Forklift Operator Training



Learning Objectives

- The various types of powered industrial trucks and their attachments
- The components of a pre-shift inspection
- Safe driving and loading best practices
- Stability pyramid principles and maximum load capacity



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Course Outline

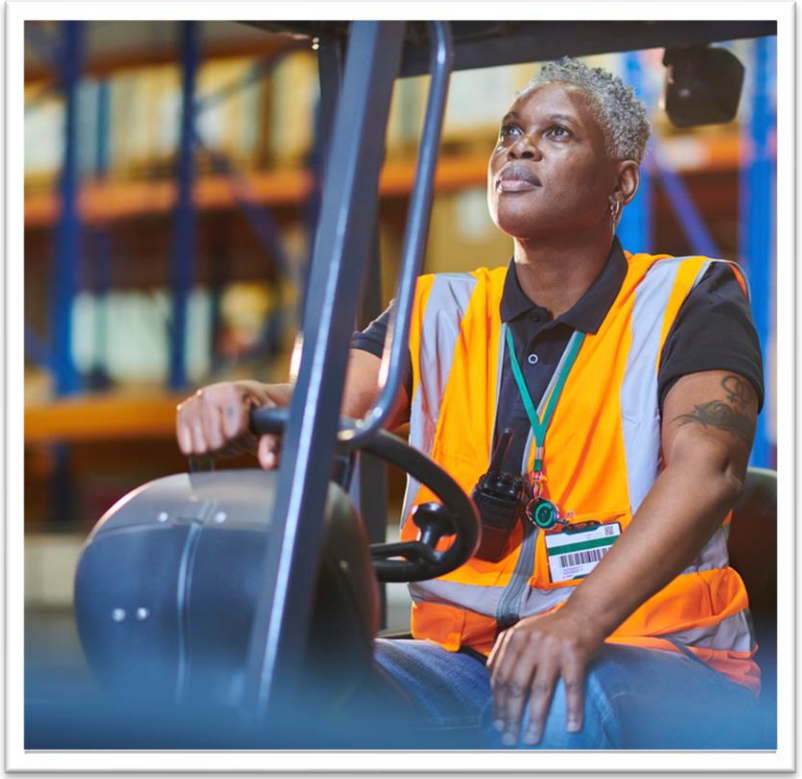
1) Introduction to Powered Industrial Trucks
2) Inspections
3) Safe Operating Practices
4) Safe Loading
5) Equipment & Attachment Safety

Introduction to Powered Industrial Trucks

What is a Powered Industrial Truck?

Powered Industrial Trucks, also known as forklifts:

- Carry and move materials
- Have a driver or walking operator
- May be powered by electric or combustion engines
- Do not include earth-moving or over-the-road hauling equipment
- Your local or state agencies may have more stringent regulations. Follow all applicable forklift safety regulations.



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Introduction to Powered Industrial Trucks

Operator Responsibilities



- **Training:**
  - Principles of forklift operation
  - Hazards and controls review
- **Skills evaluation:**
  - Competency in specific equipment
- **Certification:**
  - The name of the operator
  - The date of the training
  - The date of the evaluation
  - The name of the instructor

Introduction to Powered Industrial Trucks

Forklift Classifications



Class I: Electric Motor Rider Trucks



Class II: Electric Motor Narrow Aisle Trucks



Class III: Electric Motor Hand Trucks



Class IV: Internal Combustion Engine Truck (Solid/ Cushion Tires)



Class V: Internal Combustion Engine Truck (Pneumatic Tires)



Class VI: Electric & Internal Combustion Engine Tractors



Class VII: Rough Terrain Forklift Trucks

Forklift Selection Considerations

Variables to Consider

Weight & Size:

- Select a forklift with sufficient capacity.
- Identify manufacturer-approved attachments needed to handle the load.

The Terrain:

- Be aware of changing surfaces, grades, or weather exposure.
- Tire selection is important for maintaining stability.
  - Use solid tires only on smooth indoor surfaces.
  - Use pneumatic tires for outdoor surfaces.

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The Environment:

- Perform a hazard assessment to determine the best type of forklift based on environmental conditions.
  - Do not use internal combustion engines in environments with poor ventilation.
  - Use specially-rated forklifts in combustible or flammable environments.

Introduction to Powered Industrial Trucks

Refresher Training

Refresher training is required:

- If the operator uses the forklift in an unsafe manner
- If the operator has an accident or near-miss
- If the operator is assigned to drive a different type of forklift
- If the operator fails an evaluation
- Every 3 years
- If a workplace change affects safety



Introduction to Powered Industrial Trucks

Forklift Incidents

There are 7,000+ forklift-related incidents yearly!

