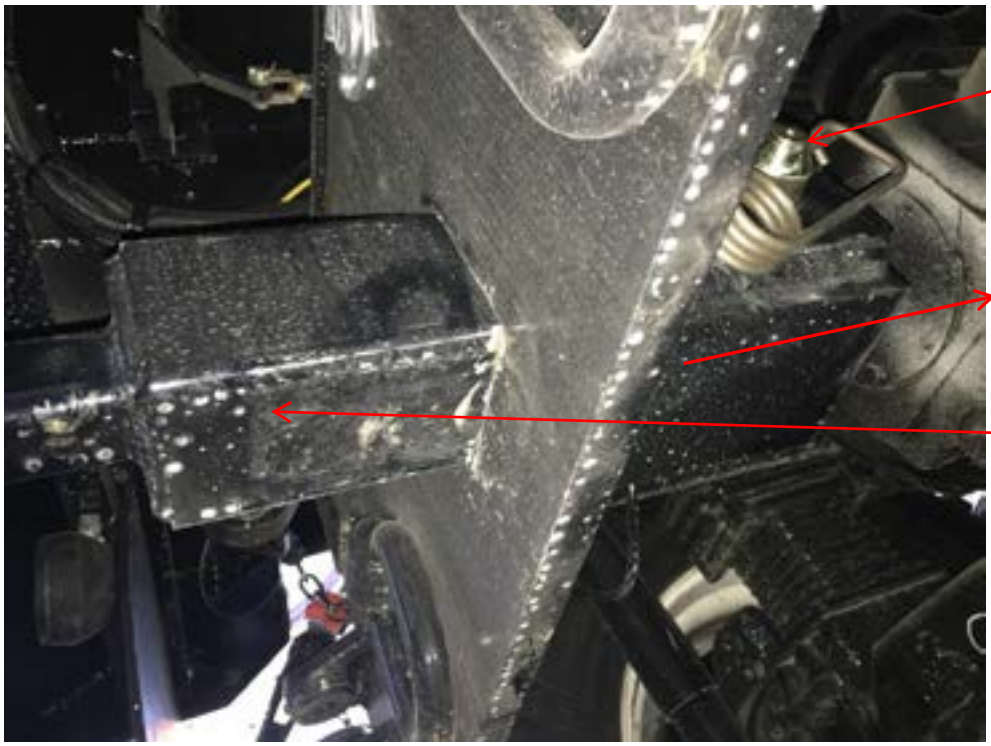
**Pinch & Snag Potential*

- Spinner Assembly

**Pinch, Snag & Crush Potential*

- Spinner Adjustment Plate Hitch Pin **Pinch and Snag Potential*

Figure D.2 *– V-Box Spinner; Hitch Assembly Pin Connection (New Style 2017-18)*



- Receiver Hitch Pin

**Pinch, Snag, Crush & Shear Potential*

TO FRONT OF VEHICLE

- Spinner Side (Rear of Vehicle)

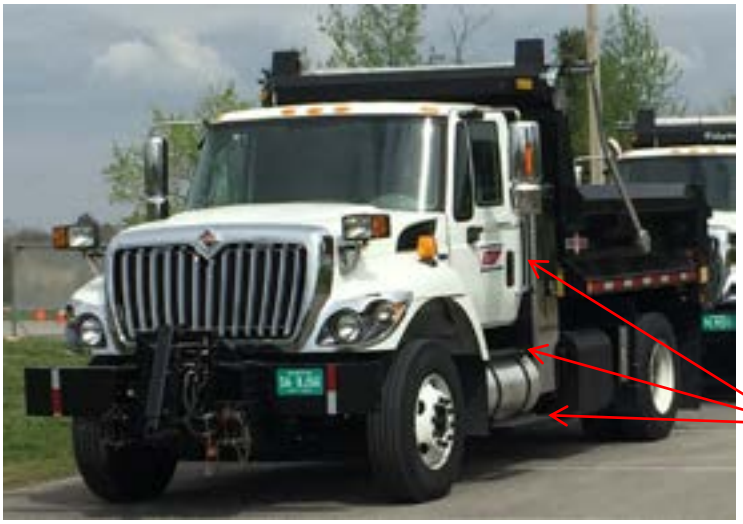
Figure E *– V-Box Spreader Assembly (Before Mid-2017)*

- Material Adjustment Gate **Pinch, Snag, Crush & Shear Potential*
- Material Chain/Delivery Assembly **Pinch, Snag, Crush & Shear Potential*
- Chute Assembly and Pins **Pinch, Snag, Crush & Shear Potential*

***NOTE:** Spinner assembly is contained within the Chute Assembly.

- Frame Legs Assembly (*Right side Leg, Not Shown) **Pinch, Snag, Crush & Shear Potential*

Figure F *– Dump Truck (Typical)*



***NOTE:** Pinned and Folding Bed Ladder Not Shown – (Passenger Side Location, Typical)

**Pinch, Snag, Crush & Fall Potential*

- Truck Steps and handrails

**Slip & Fall Potential*

***NOTE:** Pinned and Folding Bed Ladder Not Shown – (Passenger Side Location, Typical)

**Pinch, Snag, Crush & Fall Potential*

- Truck Steps and handrails

**Slip & Fall Potential*

Figure G.1 *– Material Loader with Quick-Attach Bucket (Typical)*

- Top Latches **Pinch & Crush Potential*

- Pin Latch and Lock

**Pinch, Snag, Crush & Shear Potential*

Figure G.2 *– Material Loader (Typical)*

- Rear Section of Machine

**Backover Potential*

- Loader Steps and Handrails

**Slip & Fall Potential*

- Bucket Operations

**Pinch, Snag & Crush Potential*

Occupational Health & Safety Division: Instructional & Informational Memorandum

TO: All Operations Employees engaged in Connection of Trailer-Unit Attenuators to Fleet Vehicles (Dump Trucks)

FROM: Lee Bogle, PE
State Safety Engineer, Occupational Health & Safety Division

Lee Bogle, PE
Digitally signed by Lee Bogle, PE
Date: 2020.11.24 09:59:51 -06'00'
Adobe Reader version: 11.0.18

DATE: November 24, 2020

SUBJECT: **Safety Awareness; Connection of Trailer-Unit Attenuators to Fleet Vehicles**

Recently, there has been several incidents involving the connection of trailer-mounted attenuators to the fleet of dump trucks. Specifically, hand injuries have resulted from potential procedural issues with properly connecting the cylinder arms to the dump truck, frame-mounted, pin connections. The manufacturer of these units provides procedures for proper connection of the trailer-mounted attenuators to the host vehicles. A copy of the manufacturer's procedures has been included with this memorandum. In most cases, a missing tool, that will need to be inventoried and reacquired, is needed to aid in connecting the cylinders to the vehicle. It has been determined that, in several cases, this tool is either missing or not in use during the procedures. This tool is essential to safely extending and retracting the cylinders in preparation to pin the cylinder to the dump truck frame connection points. The following information shall be used as guidance and discussion in a routine tailgate meeting where proper procedures will be reviewed, discussed and demonstrated for safe connection of the attenuators to the vehicle.

It is required that all supervisors discuss this information with direct reports who will likely connect attenuators to vehicles. This document shall be used as a discussion and training tool to highlight and identify common sources of danger and train in the approved procedures for efficiently and safely performing this task. Additional discussion is encouraged, with immediate supervisors, to identify any other hazards that may exist during performance of these operational activities.

Application

This instructional and informational memorandum on **Safety Awareness during Connection of Trailer-unit Attenuators to Fleet Vehicles** applies to all operators, mechanics and support personnel working in and around trailer-unit attenuators and host vehicles.

Equipment Training and Awareness Review:

The memorandum and procedures are provided for immediate discussion and implementation to improve safety and decrease the likelihood of injury when working around trailer-unit attenuators and performing installation tasks.

