



# **NORTH CAROLINA**

Department of Transportation



## OSHA Construction 10 Hour Struck-by

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# Objectives

- Define Struck-by injuries
- Recognize common types of struck-by hazards
- Identify how to protect yourself & co-workers from struck-by hazards
- Determine employer requirements to protect employees from struck-by hazards.

## OSHA Construction Focus Four – Struck-by

- Struck-by – when an object forcibly impacts or contacts a person, causing injury or death.
  - Struck-by flying object
  - Struck-by falling object
  - Struck-by swinging object
  - Struck-by rolling object
- The impact alone creates the injury.

# Class Examples

Who has a struck-by example?

# Struck-by Rolling Objects

What are some examples of struck-by rolling objects?

# Work Zone Struck-by



## Work Zone Struck-by

- What observations did you make from video depiction?
- What do you use as your resource for flagger/work zone safety and procedures?
- When is the most recent time that you have reviewed procedures to ensure that work zone safety is being performed as required by regulatory standards?
- When work zone procedures are not being followed as briefed, how do you as the supervisor handle it?



## Operating Equipment Struck-by

**Worker Crushed by Lowering Dump Box**

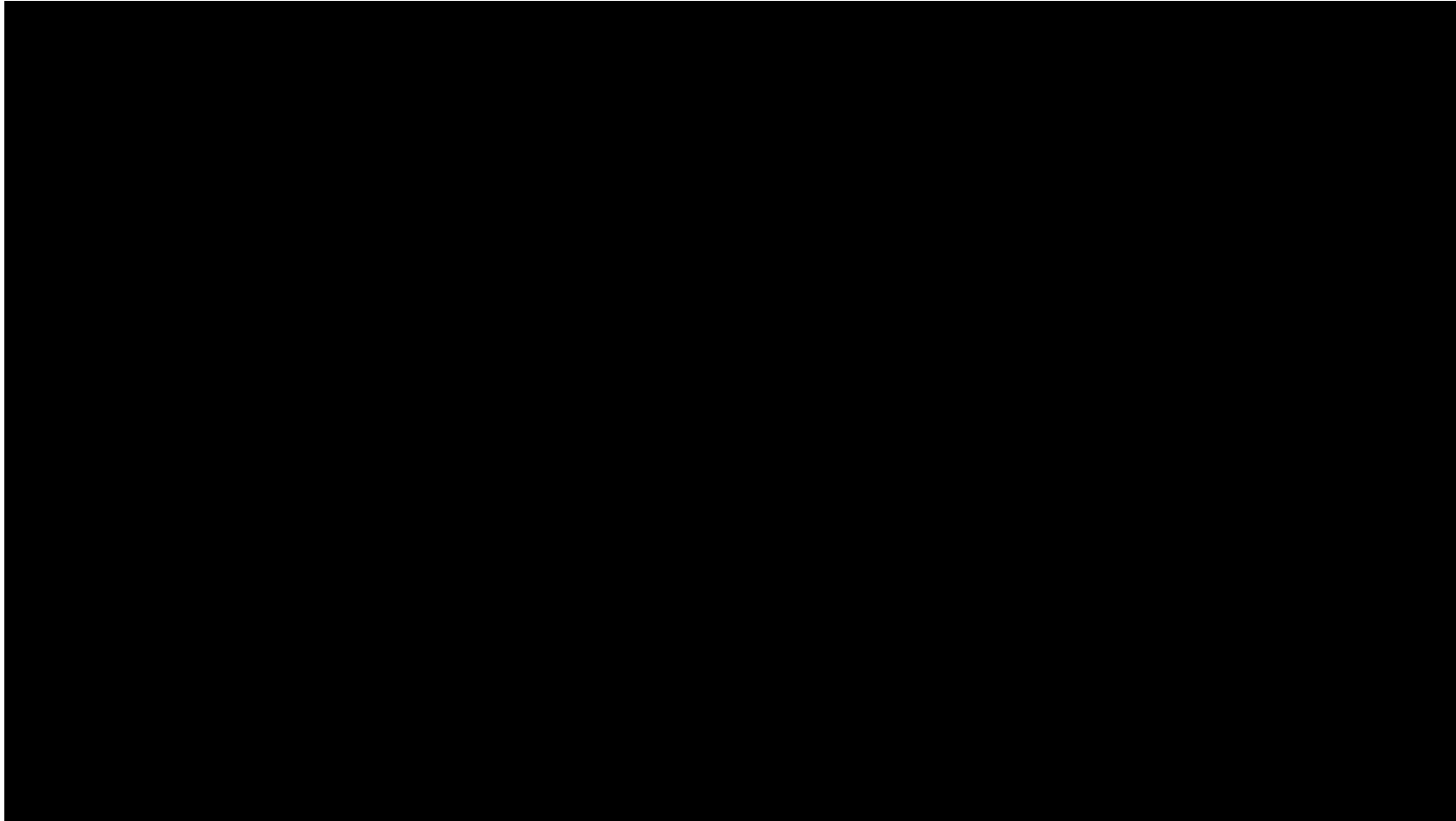




## Operating Equipment Struck-by

- Does your heavy equipment have hold-to-run controls?
- Are NCDOT operators required to be in cab when operating equipment?
- If operator rigged it to run, bypassing hold-to-run controls, what would be your actions?
- When making equipment modifications, do we consult with manufacturer and consider all facets of modification?
- When performing maintenance on heavy equipment, are we following NCDOT LOTO policy and reviewing the equipment's maintenance manual safety requirements and procedures?
- Are hazards properly labeled and do safety meetings remind workers of dangers?

