Mount Holyoke College
Powered Industrial Truck Safety Handbook

Introduction:

Each year more than 77,000 forklift accidents occur which result in employee injuries, lost time and death. A full 70% of these accidents are preventable with operator training. The need for safety training cannot be overemphasized. Forklift operation is a skilled position. Every operator must be well trained, and knowledgeable about the equipment he/she operates.

OSHA, the Occupational Safety and Health Act, was established to protect the health and safety of workers. OSHA issues safety "standards" or requirements that employers are required to follow. In an attempt to reduce the number of accidents and injuries for forklift operators, OSHA has revised the standard for powered industrial trucks under 1910.178.

Purpose:

Under the revised OSHA standard 1910.178, only trained, authorized, and certified operators shall be permitted to operate powered industrial trucks. Authorized employees are those who have completed a formal company training program. A certified operator is one who has passed a written test administered by the company. Forklift operators now must received extensive training prior to being certified as an operator. Employers must implement a forklift training program that allows only successfully trained operators to drive forklifts with the exception of any supervised training the company may require.

Training Requirements:

Training must include classroom training with a written test. Ideally, a forklift operator would be trained on safety procedures, practical knowledge, and the operation of the exact vehicle the driver is expected to operate. This program contains the required training for safety requirements relating to design, maintenance, and use of forklift trucks, and practical training as required.

Once drivers are trained, they are required under this standard to be evaluated annually. Once initial training of all operators has been provided by the employer, and the appropriate record keeping requirements met, employers may allow proficient drivers to forego the annual recurrent training provisions of this statute.

Forklift Training Program Must Inform Operators:

1. The primary responsibility of operators is to operate safely.
2. Unsafe operation can result in death or serious injury.
3. Company has established and posted safety rules for operators.

Powered Industrial Truck:

By definition, any mechanical device used for the movement of supplies, materials, or finished products that are powered by an electric motor, or an internal combustion engine is determined to fit the definition of a powered industrial truck.

Scope:

This program applies to any facility and any operator utilizing the above-mentioned equipment.

General Requirements:

Only a trained, authorized and certified operator should drive a forklift.

Forklift operators need to be skillful and knowledgeable about the type of equipment being operated, and have a unique understanding of safety rules and regulations.

Forklift operators must have sufficient mechanical knowledge to be aware when an unsafe vehicle needs to be removed from service.

Approved powered industrial trucks must bear a label or some other identifying mark indicating approval by the testing laboratory. Each manufacturer is required to provide an identification plate on every forklift. This plate contains very valuable information regarding the forklifts design and rated capacity.

Information Found on the Plate Contains:

- Engine Information
- Load Capacity
- Serial Number
- Weight of Truck
- Type Design

No modifications or additions, which affect capacity and safe operation of trucks, may be performed by the company without manufacturers' prior written approval.

As used in this section, the term "approved truck" or "approved industrial truck" means a truck that is listed or approved [for fire safety purposes and its intended use] by a nationally recognized testing laboratory, using nationally recognized testing standards.

Atmospheres or locations throughout the plant must be classified hazardous or non-hazardous prior to the consideration of industrial trucks being used therein. Refer to Table N-1 of 1910.178(c)(2) of the revised statute, which is a summary table on use of industrial trucks in various locations. This information may be downloaded from the Internet. The Internet address for OSHA is www.OSHA-SLC.GOV.

Designations:

Designations are the types of forklift utilized for various job functions. They allow drivers and employers to better understand the type of equipment being utilized, and the location these units may operate in safely. For example, the designation G means the unit is a gasoline powered unit with built in additional safeguards to the exhaust and fuel systems that may not be found in an LP designation which signifies liquid petroleum gas. Only trucks designated with an EX or electrically powered unit may be used in atmospheres containing chemicals such as benzene, dichloride, lacquer or solvents where the concentrations of vapors could exist. There are eleven different designations of industrial trucks as follows:

D - Diesel engine powered units that are similar to the G units except they are diesel powered instead of gasoline powered.

DS - Diesel engine powered units that are provided with additional safeguards to the exhaust, fuel, and electrical systems. They may be used in some locations where a D unit may not be considered suitable.

DY - Diesel powered units that have all the safeguards of the DS units and do not have any electrical equipment including the ignition and are equipped with temperature limitation features.

E - Electrically powered units that have minimum acceptable safeguards against inherent fire hazards.

