Powered Industrial Truck Operator Training

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Forklift Safety:
An Operator Training Program
(OSHA Standard 1910.178)
Definitions

• The term “forklift” is used to represent all types of powered industrial trucks (PIT)

• Authorized Employee - one who has completed the company’s required training for the safe operation of forklifts

• Forklift (Powered Industrial Truck) - Any mechanical device used for the movement of supplies, materials or finished products that is powered by an electric motor or an internal combustion engine.
What does the standard require?

• Employers must develop and implement a training program. Must address:
  – General principles of safe operation
  – Types of vehicle(s) being used
  – Hazards created by the use of vehicle(s)
  – General safety requirements of the OSHA standard
  – Training must be provided: Formal & Practical
  – Training and evaluation must occur at least once every 3 years
  – Competency must be evaluated prior to operation of vehicle(s)
  – Refresher training is needed whenever a deficiency in safe operation is demonstrated
Introduction

DVD: “Developing a PIT Training Program”
Types of Forklifts
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Forklift Parts

- Overhead Guard
- Steering Wheel
- Mast
- Lift Cylinder
- Lift Chains
- Backrest
- Tilt Cylinder
- Carriage
- Forks
- Battery Indicator
- Brake Pedal
- Lights
- Horn
- Seat Belt
- Hour Meter
- Lift Control
- Tilt Control
Forklifts vs. Automobiles

- A forklift is not like a car
- Forklifts steer from the rear
- When turning, the rear end swinging a circle around the drive wheels
Forklifts vs. Automobiles

- Forklifts are less stable when turning.
- You have less steering control when turning, especially when the forklift is loaded.
- Forklift needs more time and distance to stop quickly.
- Forklift operates in forward or reverse but steer differently in each direction.
- Forklift has blind spots, especially when loaded.
Forklift Stability

- Stability Triangle
- Center of Gravity
- Load stability
Forklift Stability

• A forklift is based on the principle of two weights balanced on opposite sides of a pivot point

• The load of forks must be balanced by weight of the lift truck
A properly loaded forklift does not exceed the rate capacity of the truck as listed on the truck's data plate.
Center of Gravity

- Every object has a center of gravity (CG) about which the object is balanced in all directions.
- The forklift has moving parts and therefore has a CG that moves.
- The CG moves forward and back as the upright is tilted forward and back.
- The CG moves up and down as the upright moves up and down.
Stability Triangle

- When the forklift picks up a load, then forklift and load have a new combined CG.
- The stability of the forklift is determined by the location of its CG, or if the truck is loaded, the combined CG.
- In order for the forklift to be stable the CG must stay within the area represented by a triangle drawn between the drive wheels and the pivot of steering axle (stability triangle).
Stability Triangle

- If the CG moves forward of the drive axle, the forklift tends to tip forward.

- If the CG moves outside of stability triangle, the forklift tends to turn on its side.
Load Stability

• The load stability is affected by a number of factors as: size, weight, shape, position and type of material.

• Others factors are: height to which the load is elevated, the amount of forward or backward tilt, tire pressure and the forces created when the truck is moving.

• These forces are created for things like acceleration, braking, operating on uneven surfaces or inclined and turning.
Load Stability

• Pay attention when you are driving an unloaded forklift because this can tip over easier than with its load in the lowered position.

• When the load is carried at a great distance than the load center, the maximum capacity of truck is reduced.

• The use of special attachments instead of forks will also reduce the nominal capacity of the lift truck.
OSHA adds value to business, work and life.
Forklift Tip Over Accident

- Employee Operating PIV
- Lifted Employee up to do sheet metal work
Forklift Tip Over Accident

• Operator “tapped” the leveler control

• Forklift tipped over
Forklift Tip Over Accident

Ground Uneven
Forklift Tip Over Accident

- Warnings labeled on machine
- 2 employees injured – Crushed femur and broken arm
What’s Wrong With This?
Safe Operations

