NORTH CAROLINA
Department of Transportation









Materials Handling, Storage, Use, and Disposal

Materials Handling, Storage, Use, and Disposal

- Lesson Overview
  - Types of material handling equipment.
  - Hazards associated with material handling activities
  - Prevention of hazards associated with material handling equipment
  - Employer requirements to protect workers from material handling hazards

Types of Equipment

Conveyors

Source: OSHA

Powered Industrial Trucks

Source: TEEX-Harwood

Types of Equipment

Cranes

Source: OSHA

Slings

Source: OSHA

Factors Contributing to Injuries

- Weight and bulkiness of objects
- Bending, twisting, turning movements

Hazards

- Improper operation of equipment
- Accumulated materials or clutter

Hazards

- Unsafe conditions of materials or containers
- Flammability or toxicity of some materials

Hazards

- Weight of materials
- Binding ties or other devices that secure bundles or bound materials

Hazards

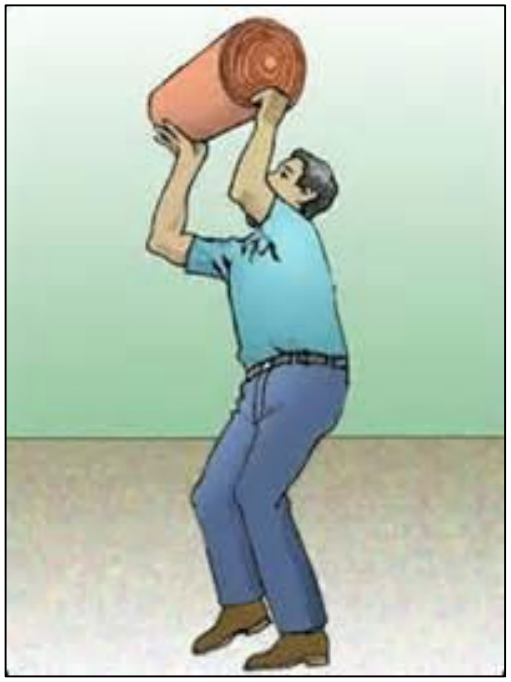
- Falling objects
- Lifting, pushing, pulling, or otherwise manually moving large, heavy items

Hazards

- Improperly stacked materials
- Struck-by or caught-in/-between hazards

Injuries

- Types of injuries commonly reported
  - Sprains, strains, tears
  - Soreness and pain
  - Bruises and contusions
  - Cuts, lacerations, and punctures



Injuries

- Examples of events or exposures leading to injuries
  - Contact with objects and equipment
  - Transportation incidents
  - Exposure to harmful substances or environments

Source: OSHA

Source: OSHA

Injuries

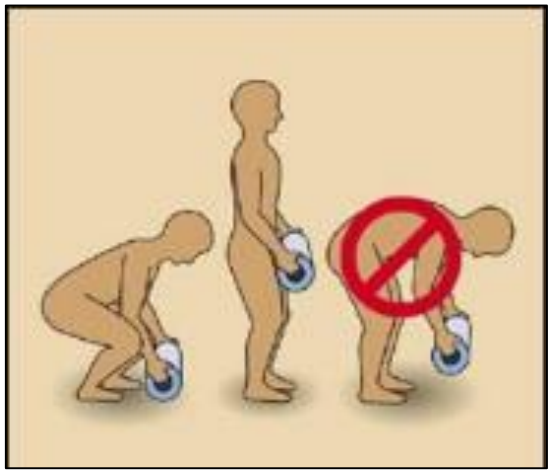
- Falls, slips, trips, or loss of balance
- Repetitive motion
- Overexertion

Source: OSHA

Source: OSHA

Preventing Hazards

- Moving materials manually
  - Use devices to assist with holding loads
  - Wear PPE
  - Use proper lifting technique
  - Seek help for oversized loads



Preventing Hazards

- Cranes
  - Major types of crane accidents
    - Contact with power lines
    - Overturns
    - Falls
    - Mechanical failure

Source: OSHA

Preventing Hazards

- Hoisting tons of material, steel, and concrete with cranes
- Operated only by thoroughly trained and competent workers

Source: OSHA

Source: TEEX - Harwood

Preventing Hazards

- Eliminate/reduce crane hazards by:
  - Knowing
    - Load
    - Capacity of the crane
    - When the load is safe to lift
  - Always checking crane load chart and never exceed load limits

