

Original

Forklift Operator Training

The purpose of this program is to prevent injuries and death, reduce waste & operation cost, reduce costs of loss in workers' compensation premium, that occur as a result of inadequate operating practices and to be in compliance with OSHA's Powered Industrial Trucks Standard, CFR 1910.178.

This program relates to fire prevention, design, maintenance, and use of fork trucks, tractors, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electric motors or internal combustion engines.

This material will not apply to manually powered, compressed air or nonflammable compressed gas-operated industrial trucks, farm vehicles, earth moving or over-the-road hauling vehicles.

Requirements:

- All powered industrial trucks will be compliant with design and construction requirements of American National Standards Institute (ANSI) B56.1-1969.
- Approved trucks (i.e., approved for fire safety purposes) shall bear a label or identifying approval by the testing laboratory.
- Capacity, operation, and maintenance instruction plates, tags, or decals shall not be removed and shall be maintained. If illegible, the plates, tags, or decals should be replaced immediately.
- Any modification and/ or additions that affect capacity and safe operation shall not be performed without manufacturer's prior written approval.
- Any front-end attachments that are installed post factory will require that the truck be marked to identify the attachment and show the weight of the truck and attachment combination at maximum elevation with load laterally centered.
- Daily pre-shift inspection will be performed before industrial truck is used.
- Power-operated industrial trucks shall not be used in atmospheres containing hazardous concentration of acetylene, butadiene, ethylene oxide, hydrogen (or gases or vapors equivalent in hazard to hydrogen, such as manufactured gas), propylene oxide, acetaldehyde, cyclopropane, diethyl ether, ethylene, isoprene, or unsymmetrical dimethyl hydrazine (UDMH).
- Power-operated industrial trucks shall not be used in atmospheres containing hazardous concentration of metal dust, including aluminum, magnesium, and their commercial alloys, other metals of similarly hazardous characteristics, or in atmospheres containing carbon black, coal or coke dust except approved power-operated industrial trucks designated as "EX".
- Contact equipment manufacturer if you still have questions about a specific truck and environment location.

- All safeguards shall be maintained. Overhead guards and vertical backrests extensions shall be used where appropriate because of hazards to operator.
- Fuel handling and storage practices shall be in accordance with the National Fire Protection Association standards 30-1969 and/or 58-1969.
- Charging and changing storage batteries shall be done in a safe manner. Charging will only be performed in areas designated for that purpose. This area will have as a minimum: electrolyte flushing and neutralizing facility, appropriate fire protection, protection of charging station from damage by trucks, and adequate ventilation for dispersal of fumes from gassing batteries.
- When charging batteries, acid shall be poured into water. NEVER the opposite.
- Trucks will be properly positioned and brake applied before charging batteries.
- Battery cover(s) shall be removed to dissipate heat.
- Smoking, open flames, sparks or electric arcs or other potential ignition sources (e.g., tool and other metallic objects) are prohibited in charging area.
- Adequate lighting will be maintained for all operating areas.
- When internal combustion engine trucks are used, carbon monoxide (CO) will not be allowed to exceed one half of the P.E.L.
- Portable and powered dockboards shall be strong enough to carry the load and will be secured in position, either by being anchored or equipped with devices that will prevent slipping. Handholds will be provided on portable dockboards to permit safe handling. Positive protection will be provided to railroad cars moving while dockboards or bridge plates are in position.
- Brakes of highway trucks shall be set and wheel chocks placed under the rear wheels to prevent the truck from rolling while they are boarded with trucks.
- Wheel stops or other positive protection shall be used to prevent railroad cars from moving during loading and off-loading operations.
- Uncoupled trailers shall be supported to prevent up ending during loading/ off-loading operations. This may be accomplished with fixed jacks.

Training Program:

The following related topics will be covered in training session, unless it is not applicable to our operations.

- Operating instructions, warnings, and precautions for the types of truck the operator will be authorized to operate;
- Differences between the truck and the automobile;
- Truck controls and instrumentation: where they are located, what they do and how they work;
- Engine or motor operation;
- Steering and maneuvering
- Visibility (including restrictions due to loading)

- Fork and attachment adaptation, operation, and use limitations
- Vehicle capacity
- Vehicle stability
- Required Inspection and maintenance of the operator
- Refueling and/or charging and recharging of batteries
- Operating limitations
- Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of vehicle that the employee is being trained to operate.

Workplace-related topics:

- 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 restricted places where the vehicle will be operated
- Hazardous (classified) locations where the vehicle will be operated
- Ramps and other sloped surfaces that could affect the vehicle's stability
- Closed environments 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.

Trainers and Training Schedule:

We provide both lecture instruction and practical training where demonstration is performed by the trainer & exercises performed by the trainee. The trainer will also evaluate the operator's performance in the workplace.

Trainees may operate the powered industrial truck only under the direct supervision of the trainer and directly as part of the trainees training.

Initial training and evaluation of the training must be completed before the employee is assigned to operate a powered industrial truck.

Refresher Training and Evaluation:

Refresher training will be provided to the operator when the following occurs:

- The operator has been observed operating the vehicle in an unsafe manner
- The operator has been involved in an accident or near-miss incident
- The operator's evaluation reveals the operator is not operating the truck safely
- The operator is assigned to drive a different type of truck
- A condition in the workplace changes that could affect safe operation of truck.

- An evaluation of each powered industrial truck operator's performance shall be conducted at least once every three years.