Common types of incidents include:



Transportation



Struck-by Object



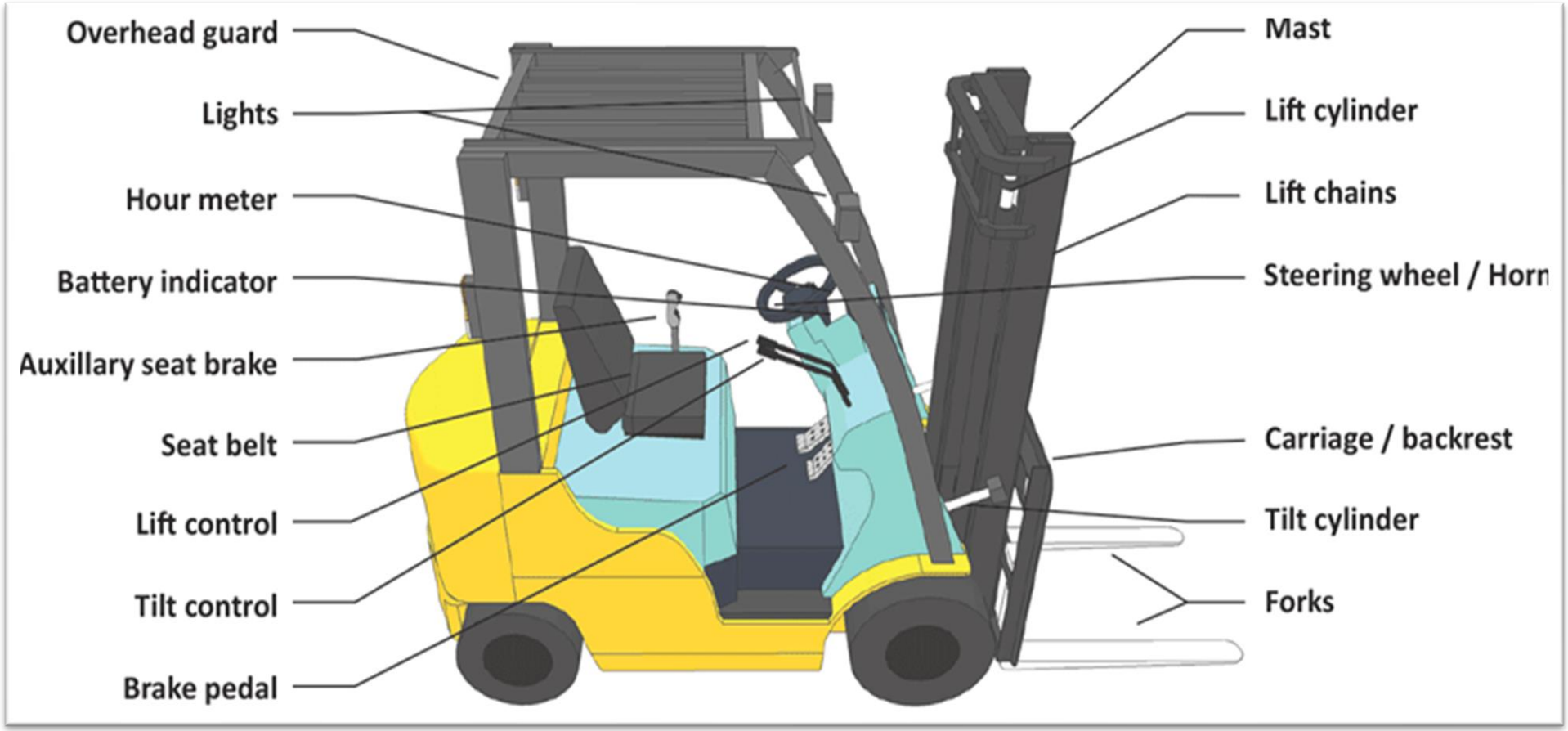
Slips, Trips, & Falls



Struck Against Object

Inspection Procedures

Common Forklift Components



Inspection Procedures

Managing Pre-use Inspections at your Facility

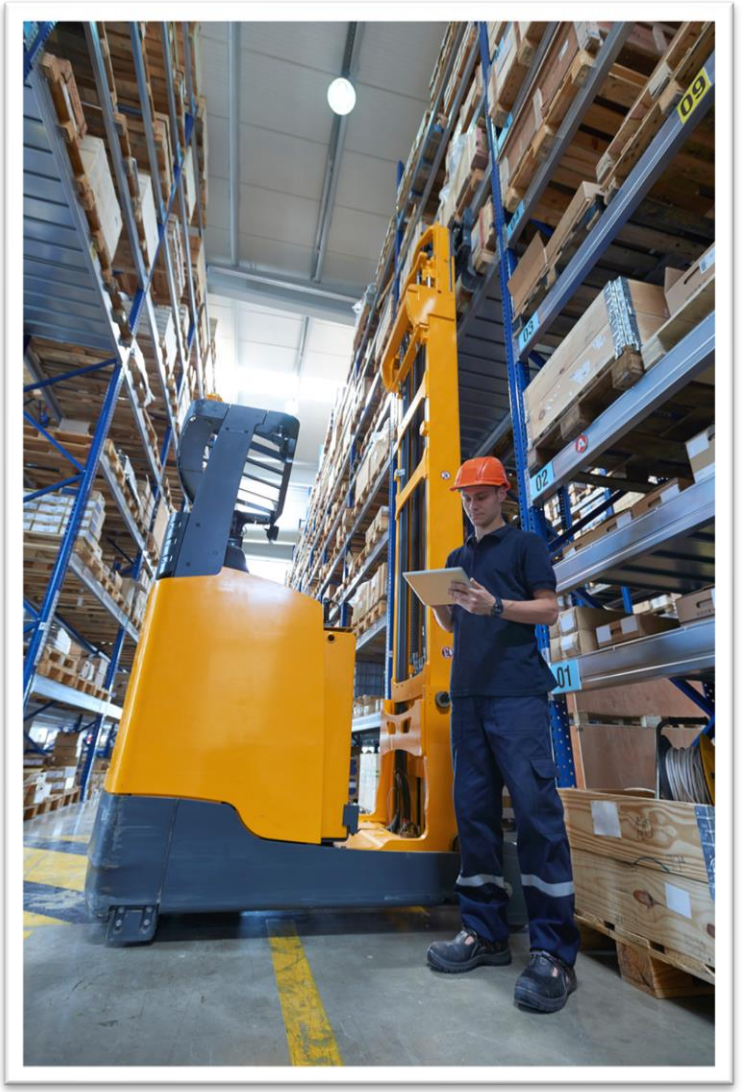
- Develop a checklist using the owner's manual.
- Conduct inspections daily, prior to using the equipment.
- Document all inspections and maintenance work.
- Never operate a forklift that needs repair.



Inspection Procedures

Visual Inspection