Source: TEEX - Harwood

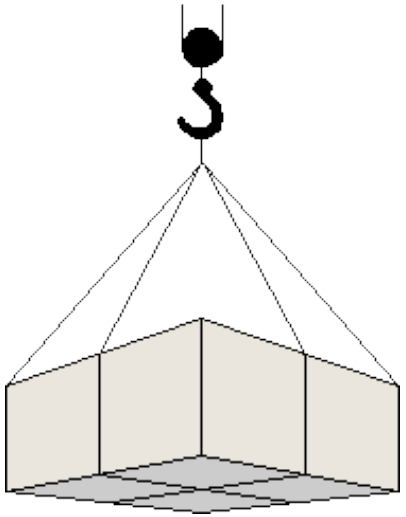
Preventing Hazards

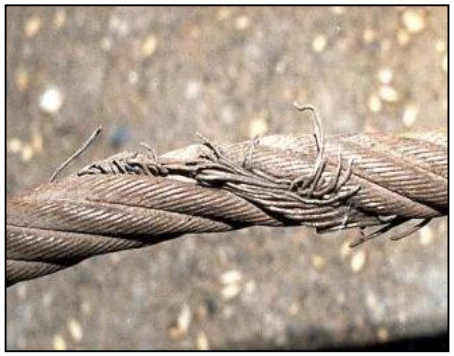
- Inspection of crane by a qualified person
  - Modified, repaired, or adjusted
  - Post-assembly
  - At least every 12 months
  - Equipment not in regular use
- Visual inspection by a competent person
  - Prior to each shift
  - Monthly

Source: OSHA

Preventing Hazards

- Slings
  - Connect a crane hook to a load
  - Proper selection
  - Inspection

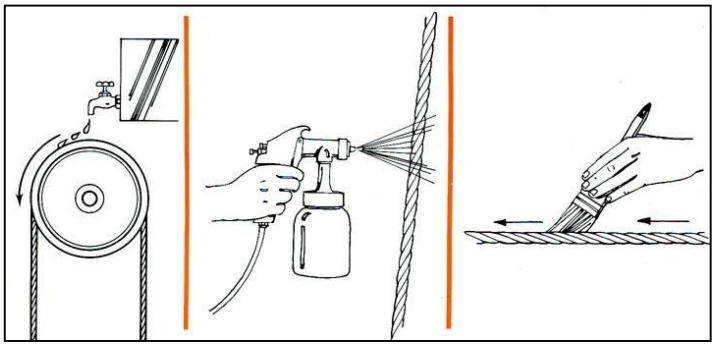




Source of photos: OSHA

Preventing Hazards

- Reduce sling hazards by:
  - Lubricated
  - Do not shorten with knots, bolts, or other devices, or kink legs
  - Keep clear of loads
  - Avoid sudden movement



Source: OSHA

Source: OSHA

Preventing Hazards

- Forklifts
  - Main causes of injuries
    - Forklift overturns
    - Forklift striking workers on foot
    - Persons crushed by forklifts
    - Persons falling from forklifts

Source: OSHA

Preventing Hazards

- Illegal forklift operators
  - Anyone under 18
  - Anyone not properly trained and certified

Preventing Hazards

Driving the forklift

- Obstructed vision
- Travel path
- Approaching people
- Elevated platform
- Seat belts and ROPS
- Raising/lowering forks
- Safe distance

Preventing Hazards

- Elevating workers with forklift
  - Standing on forks
  - Lifting personnel
  - Approved lift platform
  - Restraining means

Preventing Hazards

- Driving forklift on Grades/Ramps
  - Use extreme caution
  - No turns
  - Tilting and raising load
  - Point load up the incline

Source of photos: OSHA

Preventing Hazards

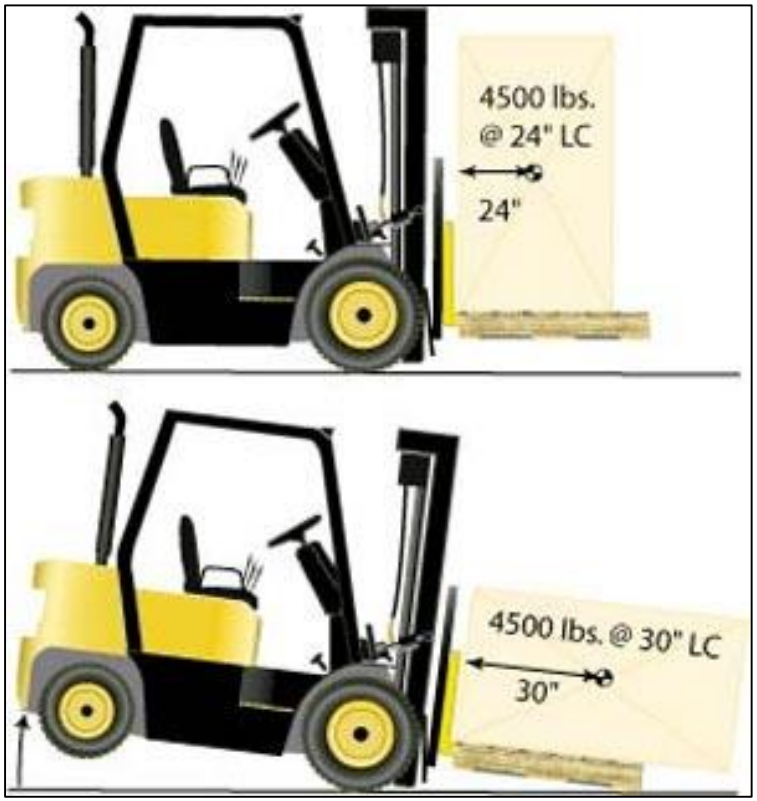
- Forklift operating speed
  - Tip-overs
  - Turning
  - Avoiding collisions
  - Wet and slippery floors
  - Ascending/descending
  - Obstructed vision