Criteria for discussion:

Conduct a Tailgate Safety Meeting

- Review the manufacturer procedures for attaching the *SST9000 Trailer-unit Attenuator* and the *Photos and Illustrations-Supplemental Info* document. It is encouraged to have an open discussion, demonstrate and practice connection procedures and resolve any questions.
- A Learning Network Video is available for review; Keywords "Attenuator Cylinder"
- Follow Regional procedures for documentation of the tailgate meeting.

Full Manual; SST9000: https://trinityhighway.com/wp-content/uploads/2018/07/115313-SST-9000.pdf

Inventory and Procurement of any missing tools required for cylinder connection:

Check all trailer-unit attenuators to ensure that each unit has a tool that is used to extend/retract the cylinders during connection or removal with the host vehicle, pin connections. A picture of the tool is shown in *Figure A* and included in the *Photos and Illustrations-Supplemental Info* document.

The following steps shall be taken to procure a replacement tool:

1. Districts; develop a list of units, by Tag Number and Location that require tool replacement.
2. Submit the list to District Management
3. District Management, submit to the Regional Garage Manager.
4. Garage Manager, work with Engineering Operations for Procurement.

**Spreadsheet template is attached.*

Figure A

***Complete the Tailgate Meeting, Tool Inventory Sheet and submit by December 18, 2020.**

STATE OF TENNESSEE
DEPARTMENT OF TRANSPORTATION
AERONAUTICS DIVISION
7335 CENTENNIAL BOULEVARD
NASHVILLE, TENNESSEE 37209
(615) 741-3208

BUTCH ELEY
DEPUTY GOVERNOR &
COMMISSIONER OF TRANSPORTATION

BILL LEE
GOVERNOR

Memorandum

TO: All Staff

FROM: John-Paul Saalwaechter, P.E.
Aeronautics Division Director

DATE: October 16, 2023

SUBJECT: Use of Safety Vest, Radio on Airports, and Vehicle Strobe Lighting System

Effective today, in keeping with TDOT Policy 305-01 – Personal Protective Equipment, you are required to wear a “Type 3” safety vest or equivalent when you are on a runway or in a runway safety area (RSA) regardless of whether construction of the runway or RSA is ongoing or you are inside or outside of a vehicle in these areas. The Runway Safety Area (RSA) is a defined area surrounding the runway consisting of a prepared surface suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway. Per the Rules of the TDOT Aeronautics Division Chapter 1680-1-2 *Licensing and Registration of Airports*, the State minimum RSA is 100 feet off the physical runway end and 150 feet wide – 75 feet off each side of the runway centerline. The Federal Aviation Administration (FAA) defines the area of each RSA based on the airport’s existing critical aircraft. The FAA RSA dimensions for each airport can be found on the airport’s approved Airport Layout Plan (ALP), specifically the Airport Layout Drawing sheet in the ALP set. Please review the ALP prior to visiting each airport to understand and adhere to this policy given the airport’s FAA-defined RSA dimensions. If you need assistance finding this information, please contact the airport’s assigned Planning and Environmental staff member.

If transporting visitors into these areas defined above, please plan ahead to provide a safety vest for each visitor. “Type 3” safety vests or equivalent can be acquired from the Aeronautics Division’s front desk or the Region 3 stockroom.

When entering the airport’s Air Operations Areas (AOA), such as the apron, taxiway, runway, or around hangars, a radio shall be taken and used to monitor the airport’s Common Traffic Advisory Frequency (CTAF) for situational awareness of aircraft operating in and around the airport. The airport’s CTAF is a frequency designed for the purpose of carrying out airport advisory practices while operating to or from an airport without an operating control tower. CTAF can take other forms such as Universal Communication (UNICOM), MULTICOM, Flight Service Station, or tower frequency depending on the airport. Please check the appropriate aeronautical publications to identify the type of CTAF being used and the frequency to use at the airport prior to departing your official work station. Radios are available to check out in the Grant and Compliance section.

If driving a vehicle on the airport's airside facilities, a strobe light or lighting system must be placed on the vehicle and activated until you have exited the AOA.

Questions regarding this memo are to be directed to Christopher Starr, P.E., at Christopher.Starr@tn.gov or 931-222-9878.

Tailgate removal procedures: *Procedure A*

Excludes all Hi-Lift equipped truck bodies.

Special Notes:

- **ALWAYS** refer to *Table A* of *Policy 305-01*, for the appropriate PPE.
- **ALWAYS** maintain 3-Points of contact when climbing.
- **ALWAYS** apply spray lubricant or penetrating liquid to pin connections prior to attempting removal.
- **NEVER** position yourself below the tailgate during removal or installation
- **NEVER** step between the truck and the piece of equipment that is supporting the tailgate.
- **NEVER** use your fingers or hands to align pin holes or flange ears in removal of pin connections.
- **ALWAYS** use hammers, spud wrench, pry bars, alignment tools and appropriate pieces of equipment to remove pins or to align holes for pin installation.
- **NEVER** place yourself between the truck, equipment nor either end or sides of the tailgate
- **ALWAYS** inspect all chains, straps, clevises and connection points prior to beginning work

PROCEDURE:

Procedure A; Removal, while bed remains in lowered position

1. Park vehicle on **level ground** – level in all directions, as much as practical
    a. Level in the forward and back position to reduce weight/binding pressure on top pins
    b. Level side to side – to reduce binding or stress on pins and flanges
2. Ensure **Vehicle is Off** and **Parking Brake Applied**. (this ensures everyone hears commands and verbal communication)
3. Place Roadway cones while performing this work (4-Typical, 28”):
    a. One on each corner, at the rear of the truck
    b. One each side at approximately 10ft spacing from corner of truck and continuing rearward (forming an alley or “Safe Area” reminder/awareness) – ***See Photos & Illustrations, Photos A & A1***.
4. A **minimum of 3 persons** is required to perform this task.
5. **Prior to start**, decide **“Who”** is giving commands to the equipment operator and crew to limit confusing or conflicting information (one person).
    a. **ANY Person can say “STOP” during any part of the process.**
6. Utilize a forklift, skid steer, backhoe or end loader **with forks** or a piece of equipment able to support and balance the tailgate during pin removal. ***See Photos & Illustrations C & D***.
    a. Forks should be spread as wide as possible for maximum stability and balance
7. Ensure lower tailgate latches are engaged to prevent swing-out of the bottom portion of the tailgate during top pin removal.

8. **VERIFY:** Bed is empty and that there is **NO** debris or materials inside bed.
9. Utilize the tailgate chains to **secure the tailgate at each top corner** by inserting the appropriate amount of chain through the top corner flanges, to prevent the tailgate from falling (*Set at ≤ 6 inches of tailgate fall, after pin release*) ***See Photos & Illustrations G & H***.
10. Personnel may work from inside the bed of the truck and not from below or outside in the direction of tailgate fall, during top pin removal.
    a. Enter the bed utilizing all available ladders, hand holds and provided access points.
    b. ALWAYS maintain 3-Points of contact when entering or exiting the bed.
    c. An approved Temporary or Permanently mounted ladder or steps must be utilized when exiting the bed to transfer to the externally mounted ladder **OR** exit through the rear opening with an appropriate ladder or step system, only if the tailgate has been removed and relocated from the immediate area; after *Step 26*.