ES - Electrically powered units that, in addition to all of the requirements of the E units, are provided with additional safeguards to the electrical system to prevent emission of hazardous sparks and limit surface temperature. They may be used where the E and ES units may not be considered suitable.

EE - Electrically powered units that have, in addition to all of the requirements for the E and ES units, the electric motors and all the other electrical equipment enclosed. In certain locations the EE unit may be used where the E and ES units may not be considered suitable.

EX - Electrically powered units that differ from the E, ES, or EE units in that the electrical fittings and equipment are so designed, constructed and assembled that the units may be used in certain atmospheres containing flammable vapors or dusts.

G - Gasoline powered units having minimum acceptable safeguards against inherent fire hazards.

GS - Gasoline powered units that are provided with additional safeguards to the exhaust, fuel, and electrical systems. They may be used in some locations where the use of a G unit may not be considered suitable.

LP - Liquefied propane gas powered unit with similar safeguards as the G unit.

LPS - Liquefied propane gas powered units that are provided with additional safeguards to the exhaust, fuel, and electrical systems. They may be used in some locations where the use of an LP unit may not be considered suitable.

Safety Guards:

All high lift rider trucks must be fitted with overhead guards where overhead lifting is performed unless operating conditions do not permit. In those cases where high lift rider trucks must enter, for example, truck trailers and the overhead guard will not permit this entry, the guard may be removed or a powered industrial truck without a guard may be used.

If a powered industrial fork truck carries a load that presents a hazard of falling back onto the operator, it must be equipped with a vertical load, backrest extension.

Industrial Trucks and Railroad Cars:

In plant receiving and shipping areas, powered industrial trucks are often utilized to load and unload materials from trucks and railroad cars. The brakes of highway trucks must be set and wheel chocks placed under the rear wheels to prevent trucks from rolling while they are boarded with powered industrial trucks.

Wheel stops or other protection must be provided to prevent railroad cars from moving during loading and unloading operations.

Jack stands may be necessary to support a semi-trailer and prevent up-ending during the loading or unloading when the trailer is not coupled to a tractor.

Industrial Truck Operations:

Some of the requirements regarding industrial truck operations include:

- No person shall be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.
- Unauthorized personnel shall not be permitted to ride on powered industrial trucks. A safe place to ride shall be provided where riding of trucks is authorized.
- When a powered industrial truck is left unattended, load engaging means must be fully lowered, controls neutralized, power shut-off, and brakes set. Wheels must be blocked if the truck is parked on an incline.

Forklift vs. Automobiles:

Forklifts are designed differently from automobiles. In order to lift huge weights, forklifts are constructed with counterweights. A forklift can weigh as much as three times more than an automobile.

Unlike an automobile, a forklift steers with its rear wheels. This allows for a tight turning radius needed in small aisles and work spaces. Unlike an automobile, having steering from the rear means forklifts swing considerably more in the rear when turning. A forklift should be slowed down to no more than two miles per hour before turning to prevent the equipment from turning over.

Automobiles have four wheels and a four-point suspension system making automobiles difficult to tip over. Forklifts have a three-point suspension making a forklift far more likely to tip over.

Center of Gravity:

The center of gravity for a forklift moves depending on the load and how it is positioned on the forklift. Raising or lowering the fork changes the center of gravity on the vehicle. The center of gravity will move when accelerating, braking or turning. Operators should avoid quick accelerating or braking, and turns while operating a forklift should be slow and calculated.

Since the center of gravity changes with the height of the load, it is important to always keep the load low to the ground. Two to four inches off the ground is a safe working distance.

The counterbalance affects the center of gravity as well. Forklifts are designed to carry loads. An unloaded forklift has the potential to tip over more easily than a loaded one due to its counterbalance weight.

Pre-Operation Inspection of Vehicle:

Before the beginning of each shift, the vehicle must be inspected. These pre-operation inspections are critical for the safety of the operators, and are mandatory, not optional. If your inspection reveals a problem with the vehicle, report the problem immediately to your supervisor. Do not operate an unsafe vehicle.

Specific to the Standard for Operation of a Forklift, the Following is Applicable:

1. If at any time the powered industrial lift is found to be defective, in need of repair, or in any way unsafe, the truck must be taken out of service until it has been restored to a safe operating condition.

2. Fuel tanks shall not be filled while the engine is running. Spillage should be avoided.

3. Any spillage of fuel or oil shall be carefully washed away or completely evaporated, and the fuel cap replaced before restarting engine.