Source of photos: OSHA

Preventing Hazards

Avoiding Excess Weight

- Do not exceed weight capacity of forklift.
- Center loads and secure to keep from shifting to maintain balance of weight



Preventing Hazards

- Use of Dock Boards for Loading/Uploading
  - Bridging space
  - Securing portable dock boards
  - Handholds for dock boards

Source: OSHA

Preventing Hazards

- Exiting the Forklift
  - Set brake, lower forks/lifting carriage, neutralize controls
  - Stand-up type forklift

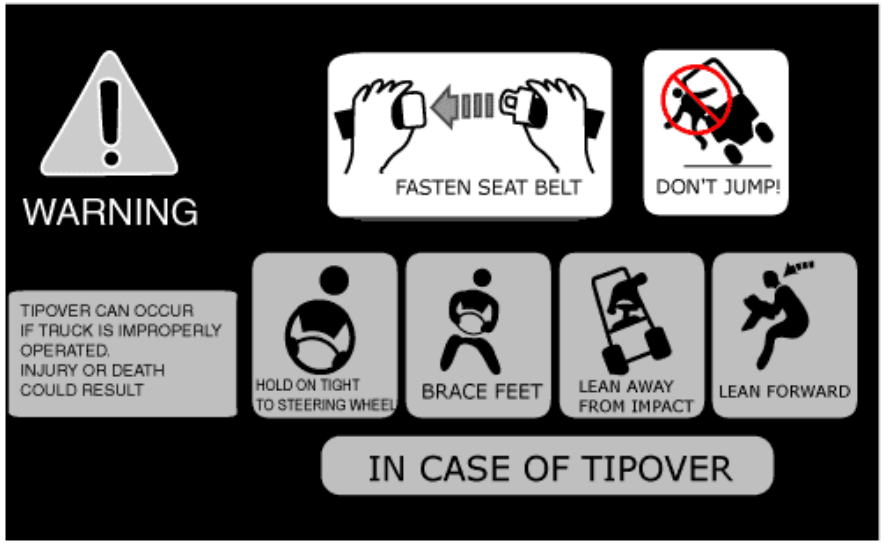
- Riding the forklift
  - No passengers allowed
  - Exception – seat is provided

Source of photos: OSHA

Preventing Hazards

– Avoiding Struck-by/Crushed-by

- Don’t jump from an overturning, sit-down type forklift.
- Stay with the truck, hold on firmly, and lean in the opposite direction of the overturn.



Source: OSHA

Preventing Hazards

- Forklift Training – do not operate a forklift without proper training and licensing.
- Reporting Damage – any damage or problems that occur to a forklift during a shift should be reported to the supervisor.

Source: OSHA

Preventing Hazards

- Earth-Moving Equipment
  - Scrapers
  - Loaders
  - Crawlers
  - Bulldozers
  - Off-highway trucks
  - Graders
  - Tractors

Source of photos: TEEX - Harwood

Preventing Hazards

- Earth-Moving Equipment
  - Seatbelts
  - Reverse gear not used unless that piece of equipment has:
    - Back-up signal alarm or
    - Signaler
  - Operator properly trained

Source: OSHA

Employer Requirements

- Comply with OSHA standards related to materials handling, including:
  - Training requirements, including requirements for forklift training.
  - Inspection requirements

Source of photos: OSHA

Employer Requirements

- Comply with manufacturers' requirements and recommendations for materials handling equipment.

Recognizing Hazards

Identify potential hazards and possible solutions:

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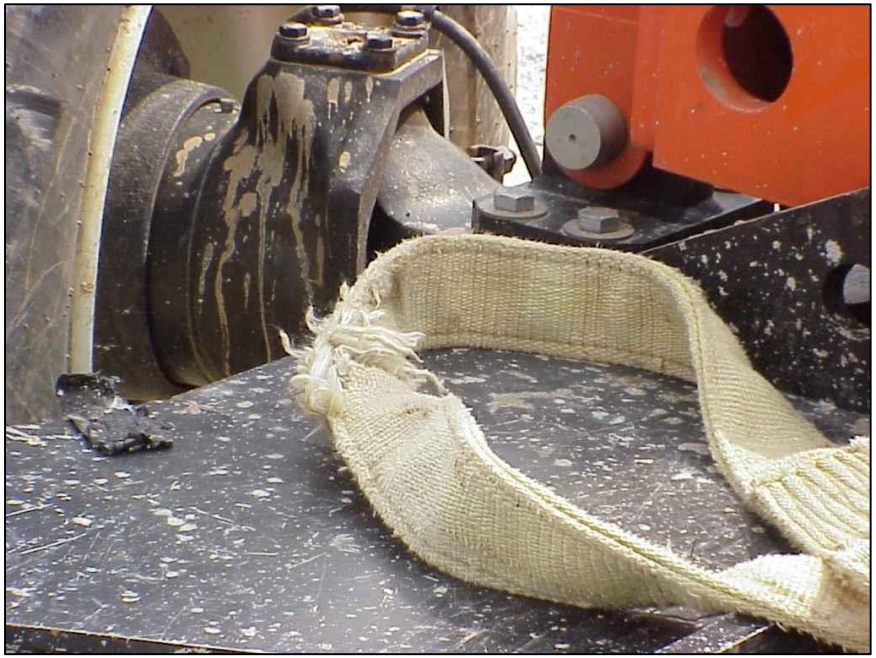
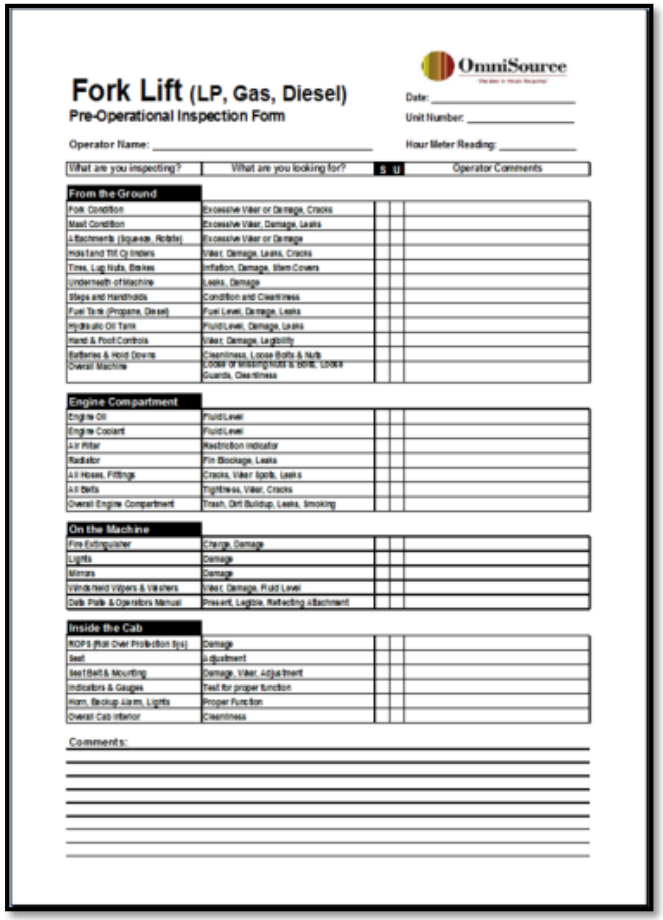


What three steps need to take place before an employee may operate any piece of mobile equipment?

1. Class room instruction and written test
2. Equipment overview and hands-on
3. Final operational evaluation

Why do we fill out pre-operation inspection sheets?

1. Keep up with equipment maintenance
2. Ensure equipment is safe to operate
3. Compliance



OmniSource

Fork Lift (LP, Gas, Diesel)
Pre-Operational Inspection Form

Date: _____
Unit Number: _____
Operator Name: _____
Hour Meter Reading: _____

What are you inspecting?	What are you looking for?	S	U	Operator Comments
From the Ground				
Fork Condition	Excessive Wear or Damage, Cracks			
Mast Condition	Excessive Wear, Damage, Leaks			
Attachments (Squeeze, Rotate)	Excessive Wear or Damage			
Hoist and Tilt Cylinders	Wear, Damage, Leaks, Cracks			
Tires, Lug Nuts, Brakes	Inflation, Damage, Wear, Covers			
Underneath of Machine	Leaks, Damage			
Steps and Handholds	Condition and Cleanliness			
Fuel Tank (Propane, Diesel)	Fuel Level, Damage, Leaks			
Hydraulic Oil Tank	Fluid Level, Damage, Leaks			
Hand & Foot Controls	Wear, Damage, Legibility			
Batteries & Hold Downs	Cleanliness, Loose Bolts & Nuts			
Overall Machine	Loose or Missing Nuts & Bolts, Loose Guards, Cleanliness			
Engine Compartment				
Engine Oil	Fluid Level			
Engine Coolant	Fluid Level			
Air Filter	Restriction Indicator			
Radiator	Fin Blockage, Leaks			
All Hoses, Fittings	Cracks, Wear Spots, Leaks			
All Belts	Tightness, Wear, Cracks			
Overall Engine Compartment	Trash, Dirt Buildup, Leaks, Smoking			
On the Machine				
Fire Extinguisher	Charge, Damage			
Lights	Damage			
Mirrors	Damage			
Windshield Wipers & Washers	Wear, Damage, Fluid Level			
Data Plate & Operators Manual	Present, Legible, Reflecting Attachment			
Inside the Cab				
ROPS (Roll Over Protection Sys)	Damage			
Seat	Adjustment			
Seat Belt & Mounting	Damage, Wear, Adjustment			
Indicators & Gauges	Test for proper function			
Horn, Backup Alarm, Lights	Proper Function			
Overall Cab Interior	Cleanliness			