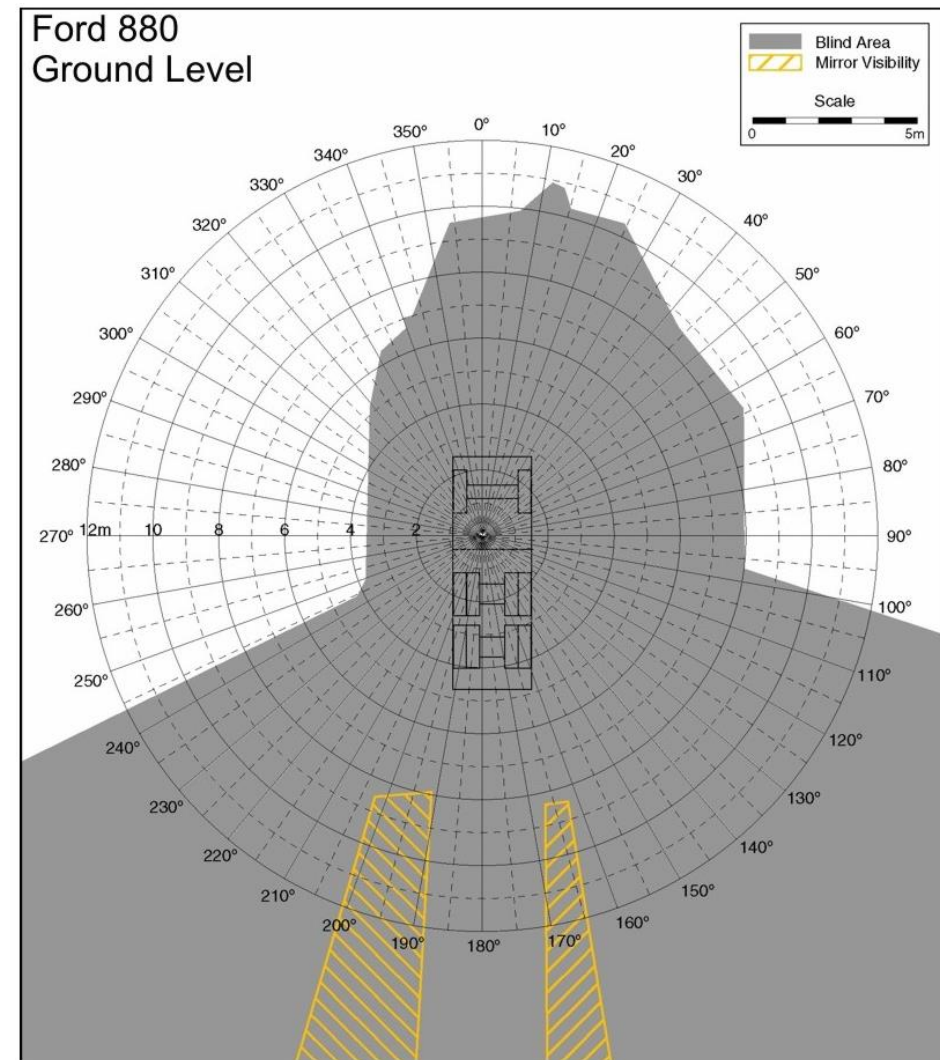