Note: *The internal and external ladders/steps are for access only and not for conducting work tasks.*

11. Move the piece of equipment with forks, to the rear of the truck and into position
    a. Position forks near the upper third of the tailgate and balanced (one fork placed each side of the center of the tailgate)
    b. Forks should be lightly touching the tailgate to prevent sudden drops when the pins are removed from the top connections. ***See Photos & Illustrations, Photo H***.
12. Ensure tailgate chains are attached to bed flanges, for secondary catchment and the equipment with forks is **Shut Off** and **Parking Brake** applied.
13. Proceed to remove pins from top section of tailgate, while supporting with the piece of equipment with forks.
14. Once pins have been removed, and everything is visually stable, disconnect chains from the truck bed flanges. Pressure may have to be taken off chains prior to removal.
15. Persons removing pins, from inside bed, will move away from the immediate area and clear of the tailgate (toward the front of the bed).
16. Utilize the equipment with forks to slowly back away while simultaneously lowering the tailgate to a level position with the bed.
17. The tailgate should now be fully supported and resting on the forks. ***See Photos & Illustrations, Photos C, D & F***.
18. **STOP** and **SHUT OFF** all equipment.
19. Personnel, inside bed, may now exit the bed utilizing one of the procedures outlined in previous ***Steps 10b & c***. **DO NOT**:
    a. DO NOT Climb out over the tailgate
    b. DO NOT Jump from the bed opening
    c. DO NOT Climb out over the supported tailgate and onto the piece of equipment supporting the tailgate
20. Secure the upper section of the tailgate to the equipment with forks, by one the following:
    a. Connect to tailgate D-ring with properly rated strap and screw-pin clevis
    b. Utilize the tailgate chains and clevises

b. Install straps to top pin locations and secure with clevises

Note: *Secure to the frame of the fork attachment utilizing frame attachment points or provided holes for securement/tiedown applications.*

Clevises, chains and straps should be rated >10K lb. breaking strength* (*See Photos & Illustrations U, V, W & Example Table for Screw-Pin Clevis Ratings***).

21. Truck operator and equipment with forks operator will prepare to release tailgate.
22. **VERIFY**:
    a. Tailgate balance on forks
    b. Securement to equipment.
    c. Look for any binding, tilting or sliding potential (i.e. fork tilt angles)
23. With **all persons clear** of the immediate area of the tailgate.
    a. Spotter to observe and maintain line-of-site to the dump truck operator **and** the equipment operator
    b. Proceed with procedure to deactivate (unlatch) the lower tailgate latches
24. Upon successful detachment of the lower section
    a. The equipment with forks will proceed to back away from the dump truck while lowering the tailgate close to the ground as practical. ***See Photos & Illustrations I***.
25. Maintain a clear area around the tailgate and equipment.
26. Proceed to the location tailgate is to be stored. Carry load as low to ground as possible.
27. Tailgates should be stored flat and level onto blocks of wood. ***See Photos & Illustrations J***.
    a. Arrive at location to be stored.
    b. Place blocks <u>prior</u> to moving tailgate into position.
        i. Blocks of wood: 2 - 4in x 4in x 6ft or larger, (1 per side) placed parallel to the forks – for flat storage
    c. Lower and tilt tailgate onto blocks.
    d. Remove securement straps or chains from fork attachment or frame
    e. Remove persons from immediate area
    f. Utilize a spotter
    g. Operator; proceed to back away from tailgate.
    h. Continue backing away from tailgate section that is now fully supported by blocks.
    i. Verify stability prior to stacking subsequent sections.
    j. Place blocks for next section <u>before</u> next tailgate is moved into position.

No more than (5) five tailgates should be stacked with wood blocks (2 blocks - between each tailgate section).

Similar dimension blocks should be utilized on a single layer to prevent sliding while stored.
(i.e. DO NOT use a 4in x 4in block and a 6in x 6in block on the same tailgate section)

28. Reinstallation should occur in reverse order with all securement procedures and personnel safety processes in place.
29. During reinstallation and in ***Steps 11 through 23***, ensure that pry bars, spud wrenches and other approved alignment tools are used in the realignment of pin holes and latches.

Tailgate removal procedures: *Procedure B*

Excludes all Hi-Lift equipped truck bodies.

Special Notes:

- **ALWAYS** refer to *Table A* of *Policy 305-01*, for the appropriate PPE.
- **ALWAYS** maintain 3-Points of contact when climbing.
- **ALWAYS** apply spray lubricant or penetrating liquid to pin connections prior to attempting removal.
- **NEVER** position yourself below the tailgate during removal or installation
- **NEVER** step between the truck and the piece of equipment that is supporting the tailgate.
- **NEVER** use your fingers or hands to align pin holes or flange ears in removal of pin connections.
- **ALWAYS** use hammers, spud wrench, pry bars, alignment tools and appropriate pieces of equipment to remove pins or to align holes for pin installation.
- **NEVER** place yourself between the truck, equipment nor either end or sides of the tailgate
- **ALWAYS** inspect all chains, straps, clevises and connection points prior to beginning work

PROCEDURE:

Procedure B; Removal, while bed is in raised position

1. Park vehicle on **level ground** – level in all directions, as much as practical
    a. Level in the forward and back position to reduce weight/binding pressure on top pins
    b. Level side to side – to reduce binding or stress on pins and flanges
2. Ensure **Vehicle is Off** and **Parking Brake Applied**. (this ensures everyone hears commands and verbal communication)
3. Place Roadway cones, at rear of vehicle, while performing this work (4-Typical, 28”):
    a. One on each corner, at the rear of the truck
    b. One each side at approximately 10ft spacing from corner of truck and continuing rearward (forming an alley or “Safe Area” reminder/awareness) – ***See Photos & Illustrations, Photos A & A1***.
4. A **minimum of 3 persons** is required to perform this task.
5. **Prior to start**, decide **“Who”** is giving commands to the equipment operator and crew to limit confusing or conflicting information (one person).
    a. **ANY Person can say “STOP” during <u>any part</u> of the process.**
6. Utilize a forklift, skid steer, backhoe or end loader **with forks** or a piece of equipment able to support and balance the tailgate during pin removal. ***See Photos & Illustrations C & D***.
    a. Forks should be spread as wide as possible for maximum stability and balance
    b. One fork should be located each side of the center of the tailgate

7. Ensure lower tailgate latches are engaged to prevent swing-out of the bottom portion of the tailgate during top pin removal.
8. Move the piece of equipment with forks, to the rear of the truck and facing the tailgate.
    a. Stage in area to the rear and clear of the dump truck body and tailgate.
9. Utilize a spotter to communicate with both operators by line-of-sight.
10. **VERIFY**:
    a. Adequate overhead clearance to fully raise truck bed. No wires, structures or other overhead obstacles are present.
    b. Bed is empty and that there is **NO** debris or materials inside bed, prior to raising unit.
11. Truck operator will raise truck bed to maximum height.
12. Utilize the tailgate chains to **secure the tailgate at each top corner** by inserting the appropriate amount of chain through the top corner flanges, to prevent the tailgate from falling (*Set at ≤ 6 inches of tailgate fall, after pin release*) ***See Photos & Illustrations, Photos G & H***.
13. Move the piece of equipment with forks, to the rear of the truck and into position
    a. Position forks near the upper third of the tailgate and balanced (one fork placed each side of the center of the tailgate)
    b. Forks should be lightly touching the tailgate to prevent sudden drops when the pins are removed from the top connections. ***See Photos & Illustrations, Photo H***.
14. Ensure tailgate chains are attached to bed flanges, for secondary catchment and the equipment with forks is **Shut Off** and **Parking Brake** applied.
15. During this procedure, personnel shall work from **outside the bed** of the truck.
16. Proceed to remove pins from top section of the tailgate.
    a. Utilize step ladders, rolling step stools, pedestal ladders, platforms, movable stairs or other approved devices to work from ground and as much to the side as practical. ***See Photos & Illustrations, Photos X, Y & Z***.
17. Once pins have been removed and tailgate is resting on the forks, disconnect chains from the truck bed flanges. Pressure may have to be taken off chains prior to removal.
18. Persons removing pins and chains will now move away from the immediate area and clear of the bed and tailgate.
19. Spotter will guide equipment operator to lower the tailgate to a flat and near level position, parallel to the ground.
20. The tailgate should now be fully supported and resting on the forks. ***See Photos & Illustrations, Photos C, D & F***.
21. **STOP** and **SHUT OFF** all equipment.
22. Secure the upper section of the tailgate to the equipment with forks by one the following:
    a. Connect to D-ring with properly rated strap and screw-pin clevis
    b. Utilize the tailgate chains and clevises
    a. Install straps to top pin locations and secure with clevises

Note: *Secure to the frame of the fork attachment utilizing frame attachment points or provided holes for securement/tiedown applications.*

Clevises, chains and straps should be rated >10K lb. breaking strength* (*See Photos & Illustrations U, V, W & Example Table for Screw-Pin Clevis Ratings***).