- Look for obvious issues.
- Check for hydraulic leaks.
- Note any malfunctioning/missing parts.
- Examine the hoses and fittings.
- Check the chains.
- Ensure the overhead guard, mast, and backrest are all undamaged.
- Examine any other attachments.



Inspection Procedures

Visual Inspection



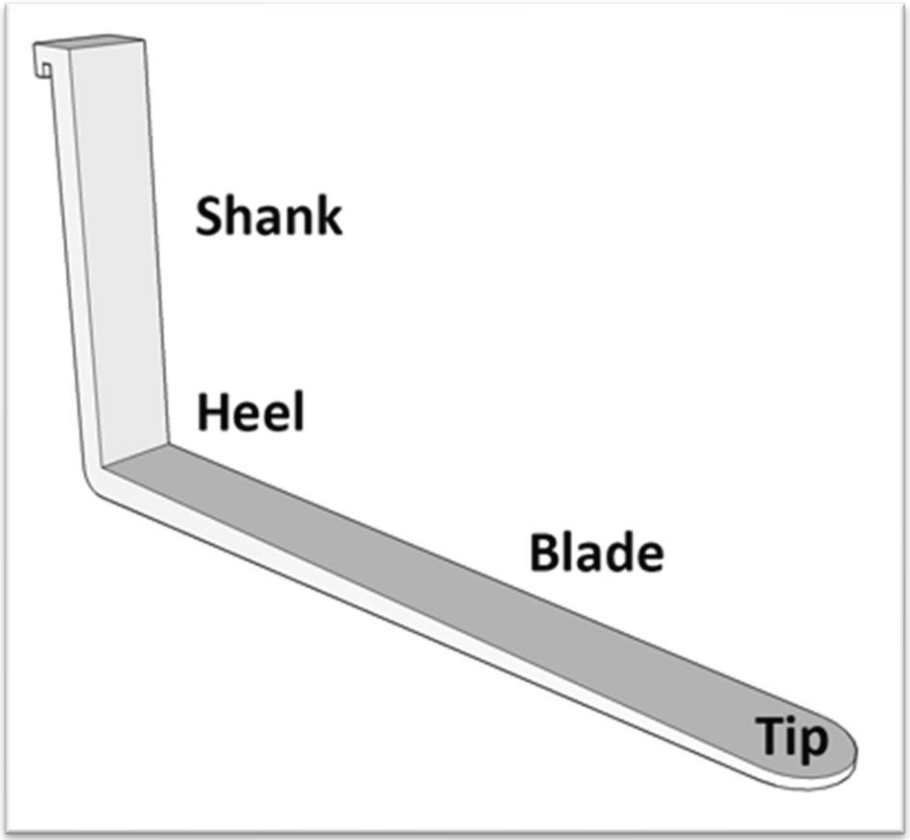
- Review the location of the operational pedals.
- Confirm that all controls work.
- Determine if the steering is properly responsive.
- Test the brakes.

Inspection Procedures

Visual Inspection

Check the blades for wear and cracks.