Comments: _____

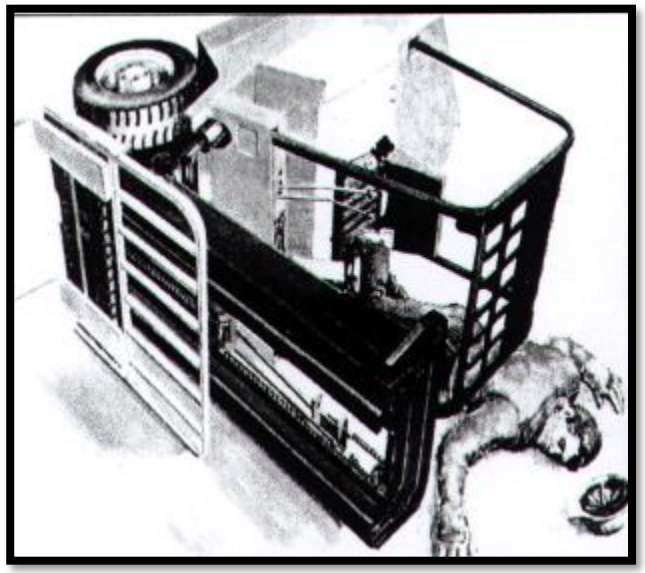
Are cell phones, earphones, etc. allowed to be used while operating mobile equipment?

What rule or method must be used when mounting and dismounting mobile equipment?

3 Points of Contact

What is the proper way to dismount a skid steer?

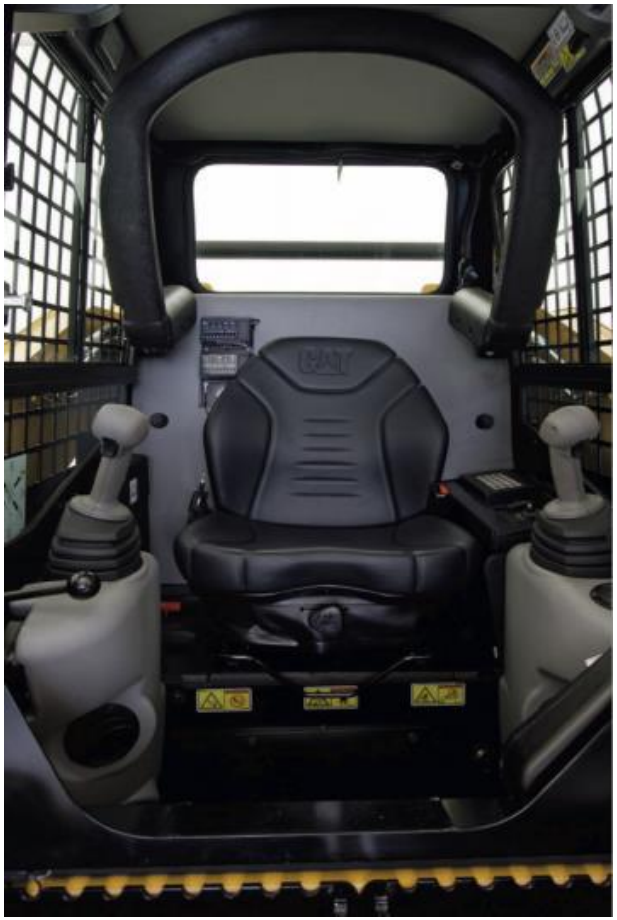
What must be in place before placing any piece of mobile equipment into motion?



ROPS SEATBELT
PUT 'EM ON KEEP 'EM ON
SAFETY
IT'S THE WAY TO LIVE!

Does a skid steer's lap bar take the place of the seatbelt?

- No, the seat belt must always be worn with the lap bar.



What are the steps to safely enter a trailer with a piece of mobile equipment?

1. Make sure brakes are set.
2. Chock trailer wheels
3. Jack stand in place if the truck is not connected
4. Check condition of floor/sides
5. Dock plate is secure
6. Secure keys from driver, dock lock, etc.

When is a piece of mobile equipment considered unattended?