23. Truck operator and equipment with forks operator will prepare to release tailgate.
24. **VERIFY**:
    a. Tailgate balance on forks.
    b. Securement to equipment.
    c. Look for any binding, tilting or sliding potential (i.e. fork tilt angles)
25. With **all persons clear** of the immediate area of the tailgate
    a. Spotter to observe and maintain line-of-site to the dump truck operator **and** the equipment operator
    b. Proceed with procedure to deactivate (unlatch) the lower tailgate latches
26. Upon successful detachment of the lower section.
    a. The equipment with forks will proceed to back away from the dump truck while lowering the tailgate as close to the ground as practical. ***See Photos & Illustrations I***.
27. Maintain a clear area around the tailgate and equipment.
28. Spotter can now verify tailgate removal and clearance to indicate that the dump bed may be lowered.
29. Proceed to the location tailgate is to be stored. Carry load as low to ground as possible.
30. Tailgates should be laid flat and level onto blocks of wood. ***See Photos & Illustrations J***.
    a. Arrive at location to be stored.
    b. Place blocks <u>prior</u> to moving tailgate into position.
        i. Blocks of wood: 2 - 4in x 4in x 6ft or larger, (1 per side) placed parallel to the forks – for flat storage
    c. Lower and tilt tailgate onto blocks.
    d. Remove securement straps or chains from fork attachment or frame
    e. Remove persons from immediate area
    f. Utilize a spotter
    g. Operator; proceed to back away from tailgate.
    h. Continue backing away from tailgate section that is now fully supported by blocks.
    i. Verify stability prior to stacking subsequent sections.
    j. Place blocks for next section <u>before</u> next tailgate is moved into position.

No more than (5) five tailgates should be stacked with wood blocks (2 blocks - between each tailgate section).

Similar dimension blocks should be utilized on a single layer to prevent sliding while stored.
(i.e. DO NOT use a 4in x 4in block and a 6in x 6in block on the same tailgate section)

31. Reinstallation should occur in reverse order with all securement procedures and personnel safety processes in place.
32. During reinstallation and in ***Steps 16 through 26***, ensure that pry bars, spud wrenches and other approved alignment tools are used in the realignment of pin holes and latches.

Tailgate removal procedures: *Procedure C*

Excludes all Hi-Lift equipped truck bodies.

Special Notes:

- **ALWAYS** refer to *Table A* of *Policy 305-01*, for the appropriate PPE.
- **ALWAYS** maintain 3-Points of contact when climbing.
- **ALWAYS** apply spray lubricant or penetrating liquid to pin connections prior to attempting removal.
- **NEVER** position yourself below the tailgate during removal or installation
- **NEVER** step between the truck and the piece of equipment that is supporting the tailgate.
- **NEVER** use your fingers or hands to align pin holes or flange ears in removal of pin connections.
- **ALWAYS** use hammers, spud wrench, pry bars, alignment tools and appropriate pieces of equipment to remove pins or to align holes for pin installation.
- **NEVER** place yourself between the truck, equipment nor either end or sides of the tailgate
- **ALWAYS** inspect all chains, straps, clevises and connection points prior to beginning work

PROCEDURE:

Procedure C; Utilizing Factory Installed D-ring, while bed is in raised position

1. Park vehicle on **level ground** – level in all directions, as much as practical
    a. Level in the forward and back position to reduce weight/binding pressure on top pins
    b. Level side to side – to reduce binding or stress on pins and flanges
2. Ensure **Vehicle is Off** and **Parking Brake Applied**. (this ensures everyone hears commands and verbal communication)
3. Place Roadway cones while performing this work (4-Typical, 28”):
    a. One on each corner, at the rear of the truck
    b. One each side at approximately 10ft spacing from corner of truck and continuing rearward (forming an alley or “Safe Area” reminder/awareness) – ***See Photos & Illustrations, Photos A & A1***.
4. A **minimum of 3 persons** is required to perform this task.
5. **Prior to start**, decide **“Who”** is giving commands to the equipment operator and crew to limit confusing or conflicting information (one person).
    a. **ANY Person can “STOP Work” during any part of the process.**
6. Utilize a forklift, skid steer, backhoe or end loader **with forks** (and lift attachment) or **bucket attachment** with factory mounts or connection points able to support and balance the tailgate during pin removal. – ***See Photos & Illustrations, Photos B, K, L, M, N, O, P & S***.
    a. If forks are used, a manufactured system to handle lifting loads is required as an attachment to the fork unit. **DO NOT** secure loads to header rack, especially on forklifts

or any location not approved for lifting loads. ***See Photos & Illustrations, Photos Q & R*** for example devices and attachment locations.

7. **THIS Method Only** (***Procedure C***) can utilize appropriately rated equipment with bucket attachments and factory attachment points to hoist and hold the tailgate, as shown in ***Photos & Illustrations, Photos B, K, L, M, N, O, P & S***.
8. Attach a tag line, tether rope(s) or strap(s) (*2-preferred; one per side*) to a bottom connection, box, channel or chain to allow a ground person to control swing and twist of the tailgate, once freed from the truck. ***See Photos and Illustrations, Photos P, S & T***.
   Note: This step is completed prior to removal of any tailgate pins or latches.
   a. Length of strap(s) should move the person a minimum of **6ft** from the nearest edge of the tailgate
   b. Material should be greater than 500lb breaking strength
   c. Tag lines, tethers and ropes shall be of non-conducting material
   d. Only used to prevent twisting and provide stability (**NOT** for lifting loads)
9. Utilize a spotter to communicate with the truck and equipment operators, by line-of-sight.
10. During these procedures, personnel shall work from **outside the bed** of the truck.
11. **VERIFY**:
    a. Adequate overhead clearance to fully raise truck bed. No wires, structures or other overhead obstacles are present.
    b. Bed is empty and that there is **NO** debris or materials inside bed, prior to raising unit.
12. Proceed with procedure to deactivate (unlatch) the lower tailgate latches.
13. Truck operator will raise truck bed to maximum height.
14. Attach strap(s) and screw-pin clevis to the D-ring on the tailgate.
15. Move the piece of equipment with forks or bucket attachment (as outlined in ***Steps 6 & 7***), to the rear of the truck and into position near the gate and allowing enough distance to connect the strap to the equipment.
16. **STOP** and **SHUT OFF** all equipment.
17. Attach and secure strap(s) and screw-pin clevises at the approved/factory attachment point(s) on the piece of equipment.

Note: *Two straps may be required for offset attachment points on buckets with both connecting to the single D-ring on the tailgate, as shown in* ***Photos & Illustrations, Photos K & L****.*

IMPORTANT: *Avoid Looping/draping straps over the forks as this may allow the strap and entire unit to slide from the forks due to potential of an improper tilt angle. Secure to the factory attachment points or approved attachment device, with screw-pin clevises.*

Clevises, chains and straps should be rated >10K lb. breaking strength* (*See Photos & Illustrations U, V, W & Example Table for Screw-Pin Clevis Ratings***).

18. With **all persons clear** of the immediate area of the tailgate,
    a. Position fork-mounted lifting attachment or bucket attachment point over the top edge of the tailgate (one fork should be located on each side of the center of the tailgate or

place the center of the bucket over the center of tailgate to aid in balance and minimize swing out upon pin removal).