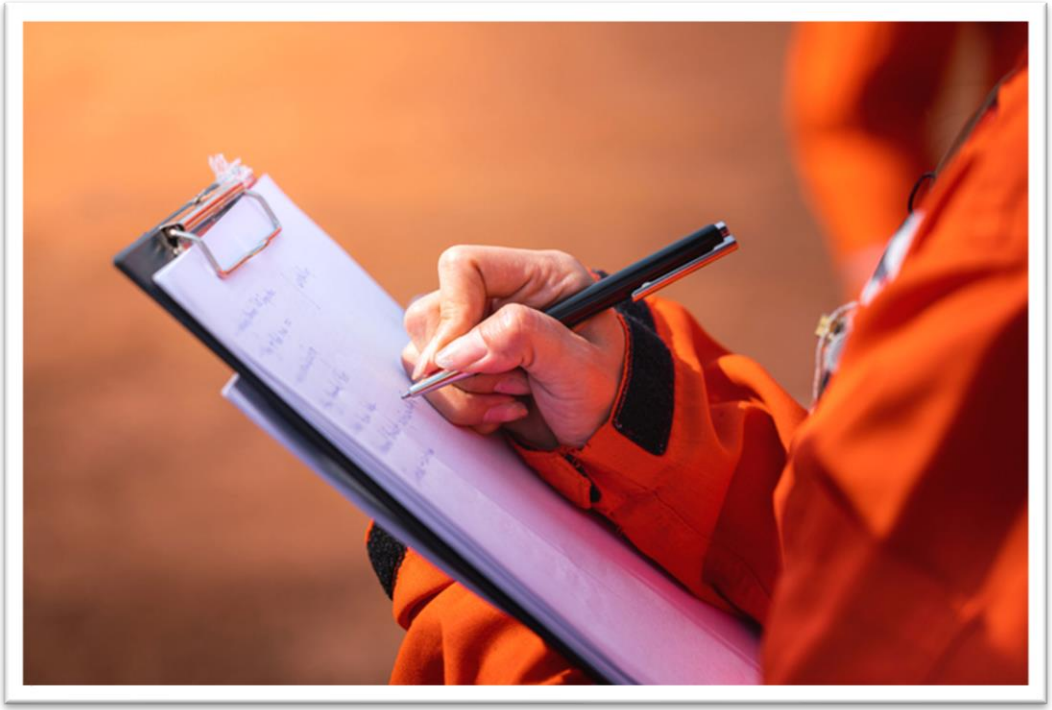
- Replace any blade that's worn 10% from its original thickness.
  - Fork-wear calipers provide a quick and convenient way to identify critical wear.
- Look for surface cracks.
  - These often occur in the heel area at the bend of the fork.
- Examine the straightness of the blades.
  - Fork tips that are at different heights indicate bent blades.
- Look for locking pins that are functional and in-use.



Inspection Procedures

Fluid Levels

- Coolant
- Battery fluid
- Fuel
- Hydraulic fluid
- Transmission fluid
- Oil
- Top-off or change low or dirty fluids according to the manufacturer's instructions.



Inspection Procedures

Safety Systems

- Check that all the following are present and in good working conditions:
  - Seatbelts
  - Headlights and backup warning lights.
  - Mirrors
  - Fire extinguisher, if applicable
- Confirm that all alarms, including the horn, are functioning properly and audible over ambient noise levels.
- Check that the fuel tank pin and fittings are properly secured.
- The overhead guard prevents objects from falling onto the operator from above. Confirm that it is stable.
- The backrest sits behind the forks and prevents the load from falling rearward toward the operator. Assure that the backrest is firmly attached and in good condition.