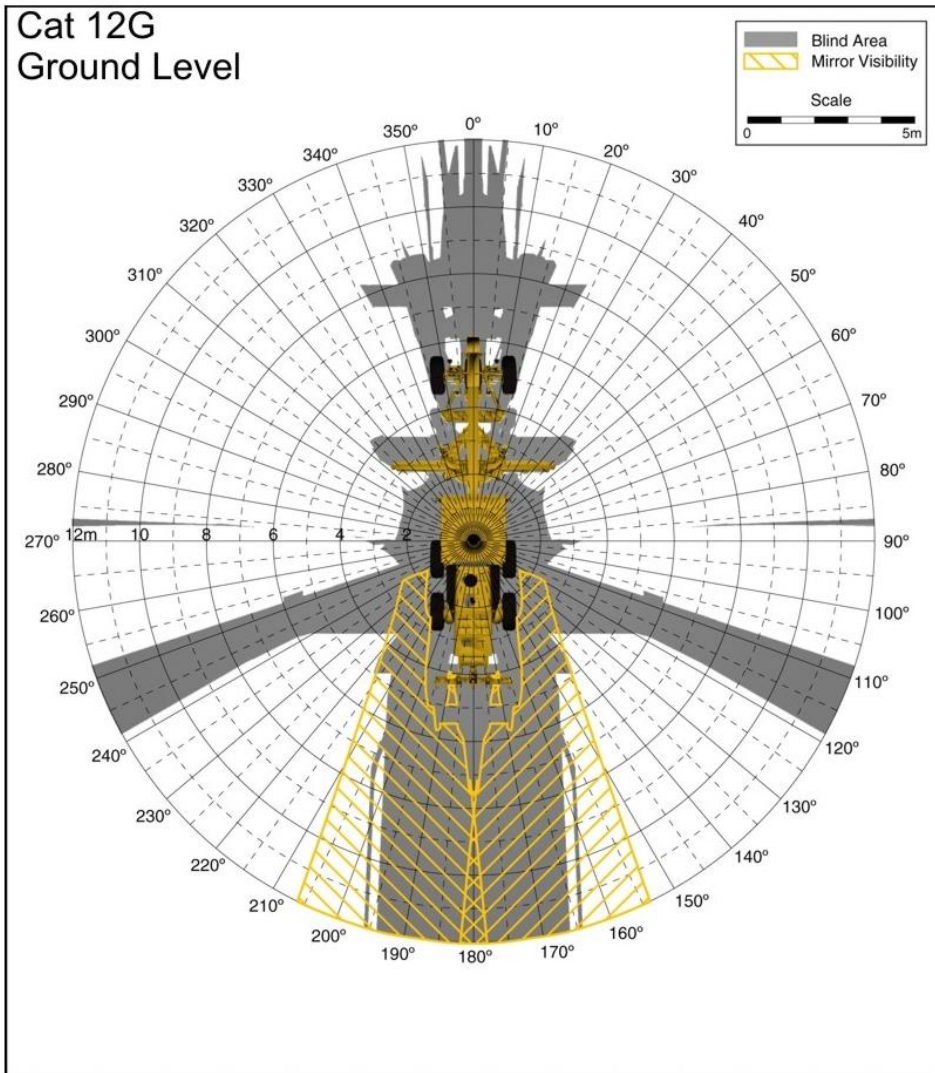
# Struck-by Heavy Equipment