4. Open flames shall not be used for checking the levels in storage batteries or gasoline levels in fuel tanks.

A model pre-operation inspection starts with a walk around inspection. At minimum the following items must be checked:

- Check all fork pins and stops to make sure they are in place.
- Check all cowling and body parts.
- Check wheels and tires and report any “play” in the steering wheel.
- Check for any broken or loosened parts.
- Check fuel level, crankcase oil level, radiator water level [if applicable], engine air cleaner, fan belt and hydraulic fuel level.
- Check battery water level and other points required by the particular model.
- Check hour meter and record it. This is important for maintenance scheduling.
- Check operation of the hour meter, headlights, taillights, warning lights, and other lights.
- Check oil pressure gauge and water temperature gauge. These will also vary by model and fuel used. Also check the clutch, hydraulics and other controls.
- The operator should also check the brakes. Brakes are the single most important cause of forklift accidents due to mechanical failure.

Safe Operation of a Forklift:

After a forklift has been checked prior to the start of a shift, operators must understand the requirements for safe operation of the vehicle. Listed below are common sense safety rules.

If the forklift you are operating has a seat belt, be sure to wear it. Seat belts keep the operator attached to the frame of the vehicle. Many forklift accidents involve operators being trapped under a forklift or the load it carries.

Controls vary on forklifts from one type of the vehicle to the next. Be sure you know where every control is prior to the start of operation of that vehicle.

- Never jump on or off the forklift.

- Keep all arms and legs inside the forklift cab at all times.
- Only start the forklift from the operators position on the vehicle.
- Always keep forks raised two to four inches off the ground while traveling.
- Never allow anyone to ride on your forklift unless the unit is specifically designed for two people.
- Always drive defensively. Pedestrians always have the right of way.
- Always drive slowly and safely.
- Be wary of bumps or seams that could cause the load you are carrying to shift or fall.
- If you must cross railroad tracks, cross at an angle to avoid tipping.
- Inclines pose special risks. Always back down and drive up an incline with a loaded forklift.
- Never travel with a load held high.
- Be aware of the rated capacity of your forklift. Do not exceed rated capacity.
- When a vehicle is left unattended, shut it off, set the brakes, bring the mast to a vertical position, lower the load completely, and put controls in neutral.

Traveling with a Load:

This section contains requirements for traveling in powered industrial trucks. Some of these requirements include:

- All traffic regulations must be observed, including authorized plant speed limits.
- The driver must be required to slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view, the driver is required to travel with the load trailing.
- Stay at least one foot away from the edge of elevated platform or dock.
- Railroad tracks are to be crossed diagonally whenever possible. Parking closer than 8 feet from the center of railroad tracks is prohibited.
- When ascending or descending grades in excess of 10 percent, loaded trucks must be driven with the load upgrade.
- Dock boards or bridge plates must be properly secured before they are driven over. Dock boards or bridge plates must be driven over carefully and slowly and their rated capacity never exceeded.

- Always drive at a safe speed.
- Slow down when taking corners.
- Watch for blind spots. Visibility is greatly reduced when traveling with a load.

Loading:

Only stable or safely arranged loads may be handled. Caution must be exercised when handling off-center loads, which cannot be centered.

Only loads within the rated capacity of the truck may be handled.

Forklift Rules of the Road:

- Watch where you are going.
- Keep to the right.
- Obey speed limits.
- Keep three vehicle lengths away from other vehicles.
- Slow down at intersections.
- The pedestrian always has the right of way.
- No horseplay is allowed.
- No riders are allowed – not on the forks, not on the seat, and not on the back.
- Always keep arms and legs inside the vehicle.
- Face the direction of travel.
- When you leave the forklift but remain within twenty-five feet of the truck, completely lower the load engaging means unless it supports an elevated platform, put controls in neutral and set the brakes to prevent movement.
- When you leave a vehicle unattended, shut-off the power, set the brakes, bring the mast to the vertical position, and completely lower the load engaging means, and put the controls in neutral. When you leave the vehicle on an incline, chock the wheels.
- Check the maximum load capacity on the forklift nameplate. Do not load trucks in excess of their capacity.
- Do not move a loaded forklift until the load is safe and secure.

- Carry the load low enough to avoid hitting overhead obstructions such as doorways, pipes, electrical conduits, or sprinklers.
- Do not operate a forklift with a leak in the fuel system.
- Know the position of your forks at all times.
- Be aware of overhead clearances.
- Always chock the wheels of a truck being loaded or unloaded.
- Stop completely before raising or lowering a load.
- Never travel with a load raised high.