Inspection Procedures

Tire Inspection

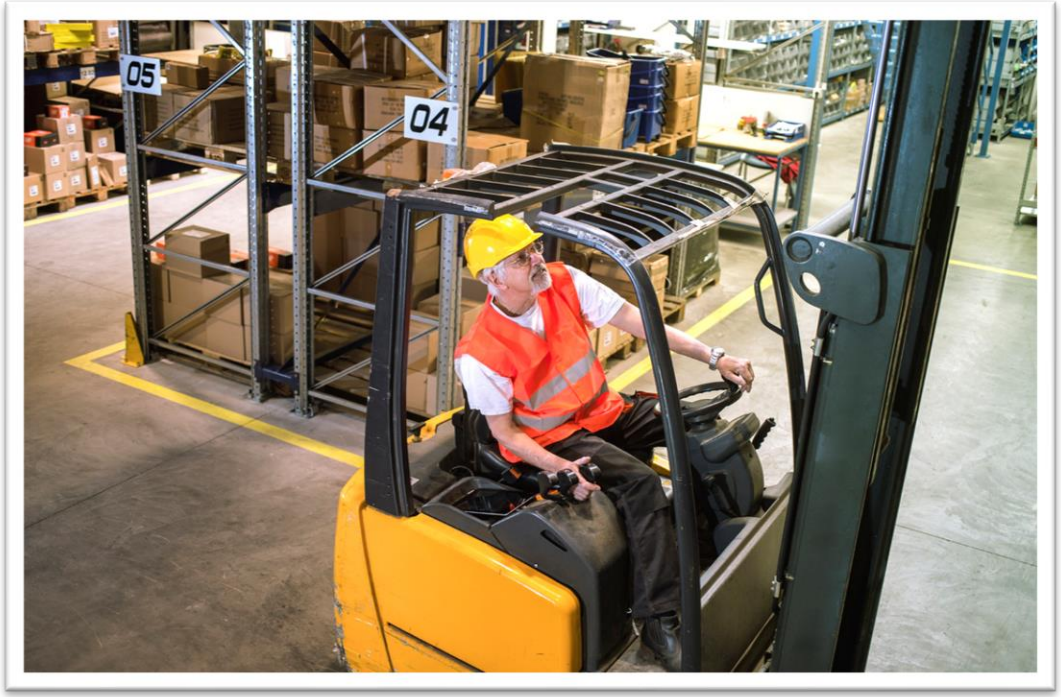
- Inspect all four tires for cracks and wear.
- Document any problems using the pre-shift checklist and flag for replacement.
- For pneumatic tires, check the air pressure to ensure compliance with the manufacturer’s inflation recommendation.



Inspection Procedures

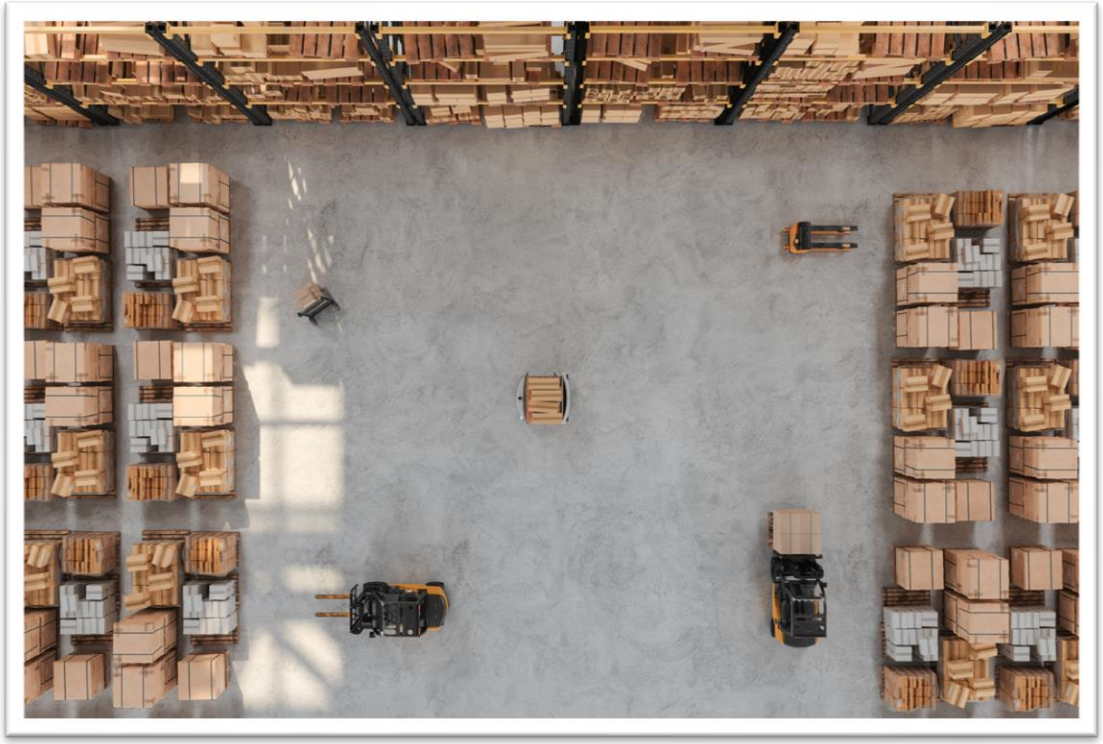
Equipment Dimensions

- Finish the pre-shift inspection by reviewing the dimensions of the equipment:
  - Familiarize yourself with the side clearance of the forklift.
  - Check the height of the fork, the mast height, and the highest extension of the fork.
- Review the load rating on the capacity plate and the load center location to prepare yourself for making loading and unloading decisions.



Safe Operating Practices

Prior to Operating



Prior to operating the forklift:

- Plan your route of travel, noting any ramps, blind spots, and tight turns.
- Prepare your set point. Note any hazards and ensure that the set point is within the reach of the forklift.