19. Utilize Spotter and lift the attachment to remove slack in the straps.
    a. Upward force should be minimal to prevent pin binding or upward tailgate stress and bottom gate upswing.
    b. Remove slack to prevent sudden drops when pins are removed.
20. Proceed to remove pins from top section of the tailgate.
    a. Utilize step ladders, rolling step stools, pedestal ladders, platforms, movable stairs or other approved devices to work from ground and as much to the side as practical. ***See Photos & Illustrations, Photos X, Y & Z***.
21. Once pins have been removed, persons removing pins will move away from the immediate area and clear of the tailgate.
22. **Verify** that everything is visually stable.
23. Prepare and ready the use of the pre-attached tether rope(s) or strap(s) as outlined in ***Step 8***.
24. With **all persons clear** of the immediate area of the tailgate.
    a. Spotter will observe and maintain line-of site to the equipment operator.
25. The spotter will aid the lowering of the tailgate as close to the ground as practical.
26. Maintain a clear area around the tailgate and equipment.
27. Proceed to location tailgate is to be stored. Carry load as low to ground as possible. ***See Photos & Illustrations, Photos P & S***.
28. It is recommended that the tailgate be lowered to rest flat on wooden blocks and then moved to its storage location with a forklift or other piece of equipment. However, it is not required.

Note: *Carrying a tailgate to the storage location, in an upright position is allowed, but placement should be done with the gate already set in a horizontal (flat) position prior to stacking. Setting the tailgate, in a vertical position and trying to lay it down has a high potential for sliding. Also, be aware that storage locations (indoor) may have height restrictions.*

29. Tailgates should be stored flat and level onto blocks of wood. ***See Photos & Illustrations J***.
    a. Arrive at location to be stored.
    b. Place blocks prior to moving tailgate into position.
        i. Blocks of wood: 2 - 4in x 4in x 6ft or larger, (1 per side) placed parallel to the forks – for flat storage
    c. Lower and tilt tailgate onto blocks.
    d. Remove securement straps or chains from fork or bucket attachment
    e. Remove persons from immediate area
    f. Utilize a spotter
    g. Operator; proceed to back away from tailgate.
    h. Continue backing away from tailgate section that is now fully supported by blocks.
    i. Verify stability prior to stacking subsequent sections.
    j. Place blocks for next section before next tailgate is moved into position.

No more than (5) five tailgates should be stacked with wood blocks (2 blocks - between each tailgate section).

Similar dimension blocks should be utilized on a single layer to prevent sliding while stored.
(i.e. DO NOT use a 4in x 4in block and a 6in x 6in block on the same tailgate section)

30. Reinstallation should occur in reverse order with all securement procedures and personnel safety processes in place.
31. During reinstallation and in ***Steps 8 through 23***, ensure that pry bars, spud wrenches and other approved alignment tools are used in the realignment of pin holes and latches.

Tailgate Removal Procedures:

Photos and Illustrations

Photo A, A1*– Cone placement. Delineates work area.*

10ft spacing (minimum)

Truck width, plus 1ft each side (minimum)

Example Equipment shown. (Different Procedures demonstrated):

Photo B

Photo C

Examples:

- *Backhoe (procedure C shown)*
- *Forklift (Procedure B shown)*
- *Wheel Loader (Procedure B shown)*
- *Skid Steer (not shown)*

*See steps outlined in a specific Procedure to understand recommendations on attachment and acceptable uses of a piece of equipment.

Photo D

Tailgate Lower Latches *(Procedures A & B)**:***

Pre-Work start – latches engaged ***Photo E***

Procedure A shown.

- *Verify lower latches are engaged (<u>both sides</u>).*

Photo F

- *Prepare tailgate, lower latch, release.*

for

Procedure B shown.

***Example of Temporary Tailgate Securement Measures** (Procedures A & B):*

Photo G

Procedure B shown (Photos G & H).
Similar to Procedure A, (bed in lowered position).

Photo H

- Forks resting against tailgate, prior to pin removal.
- *Tailgate temporarily secured, during pin removal (both sides).*

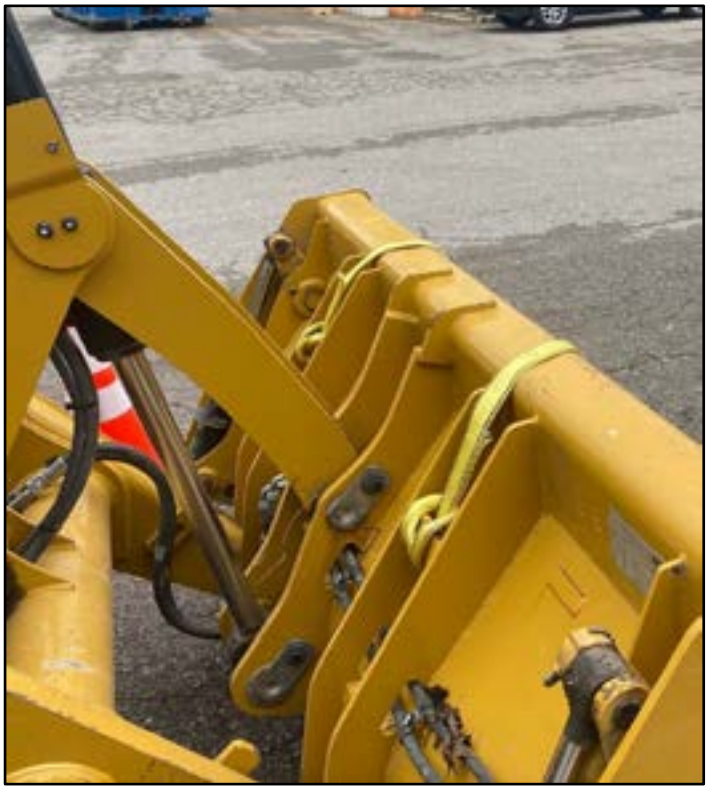
Detached Tailgate and Storage *(Procedures A & B):*

Photo I *Unit lowered upon release.*

Photo J *Unit stored on blocks of similar dimensions.*

Example Attachment *(Bucket; Procedure C only)**:***

Photo K *(Backhoe)*



- *Acceptable to use strap loops, if provided.*
- *Clevises can also be used to secure straps.*

**Some models provide an attachment at the center of the bucket and will allow for use of one, properly rated strap.*

This example: One strap used each side of center to balance load.

Photo L *(Backhoe)*

Wheel Loader Attachment *(Typical):*

Photo M
Wheel Loader Bucket end of connection

Photo N
D-ring *connection*

Photo O
Connected ends; tailgate to bucket attachment

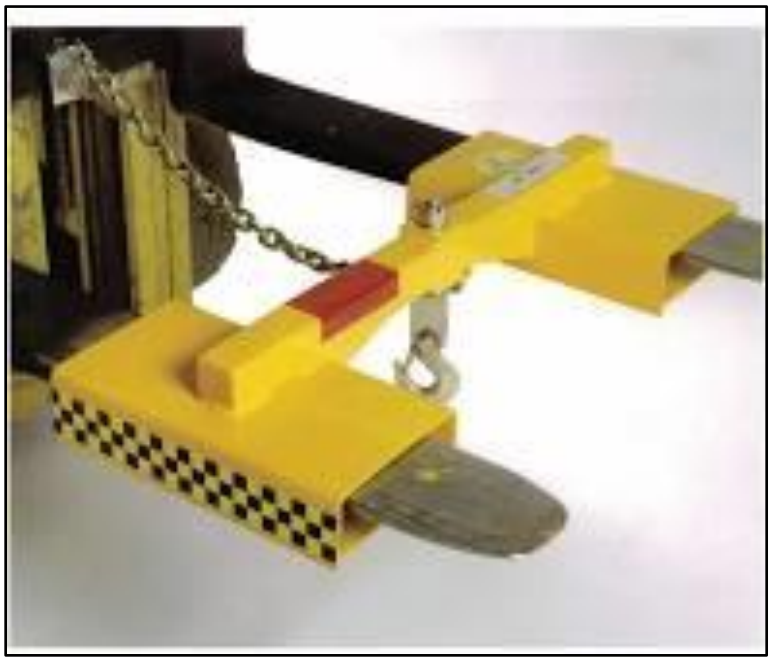
Tailgate Lowered to ground upon release *(Procedure C)**:***

Photo P

Example Forklift Attachments:

Photo Q

Photo R



Example Tag line/Tether use *(Procedure C)**:***

Photo S

Photo T

Tag lines, tethers and ropes shall be of non-conducting materials

Example Load Securement and Lifting Devices:

Note: *Straps can be used for securement to the attachments in Procedures A & B and utilized for lifting in Procedure C.*

**Clevises, chains and straps should be rated >10K lb. breaking strength*

Example Items Shown:

- *(2) - 6ft x 2inch straps – rated at 20K lbs each (depending on configuration)*
- *(1) - 7/8"screw-pin clevis – rated at 13K lbs (2 clevises are recommended)*
- *Spud Wrench for alignment/adjustments*

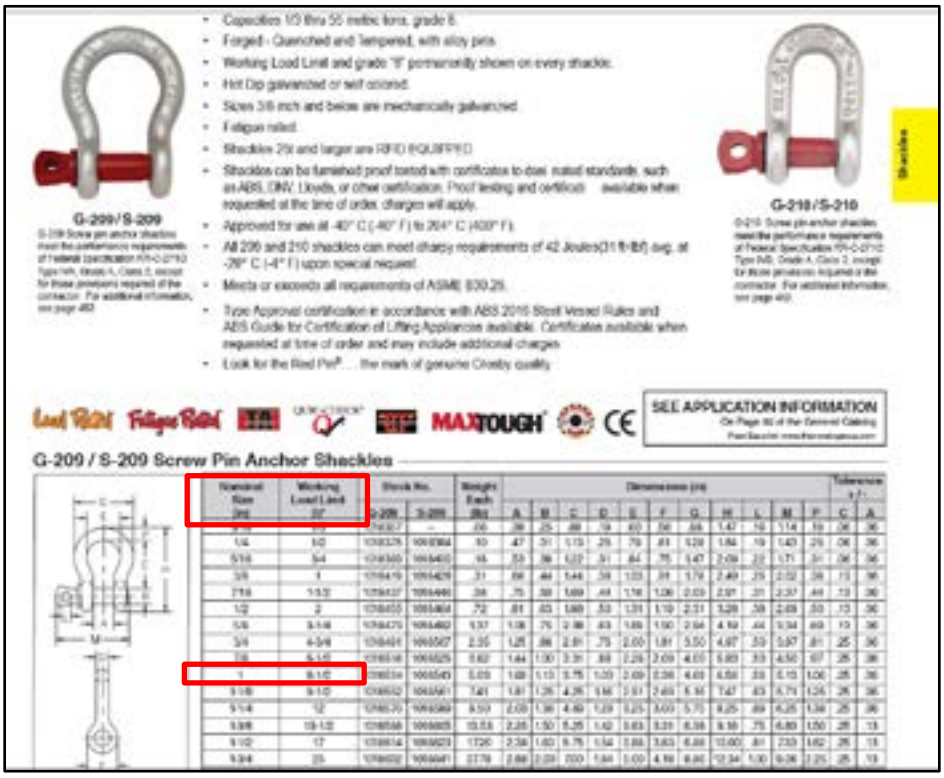
Photo U

Spud Wrench

Example Strap Rating Label:

Photo V

Example of Screw-Pin Clevis Rating:



- Capacities 1/3 thru 55 metric tons, grade 6.
- Forged - Quenched and Tempered, with alloy pins.
- Working Load Limit and grade "6" permanently shown on every shackle.
- Hot Dip galvanized or self colored.
- Sizes 3/8 inch and below are mechanically galvanized.
- Fatigue rated.
- Shackles 25t and larger are RFID EQUIPPED.
- Shackles can be furnished proof tested with certificates to most noted standards such as ABS, DNV, Lloyds, or other certification. Proof testing and certificate available when requested at the time of order, charges will apply.
- Approved for use at -40° C (-40° F) to 204° C (400° F).
- All 209 and 210 shackles can meet charpy requirements of 42 Joules@31 ft-lbf) avg. at -29° C (-4° F) upon special request.
- Meets or exceeds all requirements of ASME B30.26.
- Type Approval certification in accordance with ABS 2016 Steel Vessel Rules and ABS Guide for Certification of Lifting Appliances available. Certificates available when requested at time of order and may include additional charges.
- Look for the Red Pin® ... the mark of genuine Crosby quality.

G-209/S-209

G-210/S-210

Shackles

MAXTOUGH

SEE APPLICATION INFORMATION

G-209 / S-209 Screw Pin Anchor Shackles

- 1 inch, Crosby, Screw-Pin Anchor Shackle; Working Load Limit 8.5 Tons (17, 000lbs) – <u>Good!</u>

Tools and Materials Recommended:

Photo W

Example Steps and Platforms:

Photo X

- *Rolling step stool*

Photo Y *Rolling platform steps*

Photo Z

- *Step stool platform.*

Trailer-unit Attenuators, Supplemental Information:

Note: This information and illustrations will supplement the manufacturer's procedures as an alternate way to connect the cylinders while the trailer is connected to the host vehicle (dump truck). Whereas, the manufacturer procedures require that Step 5 be performed prior to connection of the trailer-unit to the vehicle due to lack of tool fitment in the pintle hook (tool will not fit in the pintle ring once connected to the vehicle).

Photos and Illustrations

- *Majority of photos shown, illustrate install on a truck without the rock pan for an unobstructed view. The video and a few photos include a truck with the rock pan.*

Photo A *– Tool used to extend and support cylinders during extension.*

Cylinder Tool; pinned and shown in stored position (left side trailer tongue).