Changing and Charging Storage Batteries:

Workplaces using electrically powered industrial trucks will have a battery-charging area somewhere in the plant. In many cases, depending on the number of electrically powered industrial trucks, there will be more than one changing and charging area. This section only applies to storage battery changing and charging areas associated with powered industrial trucks. It does not apply to areas where other batteries, such as those used in motor vehicles [cars or trucks], are charged, although some of the same hazardous conditions may exist.

Some of the Requirements Specified in the Regulations Include:

- Battery charging installations must be located in areas designated for that purpose.
- Facilities must be provided for flushing and neutralizing spilled electrolyte, for fire protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of air contaminants from gassing batteries.
- A conveyor, overhead hoist, or equivalent material handling equipment must be provided for handling batteries.
- Smoking is prohibited in the charging area.
- Precautions must be taken to prevent open flames, sparks, or electric arcs in battery charging areas.
- Never operate a forklift with a low-charged battery.

Fueling the Unit:

Propane:

- Always wear the proper personal protective equipment when changing tanks. For example: gloves, eye protection, protective clothing, etc.
- Shut valve off to use up propane in the line before changing tanks.
- Do not change tanks near an open flame or heat source. [No smoking allowed in this area.]
- If there is a leak, you should be able to smell it.
- Propane is heavier than air and it will settle to the floor if there is a leak.
- Check the condition of all valves and seals before connecting the new tanks.
- Handle tanks carefully. Propane can cause a “freeze” burn if it comes in contact with your skin.
- Tanks should not be stored in areas where leaking gas might accumulate.

Gasoline or Diesel:

- Always wear the proper personal protective equipment when fueling your forklift. For example: gloves, eye protection, protective clothing, etc.
- Shut-off engine.
- Be sure you are using the proper fuel.
- Avoid overfilling the tank.
- Clean up any spills following proper safety procedures for fuel spills.
- Check for any leaks.
- Replace the fuel cap.

Batteries:

- Always wear the proper personal protective equipment when changing the battery. For example: gloves, eye protection, protective clothing, etc.
- Be aware of the nearest flushing station.
- Shut-off the unit.
- Do not smoke or have an open flame in the battery charging area.

- Make sure the brake is set on the forklift before changing the battery.
- Make sure the battery is secure before lifting it.
- Stand clear when moving the battery.
- Make sure that the ventilation system is working properly before charging a battery.
- Always add battery acid to water, never add water to battery acid.
- If charging the battery on the forklift, uncover the battery compartment to prevent the build-up of heat and hydrogen gas.
- Make sure that metal objects do not come in contact with the terminals on the battery.
- Make sure that the charger is off before connecting it to the battery.
- Make sure that the vent caps are not plugged.
- Never plug the charger directly into the truck.

NOTE: If at any time you discover any problems or broken equipment in connection with a forklift, do not operate it unless repairs have been made. You are responsible for the safe operation of any forklift you use.

Maintenance:

Any power-operated industrial truck not in safe operating condition must be removed from service. All repairs must be made by authorized personnel.

No repairs may be made in Class I, II, or III locations. Those repairs to the fuel and ignition systems, which involve fire hazards, must be conducted only in locations designated for such repairs.

Industrial trucks must be inspected before being placed in service, and shall not be placed in service if the inspection shows any condition adversely affecting the safety of the vehicle. Inspections must be made at least daily. Where trucks are used on a round-the-clock basis, they are to be inspected after each shift.

Operating Rules:

Listed below are the operating rules established for this company. They are posted in the workplace as required under the standard.

1. Only drivers authorized by the employer and trained in the safe operation of industrial trucks or industrial tow tractors are permitted to operate such vehicles. Methods will be devised to train operators in safe operation of powered industrial trucks.

2. Stunt driving, causing skid marks on the floor, and horseplay are prohibited.

3. Riders are not permitted on vehicles unless provided with adequate riding facilities.

4. Employees will not ride on the fork of lift trucks.

5. Employees will not place any part of their bodies outside the running lines of an industrial truck or between mast uprights or other parts of the truck where shear or crushing hazards exist.

6. Employees are not allowed to stand, pass or work under the elevated portion of any industrial truck, loaded or empty, unless it is effectively blocked to prevent it from falling.