# Struck-by Heavy Equipment

- What is NCDOT and its supervisor's responsibility to employees?
- What do you require for construction site safety where heavy equipment is operating?
  - Traffic Control Plan
  - Spotters
  - Back-up alarms
- What is the Equipment Operator's responsibility for safety?
  - restrict entry to the area by workers
  - must not permit a worker to remain within range of the moving load
  - the operator must not move the load or the equipment if a worker is exposed to the danger.

# Grader & Dump Truck Blind Area



# Crane Swing Radius Struck-by





# Crane Swing Radius Struck-by

- Recommendations to prevent swing struck-by's?
  - Verify that the operator sees you
  - Never position oneself under a suspended load
  - Stay outside the swing radius
  - Operator does not operate equipment until all personnel are accounted for
- Who is allowed within the “fall zone” when performing lifting?
  - Employees who meet the following conditions:
    - engaged in hooking, unhooking, guiding, or receiving a load
    - engaged in the initial attachment of the load to a component or structure
- If employees are within the fall zone:
  - The material being hoisted must be rigged to prevent unintentional displacement
  - Hooks with self-closing latches or the equivalent must be used
  - The materials must be rigged by a qualified rigger.

# Forklift (Graphic video)



## Powered Industrial Truck (Forklift) Operators

- Employers must develop and implement a PIT training program
- Operators are to be trained and certified prior to operating forklifts
- Operators are to be reevaluated once every three years or if operator demonstrates a deficiency in the safe operation of the forklift
- Training shall consist of a combination of formal instruction, practical training and an evaluation of operator's performance in workplace
- Operators are to be trained on how to do the job properly and safely.

## Struck-by Flying Objects

Name examples of flying objects that could cause a struck-by injury or fatality.

# Struck-by Flying Objects





## What Are The Initial Struck-by Hazards?

- Falling rock when the situation is first reported and investigated
- Prevention?
- Recognizing the struck by hazard before approaching
- Do not enter fall zone
- Do not park or be below falling rock hazard.

# NCDOT Blasting Operations



# What Are The Explosive Created Struck-by Hazards?

- Fly rock – rocks propelled from the blast area by the force of the explosion
- Safe stand off distance
- Overhead cover
- Hard hat for head protection
- Safety Glasses for eye protection.

## Struck-by Flying Object



## Struck-by Reinforced Bar

- What would you have recommended or required were you to observe this operation prior to injury?
  - Recommend closing front.
  - Employee complains that it's hot, then what supervisor?
  - Employee complains that cracked front glass makes it hard to see adequately?
  - Would PPE have helped in this situation?
- What is the policy for wearing PPE in a work zone?
- Why did they not remove re-bar?



# Crane Load Struck-by



# Crane Load Struck-by

- Thoughts on this mishap?
- What safety procedures should have been completed prior to lifting operation?
  - Was the daily/pre-shift crane inspection completed?
  - Was the crane's hoist capability versus load weight verified?
  - Were outriggers properly extended with proper outrigger pad placement?
  - Why were personnel in fall zone?
  - Why was crane operator lifting above the crane cab?
  - Was a tagline being used to control load?
  - Were slings properly inspected annually and prior to use?
  - Were slings rated to handle weight of load?
  - Did a "qualified rigger" rig and inspect the load prior to lift?

# Vehicle Maintenance Operations Struck-by



## NCDOT Maintenance Facilities

- Facilities use lifts and jacks to perform work
- Employees are to be trained on the proper operation of lifts and jacks
- Employees are to be follow manufacturer's safety guidance and recommendations
- Employers are to review manufacturer's safety and maintenance requirements
- Employers are to implement manufacturer's safety and maintenance procedures.