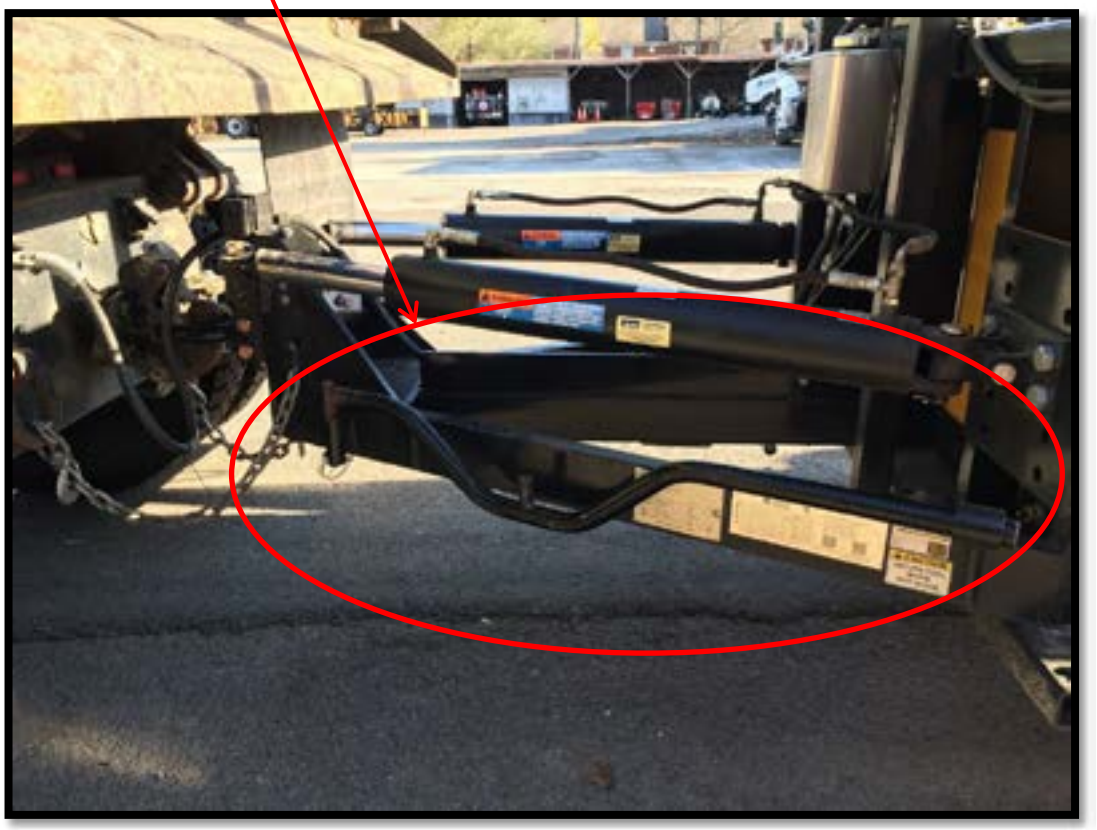
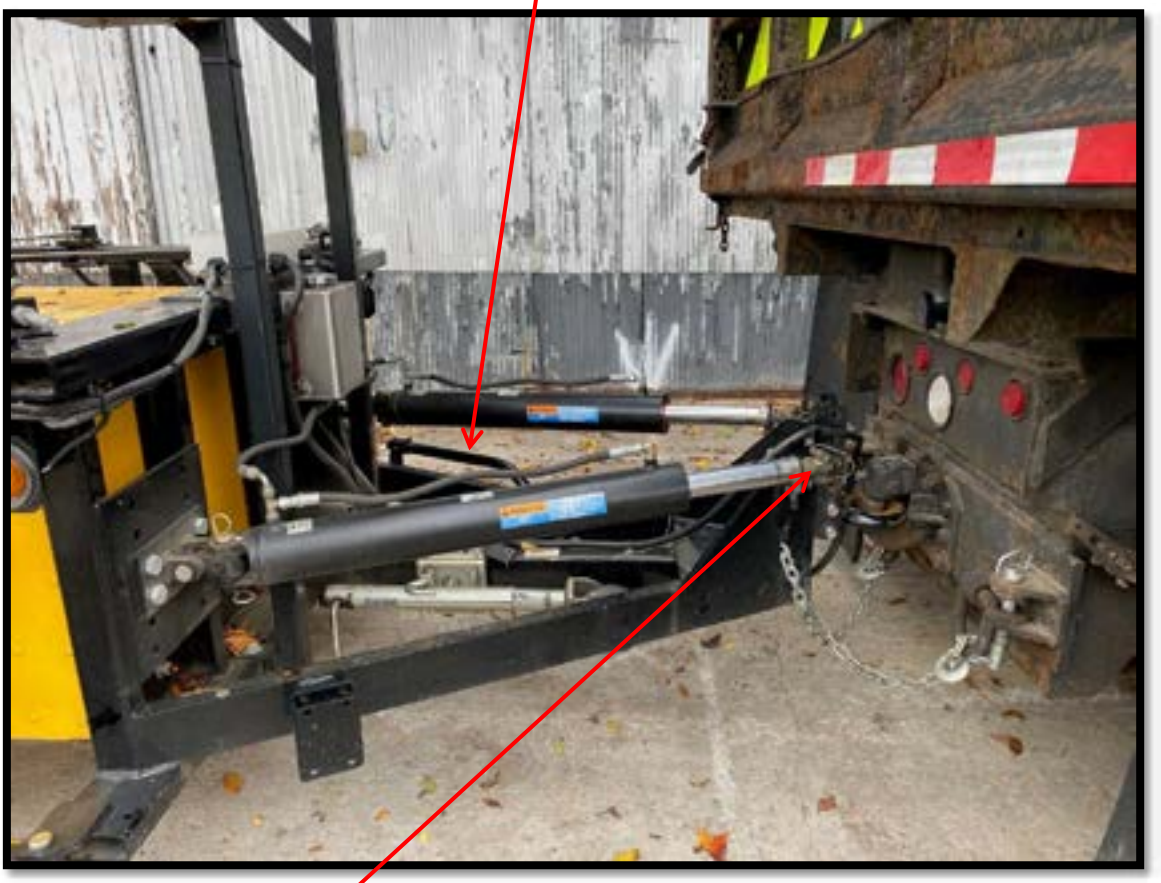


Photo B *– Cylinders resting on cradles and pin posts.*

Cylinder Tool in stored position (left side trailer tongue).



Cylinder cradle and pin connection.

Photo C *– Tool initially placed in the frame-mounted pin connection bracket on the truck to prepare for cylinder extension.*

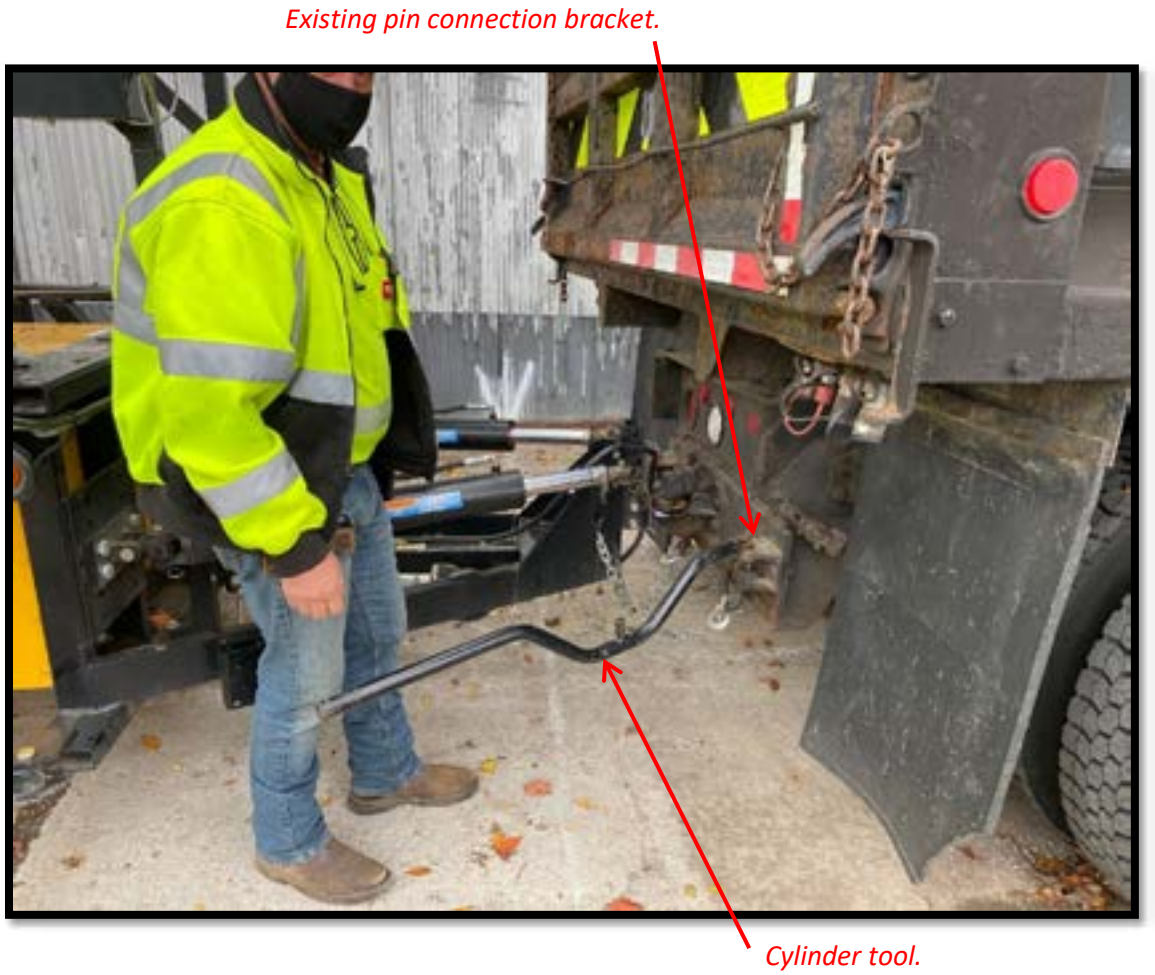


Photo D *– Cylinder removed from cradle and placed onto the pin near the center of the tool.*

Closer view:

Photo E *– Extend the cylinder so that the pin on the tool and the cylinder are near the same length as the truck's pin bracket. This should be an approximate length of extension required to connect the cylinder to the truck. Multiple trials may be required to achieve correct length.*

- *Without rock pan.*

Photo F

Note: *Due to the angle of this photo, the person's head appears and is relatively close to the truck spreader brackets and tailgate latches. It may be necessary and prudent to wear a hard hat when performing this step. Especially, if the rock pan is installed on the bed.*