1. Operator is more than 25 feet away

Or

2. Piece of equipment is out of the operators sight

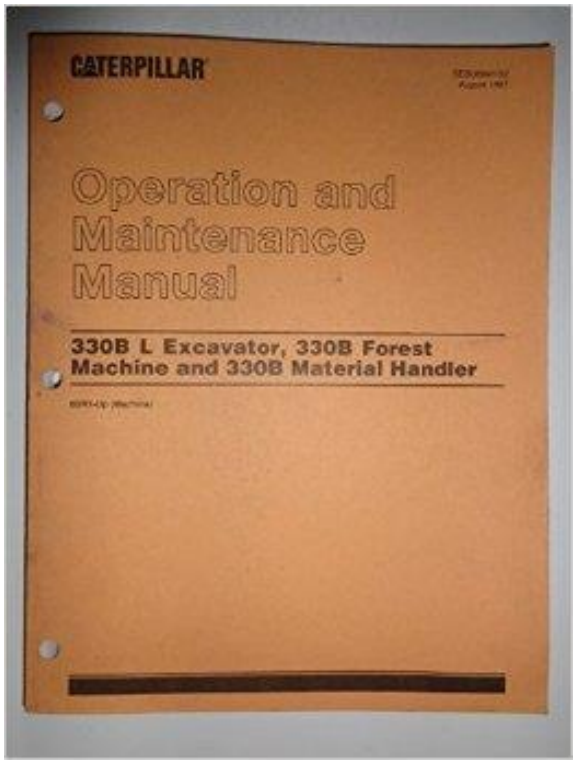
What piece of mobile equipment is the exception to the unattended rule?

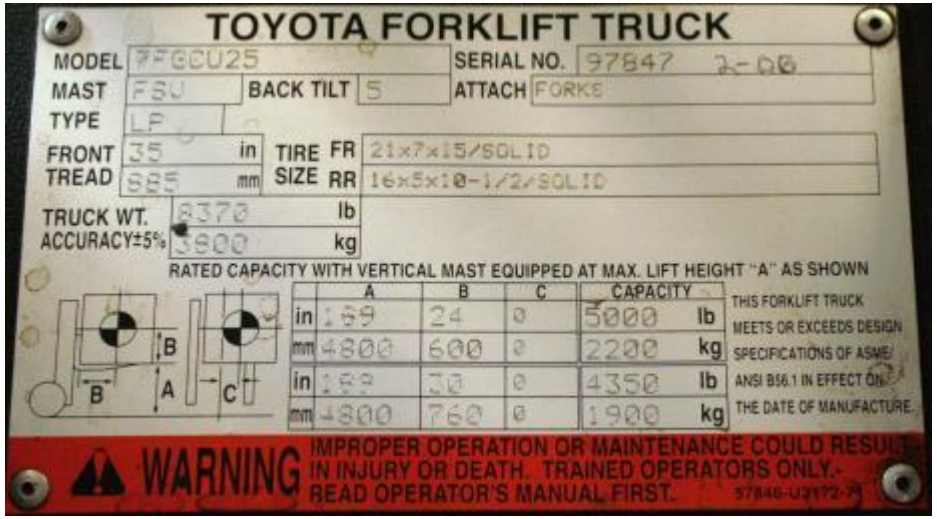
Why?

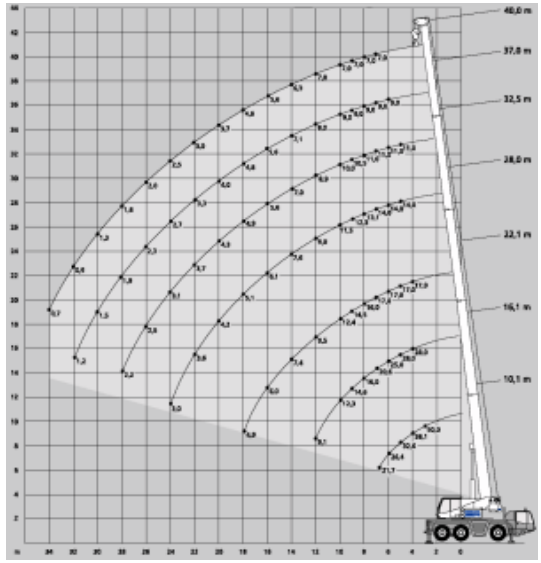
When can a piece of equipment exceed its rated capacity?

NEVER

Where can the rated capacities be found?