• Pre-Operational Inspection
• Driving the Forklift
• Fueling-Recharging

• Last day at Home Depot
Inspecting the Forklift

- Forklifts **MUST** be inspected at least daily or at the beginning of each shift.
Pre-use Inspection Parts

- Brakes
- Horn
- Steering
- Controls
- Hoses
- Ropes
- Fittings
- Batterie
- Carriage and forks
- Mast

- Chains and anchor pins
- Tires
- Counterweight
- Gauges
- Guarding
- Data plate
- Fluids
- Attachments
- Hydraulics
- Safety belt
Safe Operations

Employees **MUST** use seat restrains if the forklift comes equipped with them.
Safe Operations

• Only loads within the rated capacity must be handled

• Avoid running over loose objects

• The speed operation will permit to stop in a safe manner (5mph)

• Keep arms and legs from the mast and within the running lines of the forklift
Safe Operations

- Never pass another truck traveling in the same direction at blind corners or intersections.
- Lower forks, neutralize controls, shut off and set brakes if truck will be unattended.
- Everyone who operates a forklift requires training, re-training and certification.
Prepare for Safe Operation

- Inspect equipment
- Inspect the work area and surfaces which you will travel on
Transporting Loads

- Travel slowly over rough terrain
- Avoid sudden stops
- Keep loads as low as possible
- Avoid sharp turns
- Keep forks tilted back
- Know distances and clearances around power lines
- Know the weights of loads you will be lifting
Be aware of ground conditions and loads
Poor ground conditions with heavy load
Poor ground conditions with heavy load
Elevating Personnel

• Never use attachment devices not approved by the manufacturer
• Never lift personnel
Pallets or Platforms on Forklifts

- Attachments must be approved by the manufacturer
Improper box for elevating personnel
Platforms – It can be done right!!!

- Proper platform
- Platforms must meet ANSI/ASME 56.6-2002 requirements
Load Handling

- Picking up a load
- Travelling with a load
- Placing and stacking a load
- Operating around pedestrians
- Work areas
- Loading trucks
Picking Up a Load

- Travel at walking speed
- Be aware of the traveling surface
- Avoid sudden braking
- Keep the load slightly back
- Lift and lower the load only when stopped
Picking Up a Load

- Sound the horn when approaching corners and blind areas
- Turn in a sweeping motion
- No riders/ passengers
- Maintain at least three truck lengths
- All traffic regulations must be met
Travelling with a Load

- Ensure the load does not exceed the forklift’s capacity
- Ensure forks are positioned properly
- Ensure the load is balanced and secure
- Drive as far into the load as possible
- Slightly tilt backward and lift
- Back, stop, and lower load 2.6 inches from the floor
Placing and Stacking a Load

- Complete stop before raising a load
- Never walk, stand, or allow anyone to pass a raised load
- Move slowly after raising the load
- Tilt forward, level only when over a stack or rack
- Make sure forks have cleared the pallet when backing out and before turning or changing height
- Before backing up, check back and both sides for pedestrians or other traffic
- Caution must be exercised when handling unusually shaped and off center loads
Operating around Pedestrians

• Separate forklift traffic and other workers where possible

• Limit some aisles to workers on foot only or forklifts only

• Restrict the use of forklifts near time clocks, break rooms, cafeterias, and main exits, particularly when the flow of workers on foot is at peak.

• Install physical barriers where practical to ensure that workstations are isolated from aisles traveled by forklifts
Operating around Pedestrians

- Evaluate intersections and other blind corners to determine whether overhead dome mirrors could improve the visibility of forklift operators or workers on foot.

- Make every effort to alert workers when a forklift is nearby. Use horns, audible backup alarms, and flashing lights to warn workers in the area.