Safe Operating Practices

Forklift-Specific Challenges

Forklifts are much heavier than automobiles and operate differently. Driving slowly is essential to maintaining control. The following factors may make a forklift more difficult to operate:

- **Variable weight:** Attachments and different load sizes will vary a forklift's center of gravity and affect how it handles.
- **Lack of suspension:** Forklifts do not have suspension systems like cars. They cannot easily handle rough terrain or sudden changes in surface angles.
- **Rear wheel steering:** Because the rear wheels steer the forklift, the operator must be prepared for a slow response to the steering wheel and aware of the clearance needed to swing the back of the forklift.
- **Long stopping distance**: Forklifts take longer than cars to respond to controls.

Safe Operating Practices

General Operational Safety

Entering and Exiting:

- Use a three-point stance.
- Never jump.
- Keep the steps and floor clear.

Seat Belts

- Always use your seat belt.
- Only carry passengers in factory-installed seats.

In a Tip-Over:

- Do not jump.
- Plant your feet on the vehicle's floor.
- Grasp the steering wheel.
- Lean forward and away from the impact.

Safe Operating Practices

Forklift Do's and Don'ts

DO'S

- Tilt the mast back while traveling.
- Carry the load as low as possible.
- Drive slowly.
- Stop at blind intersections.
- Sound the horn.
- Look before backing up.

DON'TS

- Pass at intersections.
- Turn sideways on a ramp or inclined area.
- Use a forklift to tow or push any vehicles or equipment.
- Exceed the floor load rating.
- Stick arms or legs outside of the powered industrial truck.

Safe Operating Practices

Restricted Views

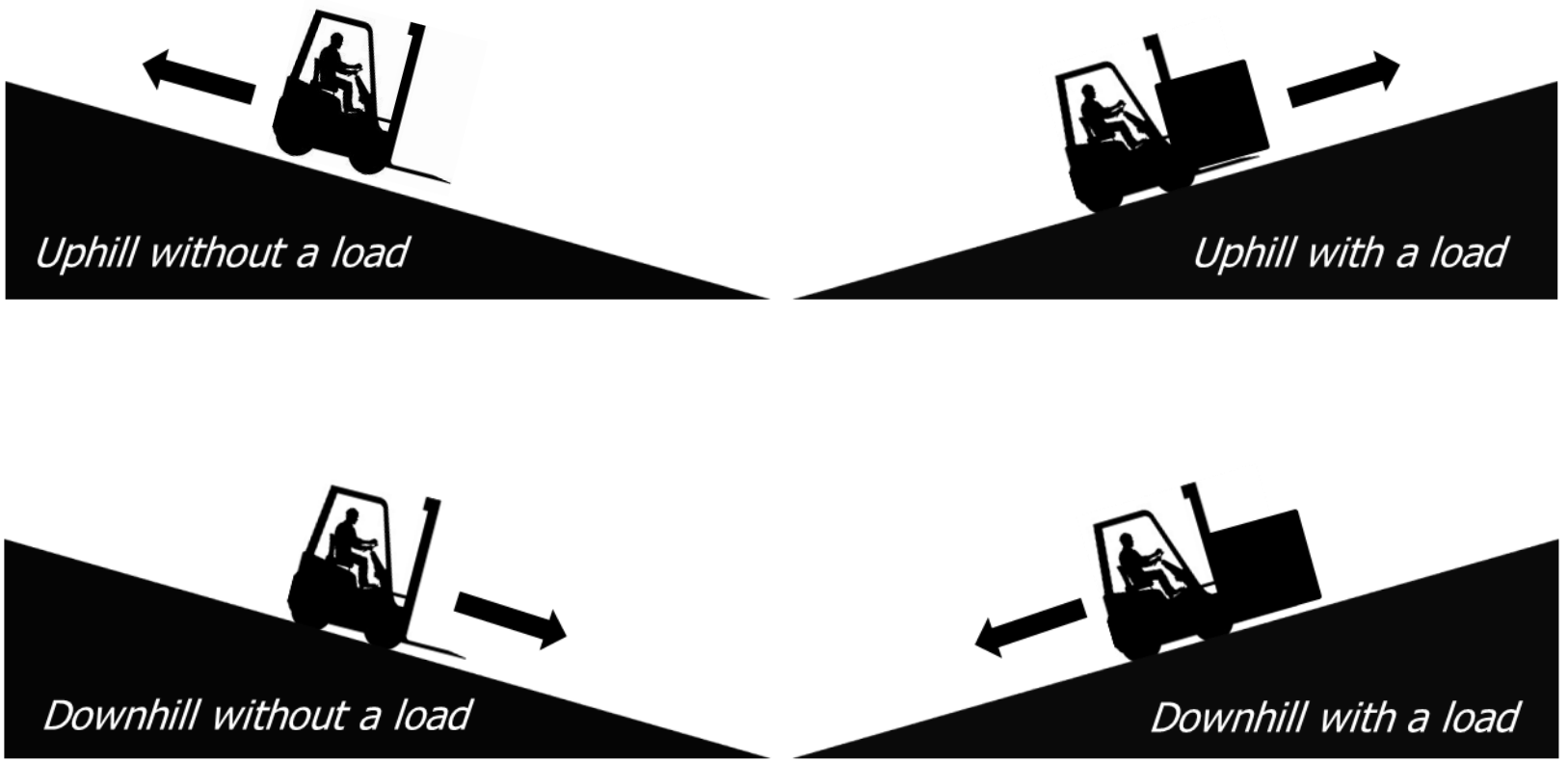
When driving a forklift, your view may be restricted by the cage, the mast, or the load you are carrying.