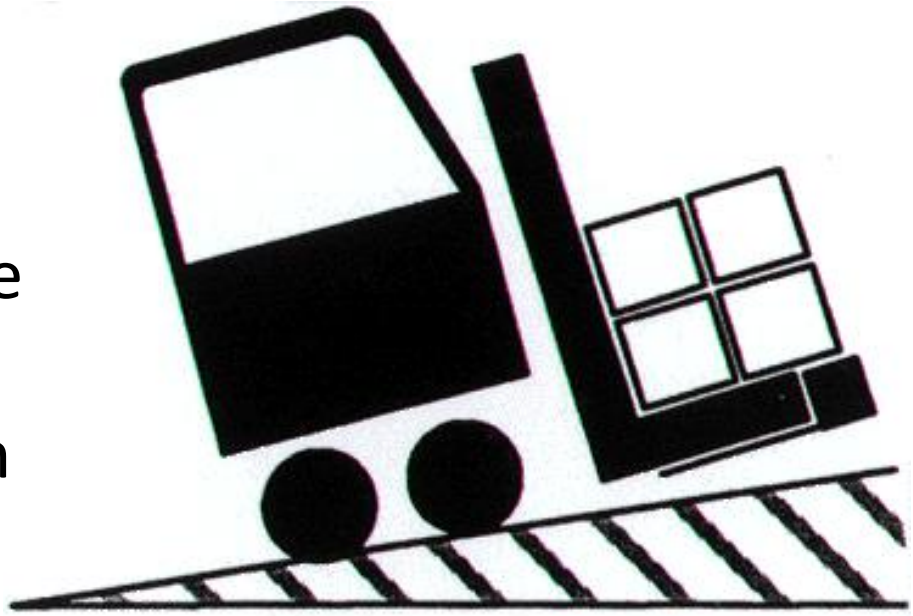






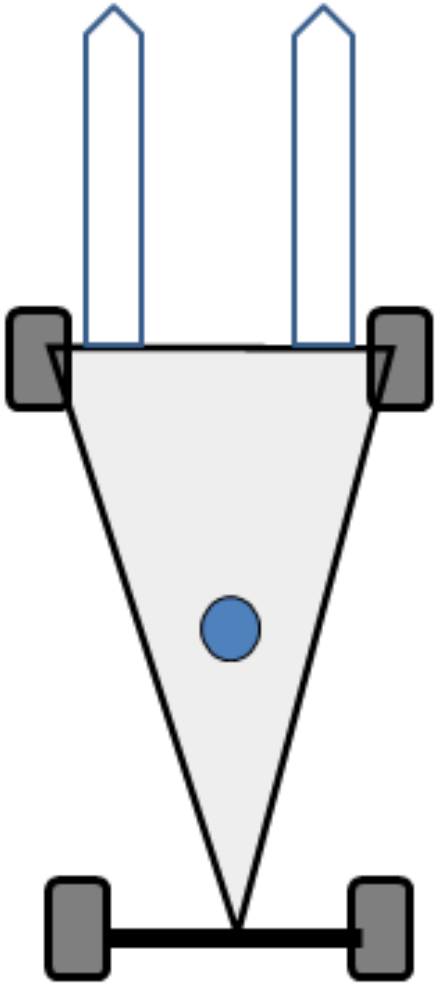
What direction does a loaded piece of equipment always need to face on a slope?

- Loaded forks or bucket need to face UP the slope at all times.
- Never attempt to turn on a slope.

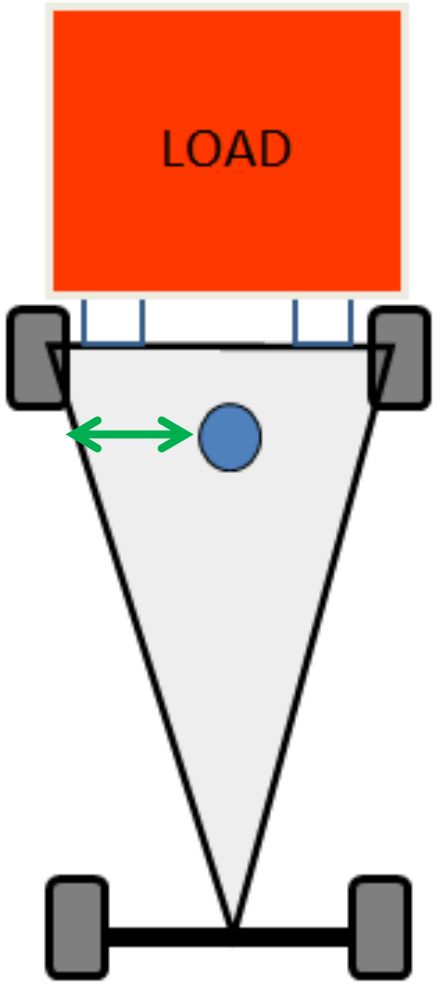


UNDERSTANDING YOUR LIFT TRUCK

BASIC PRINCIPALS OF A LIFT TRUCK



Which Lift Truck is More Stable When Making Turns? Why?



Why do we carry loads as close to the ground as possible?

- Center of gravity and the stability triangle.

Who is responsible for pedestrian safety around mobile equipment?