7. Drivers must check the vehicle at least once per shift, using the operator's daily checklist. If it is found to be unsafe, the matter must be reported immediately to a foreman or mechanic, and the vehicle shall not be put in service until it is made safe. Attention will be given to the proper functioning of tires, horn, lights, battery, controller, brakes, steering mechanism, and the lift system of the forklifts [forks, chains, cable, and limit switches].

8. Trucks will not be operated with a leak in the fuel system.

9. Vehicles are not to exceed authorized or safe speed, always maintaining a safe distance from other vehicles, keeping the truck under positive control at all times while observing all established traffic regulations. When trucks are traveling in the same direction, a safe distance is a time lapse of 3 seconds upon passing the same point or approximately 3 truck lengths between each truck.

10. There is to be no passing of other trucks traveling in the same direction at intersections, blind spots, or dangerous locations.

11. The driver must slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view, the driver will be required to travel with load trailing.

12. Operators must look in the direction of travel and must not move a vehicle until certain that all is clear.

13. Trucks may not be driven up to anyone standing in front of a bench or other fixed object of such size that a person could be caught between the truck and the object.

14. Grades shall be ascended or descended slowly.

a. When ascending or descending grades in excess of 10 percent, loaded trucks must be driven with the load upgrade.

b. On all grades, the load and unload-engaging means should be titled back if applicable, and raised only as far as necessary to clear the road surface.

c. Motorized hand and hand/rider trucks should be operated on all grades with the load-engaging means downgrade.

15. The forks must always be carried as low as possible consistent with safe operations.

16. When leaving a vehicle unattended, the power must be shut-off, brakes set, the mast brought to the vertical position, and the load-engaging means left in the down position. When left on an incline, the wheels must be blocked.

17. When the operator of an industrial truck leaves the truck and is within 25 feet, and has the truck in view, the load engaging means should be fully lowered, controls neutralized, and the brakes set to prevent movement.

18. Vehicles are not to be placed onto any elevator unless the driver is specifically authorized to do so. Before entering an elevator, the driver must make sure that the capacity of the elevator will not be exceeded. Once on the elevator, the vehicles' power is to be shut-off and the brakes set.

19. All motorized hand trucks are to enter elevators or other confined areas with the load end forward.

20. Vehicles must not be operated on floors, sidewalks doors, or platforms that will not safely support the loaded vehicle.

21. Prior to driving onto trucks, trailers, and railroad cars, their flooring must be checking for breaks and other structural weaknesses.

22. Vehicles are not to be driven in and out of highway trucks and trailers at unloading docks until such trucks are securely blocked and brakes set.

23. The width of one tire on the powered industrial truck shall be the minimum distance maintained from the edge by the truck while it is on any elevated dock, platform, freight car or truck.

24. Railroad tracks should be crossed diagonally, whenever possible. Parking closer than 8-1/2 feet from the centerline of railroad tracks is prohibited.

25. Trucks must not be loaded in excess of their rated capacity.

26. There must be no moving of a loaded vehicle until the load is safe and secure.

27. Extreme care should be taken when tilting loads. Tilting the load forward while elevated is prohibited except when picking up the load.

NOTE: Elevated loads are not to be tilted forward except when the load is being deposited onto a storage rack or equivalent. When stacking or tiering, backward tilt is limited to what is necessary to stabilize the load.

28. The load-engaging device is to be placed in such a manner that the load will be securely held or supported.

29. Special precautions are to be taken in the securing and handling of loads by trucks equipped with attachments, and during the operation of these trucks after the loads have been removed.

30. When the powered industrial trucks are used to open and close doors, the following provisions must be complied with:

    a. A device specifically designed for opening and closing doors is to be attached to the truck.

    b. The force applied by the device to the door should be applied parallel to the direction of the door.

    c. The entire door opening is to be in full view of the operator.

    d. The truck operator and other employees should be clear of the area, in case the door falls while being opened.

At the conclusion of the classroom portion of the training, the employee will take the written examination. Upon passing, [80% correct answers], the test will be reviewed with the employee by the trainer.

After completion of written examination, the employee must demonstrate proficiency in driving/operating skills for the trainer. A course should be designed to allow demonstration of all areas of operation. Areas should include but not limited to:

    a. Pre-trip/post-trip inspection.

    b. Forward and reverse traveling with and without a load while maintaining safe speeds and clearances.

    c. Loading and unloading.

    d. Safe parking.