Safe Driving Tips:

- Keep an eye out for overhead and side clearance issues or sudden drop-offs in the work surface, such as loading docks or ramps.
- Alert others to the presence of the forklift using alarms, horns, and lights.
- If you are carrying a large load that obstructs your view, drive in reverse to improve visibility and make use of a spotter to help guide you.
- Maintain a safety buffer of distance around other forklifts, pedestrians, power lines, and other electrical components

Safe Operating Practices

Inclines



Safe Operating Procedures

Refueling

When using an internal combustion forklift, it's important to refuel at the end of every day and always keep at least a 0.25 tank of fuel to avoid damaging the engine. When refueling:

- Turn off the engine and apply the handbrake.
- Wear appropriate personal protective equipment.
- Be sure that there is a fire extinguisher nearby.
- Never smoke or allow any open flames or spark or arc-generating equipment in the refueling area.
- Check for leaks and clean up any spilled fuel before restarting the engine.
- Refuel outdoors.



SAFETY ASSURANCE TIP

Liquified Petroleum (LP) Gas is extremely cold. Wear appropriate gloves as required in your hazard assessment.

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Safe Operating Practices

Charging Batteries

Only recharge batteries in areas that have the following:

- Adequate ventilation
- Charging apparatus with ground connection
- Eyewash and safety shower
- Fire extinguisher
- Neutralizing materials
- Carboy tilter or siphon
- Conveyor or overhead hoist
- No smoking or sparks



Safe Operating Practices

Charging Batteries

To avoid permanent damage to forklift batteries, only trained employees should charge them. Charging should be completed before they get below the manufacturer's recommended level. When recharging or changing a forklift battery:

- Turn off the forklift and set the parking brake.
- Wear the appropriate personal protective equipment.
- Keep metal tools and jewelry away from charging batteries.
- Ensure that vent caps are functioning and are not plugged.
- Open the battery and compartment covers to dissipate heat.
- Pour acid into the water — never water into acid and reinstall batteries securely in the proper position.

Safe Operating Practices

Workplace-Specific Information

As part of forklift operator training, OSHA requires that workplace-specific information be communicated:

- 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 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.

Safe Loading

Setting up the Load

- Examine the material.
  - If it contains hazardous materials, ensure you are properly trained and have the product's safety data sheet (SDS).
- Arrange the load for stability:
  - Place the heaviest items against the back.
- Set the forks as wide as possible.
- Approach the load slowly and directly.
- Keep the mast vertical until the load is resting against the backrest.
- Lift the forks high enough to clear the floor and then tilt them back.



Safe Loading

Loading in Trailers or Railcars

At loading docks, operators often drive their forklifts up ramps, called dock boards, onto trucks or trailers. If the truck or trailer is not secured in place and shifts over time, the dock board could collapse when a forklift is on it.

Stabilize the truck or trailer with the following steps:

- Chock the wheels and lock the axle.
- If a tractor or engine is not attached to the trailer, use jack stands to prevent upending.
- If a tractor or engine is attached, control the keys to prevent anyone from moving it.
- Check the dock board, flooring, and interior for hazards.



SAFETY ASSURANCE TIP

Practice caution and ensure ventilation when running an internal combustion engine forklift in a trailer or railcar to prevent exhaust buildup.

Safe Loading

Unloading

When you arrive at your destination and are ready to unload:

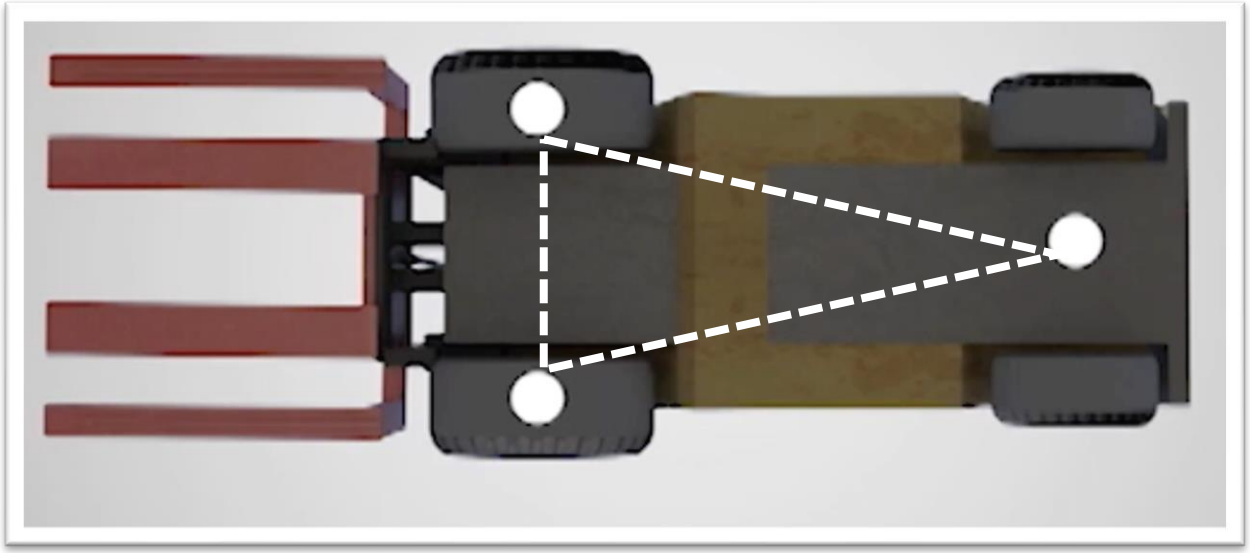
- Move squarely into position in front of where you will place the load before raising the mast. Do not lift and turn simultaneously.
- Verify that the load is stable and that there are no overhead obstructions.
- Raise the load to the proper height and tilt the load forward only when it is over the stable spot where it will be placed.
- Back out slowly with the mast still raised and level.
- Lower the mast only once it is clear of the load.



Safe Loading

The Stability Pyramid

- In a counterbalanced forklift, the two front wheels and the center of the rear axle form a triangle that is the base of the pyramid.
- The combined center of gravity of the load and the forklift must remain within the boundaries of the pyramid or the vehicle will tip over.



Safe Loading

Staying within the Stability Pyramid



Tip over risk factors include raising the load, adding weight, driving fast, and stopping or turning. To keep a forklift's combined center of gravity within the stability pyramid, do the following:

- Drive slowly, particularly around turns and before stops.
- Never tilt the forks forward unless you are loading or unloading.
- Tilt the load back only far enough to stabilize it.
- Travel with the load as low as possible.
- Know and obey the equipment's weight limitations.

Safe Loading

Determining Load Weight

To stay within weight limitations, you must first identify the weight of the load. There are a few methods you can use to determine the total weight of a load:

- Check shipping documentation.
- Check item or product.
- Check weights and measures standards.
- Account for the weight of attachments.



SAFETY ASSURANCE TIP

Find your forklift's specific limitations by viewing the capacity plate.

Forklift Equipment Safety

Working Safely with Pallet Trucks



Hand-operated pallet trucks utilize a pump handle mechanism to lift and transport loads on pallets.

- Never use a pallet truck without proper training.
- Always complete and document a pre-shift inspection to ensure that the pallet truck is in good working order.
- Prepare a clear path and set point before picking up the load.
- Move slowly and deliberately, taking care not to pin yourself in tight spaces.
- If there is a problem, release the controls, and the brake will set automatically and stop the truck.

Forklift Equipment Safety

Forklift Attachments

- Only use attachments designed by the manufacturer.
- Know the weight limits of the equipment with and without attachments.
- Assure that capacity plates explaining the effect an attachment has on operation are posted on the forklift or attachment.
- Never attach slings, cables, or chains to the forks.



Forklift Equipment Safety

Forklift Work Platforms

Work platforms are used to raise employees. **NEVER** lift someone on the forks!

- Designed and certified by a manufacturer or professional engineer
- Securely attached to the forks
- Equipped with:
  - Guardrails
  - Fall protection
  - Signs showing capacity
- Always monitored by the forklift operator.



Summary

- ***Powered industrial trucks are versatile but potentially deadly tools that necessitate training and certification for all operators.***
- ***Choosing the proper equipment for the environment and conducting thorough pre-shift inspections is paramount.***
- ***Safe operation begins with mental and physical preparation and continues with the best driving, refueling/recharging, and loading practices outlined in this training.***
- ***These, when combined with an understanding of the principles of the stability pyramid and load capacity limits, will limit forklift-related incidents and save lives.***

Remember

- *Forklift operators must undergo a practical evaluation as part of their forklift certification process.* ***THIS TRAINING ALONE IS NOT SUFFICIENT.***
- *OSHA requires that "all operator training and evaluation shall be conducted by persons who have the knowledge, training, and experience to train powered industrial truck operators and evaluate their competence."*
- *The "forklift-competent person" will conduct the forklift operator evaluation under their direct supervision.*
- *Forklift performance evaluations will be done in a safe environment that doesn't compromise other employees' safety.*