- Ultimately the operator, but pedestrians have responsibility too.
- “10 foot rule”

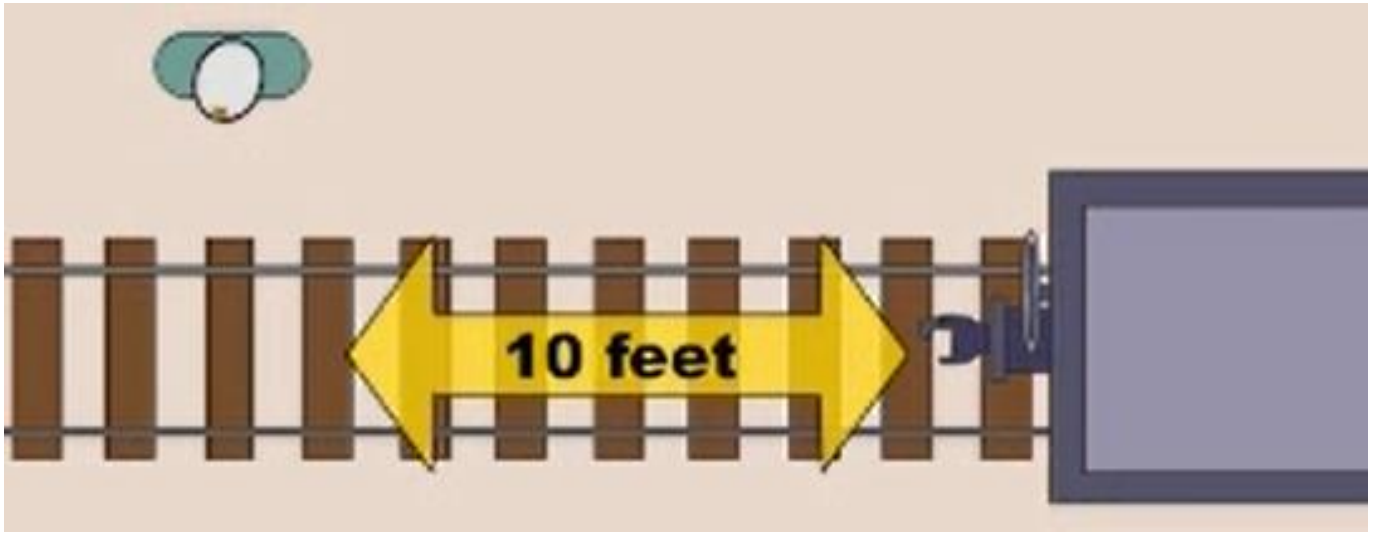
- **How many employees are needed to safely complete rail movements?**

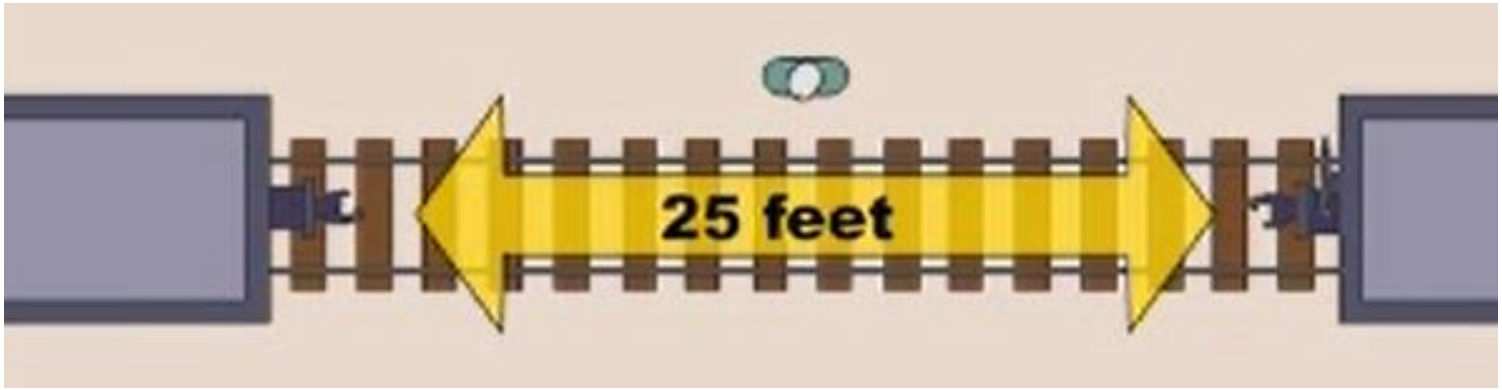
- Min. of Two.
- ALWAYS work in pairs when operating rail equipment.
- There should be one conductor (switchman) and one engineer.

Is it safe to walk or stand on the tracks?

- No, it is never safe to walk or stand in the “line of fire” or in the gauge.

How far should you be from the end of a railcar before crossing?





Is it acceptable to set a hand brake from the ground?

- No, hand brakes must be set from the brake platform.
- Reduces risk of back strain and standing in front of railcars.

Where should the spotter be standing while coupling cars?

- 3’+ off the side of the tracks.
- Never authorize movement until completely clear.
- Never reach in to make last second adjustments to knuckle.

Questions?