- Flashing lights are specially important in areas where the ambient noise level is high.
Work Areas

- Ensure that workplace safety inspections are routinely conducted by a person who can identify hazards and conditions that are dangerous to workers.
- Install the workstations, control panel, and equipment away from the aisle when possible.
- Do not store bins, racks, or other materials at corners, or locations that obstruct the view of operators or workers at workstations.
- Enforce safe driving practices such as obeying speed limits, stopping at signs, and slowing down and blowing the horn at intersections.
- Repair and maintain cracks, crumbling edges, and other defects on loading docks, aisles, and other operating surfaces.
Loading Trucks

• The breaks of trucks must be set and wheel chocks placed under the rear wheels to prevent the trucks’ from rolling while they are boarded with forklifts’

• Fixed jacks may be necessary to support a semi-trailer and prevent upending during the loading or unloading when the trailer is not coupled to a tractor

• Bridges or docking plates shall be properly secured before they are driven over. A bridge or dock plate shall be driven over carefully and slowly, and their rated capacity never exceeded

• Inspect the trailer floor for weakened sections, holes, rot, slick conditions

• Directional lighting might be needed
Maintenance

- Defective/ unadjusted brakes
- Damaged mast chain
- Play in steering
- Sparks from exhaust
- Inoperable horn
- Defective controls
- Damaged chain anchor pin
- Worn tires/damaged rims
- Inoperable gauges
- Defective counterweight
- Damaged overhead guard
- Defects in the forks or carriage
- Defects in mast structure
- No legible data plate
- Leaks (hydraulics, fuel, etc)
Fueling the Unit
Fueling & Recharging

• Propane
• Gasoline or diesel
• Batteries
Propane

• Always wear proper PPE when changing tanks
• Shut valve off to use up propane in the line before tanks
• Shut off the ignition after engine stops
• Do not change tanks near an open flame or heat source – NO SMOKING!
• If there is a leak, you should be able to smell it
• Propane is heavier than air and it will settle to the floor
• Check condition of valves & seals before connecting new tank
• Handle tanks carefully
• Store tanks where leaking gas can’t accumulate
Fueling-Recharging

- Battery charging and deposit refueling must be done in a designated area.
- Protect charging devices, battery posts and cable terminals from corrosion and damages.
- Keep metal tools and objects away from uncovered batteries.
- Provide adequate ventilation.
- Use a hoist or other device when handling batteries.
- Add acid to water, do not add water to acid.
- When charging and fueling, set brakes.
- No open flames, sparks or electric arcs!
Fueling-Recharging

• **NO SMOKING!**
• Forklift motor must be shut off during refueling operation
• Diesel forklifts should not be allowed to remain idle for long periods of time in an enclosed or confined area
• Whenever vehicle using LPG are parked overnight or stored for extended periods of time indoors with the fuel container in place, the services valve of the fuel container should be closed
• When the fuel container is stored on its side, the tank should be right up
• Wear appropriate personal protective equipment as safety glasses, a face shield, an apron and chemical resistant gloves
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Work Process Day of Accident

- Installing windows
- 2 individuals in house
- 2 individuals on platform supported by rough terrain forklift
- 1 forklift operator
Work Position

- Had installed over 30 doors and windows that day.
- Last window installed.
Accident

- Forklift tipped with the platform still elevated.
- Owner and an employee were on the platform.
- Owner was killed.
- Employee sustained broken jaw in 3 spots and a broken femur.
Primary Causal Factors

- Ground slope
- Ground condition
- Forklift was driven backwards with the platform still elevated.
Ground Slope:

Approximately 10 to 12 degrees
Ground Condition:
Rough with tire ruts.
Backing Forklift With the Boom Elevated and Extended
Contributing Factors

- Forklift Design
- Platform Design
- Operator Training
- Operator Experience
Platform Design

• Platform Width
  – 12’
  – Max. = 9’ 8”

• ANSI B56.6

• Platform capacity and weight.

• Labeled on platform
Operator Training/Experience

- No training
- 1st time operating this forklift
- Limited experience on other forklifts
- Not normally a construction worker (brother of home owner)
Remember: Prior to operating the truck in the workplace, the operator’s performance must be evaluated for competency!
Wrap Up

- Questions?
- Test
- Certification
- Practical

Thank You!