## Inflating Tires Video

**Every Year People Die  
While Inflating Tires**



# Rim Safety Precautions

Employees who work with tires and rims will be trained in how to safely maintain and service any tire and rims they may work on.

- Training is to include:
  - inspecting and identifying rim wheel components
  - mounting tires
  - demounting tires
  - installing and removing rim wheels
  - inflating tires
  - how to visually inspect restraining devices before and after use
  - how to identify defects in restraining devices such as cracks at welds, cracked, broken or corroded components.

# Tire Explosion Video



## Tire Explosion Video





## Grinding, Cutting & Welding Safety

- OSHA 1910.215 & ANSI B7.1
- Grinding operations may seem safe, but can cause serious injuries.
- Grinding wheels have different applications
- Use Aluminum oxide or zirconia alumina for steel and steel alloys grinding
- Use silicon carbide for cast iron, non-ferrous metals and non-metallic metal grinding.



## Hazards

- Entanglement – wheel guard is installed and designed to prevent high spindle and wheel rpm entanglement
- Contact – gloves will prevent contact with abrasive wheel
- Fragmentation – wheel guard contains fragments if wheel shatters
- Sparks
- Debris
- Eye and face protection – Safety glasses and face shield prevents injury
- Explosion – proper grinder wheel use can prevent this



## Proper Equipment Operation Video

**Hazards of  
Improper Use  
of Equipment**

## Wear the Proper PPE

- Safety glasses
- Clear or tinted face shield
- No loose clothing or hair
- Hearing protection
- Gloves – abrasion resistant



## Trueing/dressing the wheel

- Unplug grinder, set pedestal distance to 1/8"
- Spin wheel by hand to identify high spots
- Select dressing tool that is in good working order
- Start up machine, standing off to the side
- With PPE on, rest de-burring tool on pedestal and gently begin trueing process
- Turn off grinder, re-evaluate wheel.



## Why dress the wheel?

- Keeps pores clean that may be otherwise plugged. Shop applications can cover all types of metals
- Clean pores so wheel cuts better and creates less heat
- Clogged pores will require more force, thus more probability of damaging the stone or wheel. Injuries occur with more force
- Dressing a wheel will help it to rotate properly, less vibration from being out of balance.



## Identify the Hazards

- Grinding wheel is plugged with aluminum
- Spaces between wheel and fender & tool rest is excessive (1/4 & 1/8")
- Wheel needs to be changed
- Clear plastic shield is unserviceable.





## PPE Eye & Face Protection

- Flying particles
- Molten metals
- Liquid chemicals
- Acids or caustic liquids
- Chemical gases or vapors.



# Wear Your Personal Protective Equipment



# PPE Head Protection

- Required when there is a potential for injury to the head from falling objects (OSHA 1910.135)
- ANSI Z89.1 Types and Classes
  - Type 1 – protects blows to top of head only
  - Type 2 – protects from blows to top and side of head
  - Class G (general) - proof tested at 2,200 volts
  - Class E (electrical) - proof tested at 20,000 volts
  - Class C (conductive) - Provides no protection against contact with electrical hazards
- JHA should identify when helmet protection is required.





# Struck By Chain Saw







**LIVE**

**NEW THIS MIDDAY**

**10 NEWS**

**MOTHERS PROTEST RELEASE OF SEXUAL PREDATOR  
HEARING THIS WEEK FOR DOUGLAS BADGER'S RELEASE**



**HEADLINES IN AIRLINES COUNCIL ON TALL BUILDINGS: WORLD TRADE CENTER IN**

**11:35 74°**

## OSHA Struck By

- The objective of this training session is to highlight and discuss the many, various struck by injuries that may occur
- Performing work in a manner that decreases the possibility of a workplace injury is good business for the NCDOT, for you and for your families
- Supervisors must exercise leadership training and managing employees to reduce the likelihood of struck by injuries
- What is a “just this one time” becomes the accepted unsafe practice.

Questions?