- *Shown with rock pan.*

Photo G *– Approximate length required is illustrated here. Multiple trials may be required to achieve correct length.*

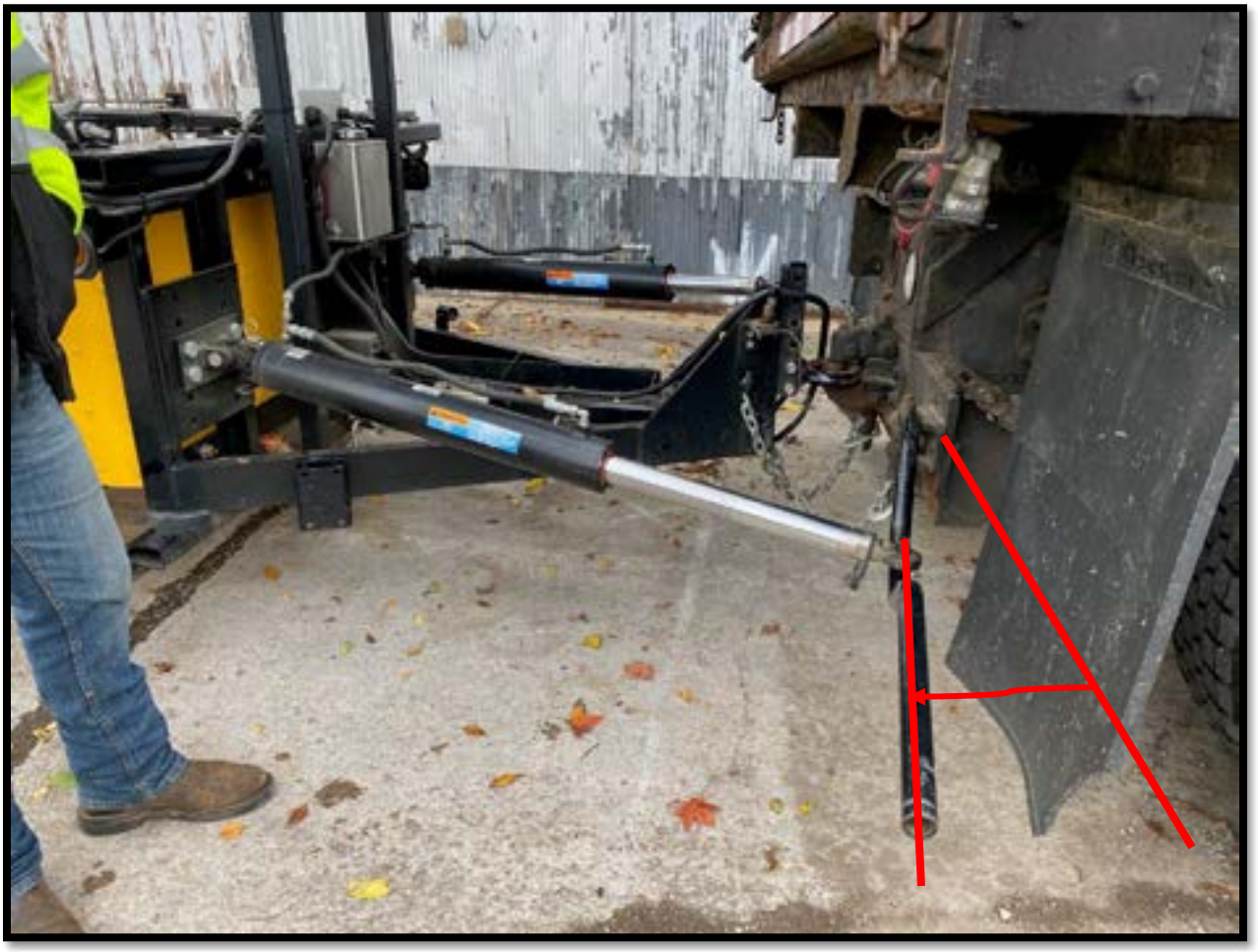
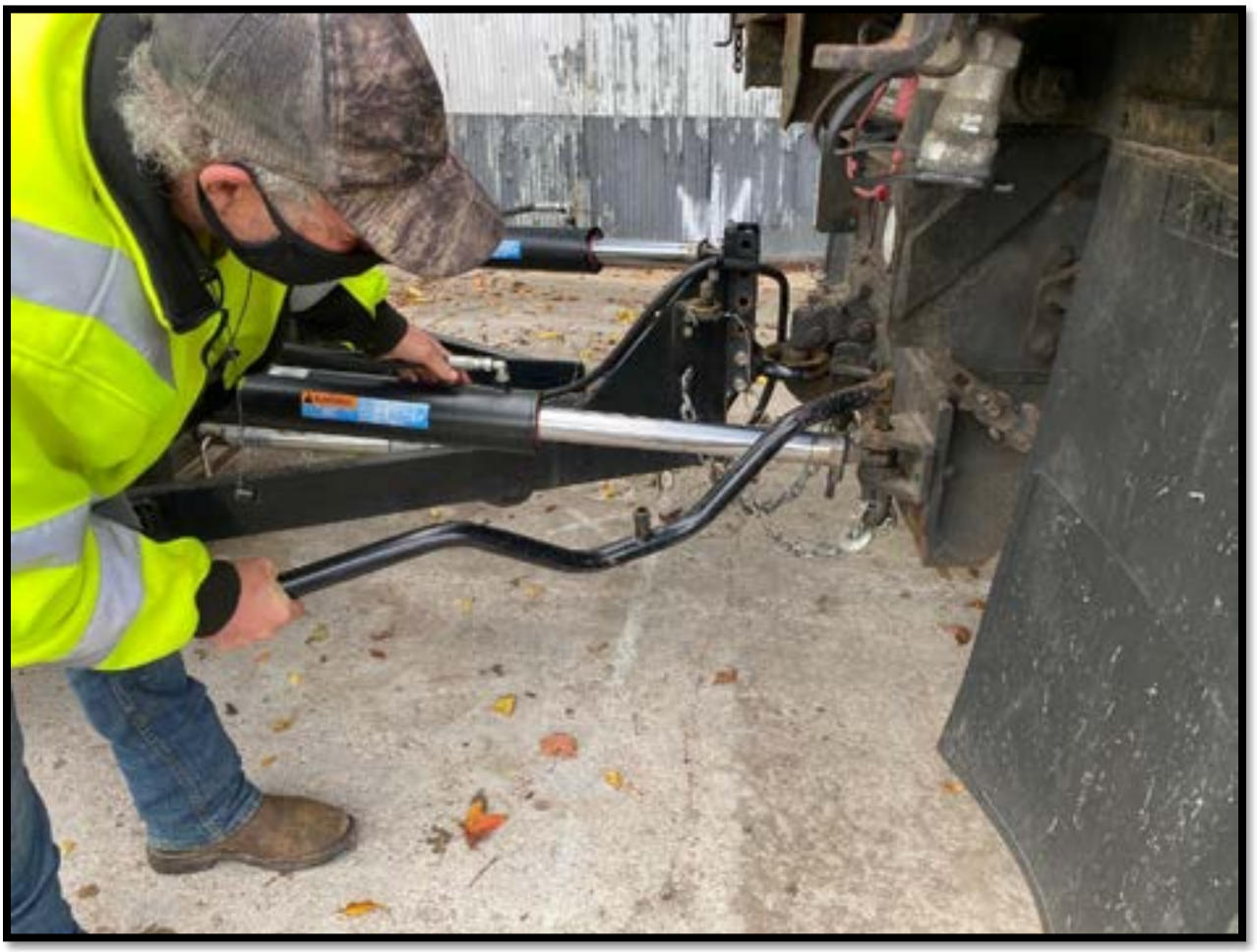


Photo H *– Utilize tool to aid in alignment of the pin connection of the cylinder end to the truck-mounted bracket. Secure with pins.*



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