Certification:

A wallet-sized certificate will be issued to all truck certified operators. A copy of this certificate will be maintained in the employee's personnel file. A master copy of all certified operators will be maintained with the Safety Director. The certificate with contain the following information:

1. Name of operator
2. Date of training
3. Date of evaluation
4. Name of trainer
5. Name of evaluator

Truck Operation Rules:

- Trucks will not be driven up to anyone standing in front any fixed object.
- No person will be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.
- Unauthorized personnel will not be permitted to ride on trucks. A safe place to ride shall be provided where riding of trucks is authorized.
- Arms or legs will be kept clear of the uprights of the mast or outside the running lines of the truck.
- When a powered industrial truck is left unattended, loads will be fully lowered, controls shall be neutralized, power shut off, and brakes set. Wheels will be blocked if the truck is parked on an incline.
- A powered industrial truck is unattended when the operator is 25 ft. or more away from the vehicle which remains in his view, or whenever the operator leaves the vehicle and it is not in his view.
- When the operator of an industrial truck is dismounted and within 25ft. of the truck still in his view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement.
- A safe distance shall be maintained from the edge of ramps or platforms while on any elevated dock, or platform or freight car. Trucks shall not be used for opening or closing freight doors.
- Brakes shall be set and wheel blocks shall be in place to prevent movement of trucks, trailers, or railroad cars while loading or unloading. Fixed jacks may be necessary to support a semitrailer during loading or unloading when the trailer is not coupled to a tractor. The flooring of trucks, trailers, and railroad cars will be checked for breaks and weakness before they are driven onto.
- There will be sufficient headroom under overhead installations, lights, pipes, sprinkler system, etc.

- An overhead guard shall be used as protection against falling objects. It should be noted that an overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., representative of the job application, but not to withstand the impact of a falling capacity load.
- A load backrest will be used whenever necessary to minimize the possibility of the load or part of it from falling rearward.
- Only approved industrial trucks shall be used in hazardous locations.

Personnel Lifting:

Whenever a truck is equipped with vertical only or vertical and horizontal controls elevatable with the lifting carriage or forks for lifting personnel, the following additional precautions will be taken for the protection of personnel:

- Use of a safety platform firmly secured to the lifting carriage and/or forks.
- Controls will be provided on the platform so employees on the elevation can shut off power to the truck.
- Protection from falling objects shall be provided.
- Fire aisles, access to stairways, and fire equipment shall be kept clear.

Traveling Rules:

- All traffic regulations shall be observed, including authorized plant speed limits. A safe distance shall be maintained approximately three truck lengths from the truck ahead, and the truck shall be kept under control.
- Right of way will be yielded to ambulances, fire trucks in emergency situations.
- Other trucks traveling in the same direction at intersections, blind spots, or other dangerous locations shall not be passed.
- The driver shall 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, driver will be required to travel with the load trailing.
- Railroad tracks shall be crossed diagonally wherever possible.
- Parking closer than 8 feet from the center of railroad tracks is prohibited.
- The driver shall be required to look in the direction of, and keep a clear view of the path of travel.
- Grades shall be ascended or descended slowly.
 - ☒ When ascending or descending grades in excess of 10 percent, loaded trucks shall be driven with the load upgrade.
 - ☒ On all grades the load will be tilted back and raised only as far as necessary to clear the road surface.
- Under all travel conditions the truck shall be operated at a speed that will permit it to be brought to a stop in a safe manner.
- Stunt driving and horseplay shall not be permitted.

- The driver will slow down for wet and slippery floors.
- Dock board or bridge plates will be properly secured before they are driven over. Dock board or bridge plates will be driven over carefully and slowly and their rated capacity never exceeded.
- Elevators shall be approached slowly, and then entered squarely after the elevator car is properly leveled. Once on the elevator, the controls shall be neutralized, power shut off, and the brakes set.
- Motorized hand trucks enter elevator with load end forward.
- Do not run over loose objects in the travel way
- While negotiating turns, speed shall be reduced to a safe level by means of turning the hand steering wheel in a smooth, sweeping motion. Except when maneuvering at a very low speed, the hand steering wheel shall be turned at a moderate, even rate.

Rules of Loading:

- Only stable or safely arranged loads shall be handled. Caution shall be exercised when handling off-center loads which cannot be centered.
- Only loads within the rated capacity of the truck shall be handled. Just high (including multiple-tiered) loads which may affect capacity.
- Operate trucks with attachments as partially loaded when not handling a load.
- A load engaging means (tines/forks) shall be placed under the load as far as possible; the mast shall be carefully tilted backward to stabilize the load.
- Extreme care shall be used when tilting the load forward or backward, particularly when high tiering. Tilting forward with load engaging means elevated shall be prohibited except to pick up a load. An elevated load shall not be tilted forward except when the load is in a deposit position over a rack or stack. When stacking or tiering, only enough backward tilt to stabilize the load shall be used.

Miscellaneous Operation Rules:

- If at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the truck shall be taken out of service until it has been restored to safe operating condition.
- Fuel tanks will not be filled while the engine is running, avoid spills.
- Spillage of oil or fuel shall be carefully washed away or completely evaporated and the fuel tank cap replaced before restarting engine.
- No truck shall be operated with a leak in the fuel system.
- Open flames such as lighters, matches will not be used for checking electrolyte level in storage batteries or gasoline level in fuel tanks.

Maintenance of Industrial Trucks:

- Any power industrial truck not in safe operating condition will be removed from service. All repairs will be made by authorized personnel.
- No repairs shall be made in Class I, II, and III locations.
- Those repairs to the fuel and ignition systems of industrial trucks which involve fire hazards shall be conducted only in locations designated for such repairs.
- Trucks in need of repairs to the electrical system shall have the battery disconnected prior to such repairs.
- All parts of any such industrial truck requiring replacement shall be replaced by parts with those used in the original design.
- Industrial trucks shall not be altered so that the relative positions of the various parts are different from what they were when originally received from the manufacturer, nor shall they be altered either by the addition of extra parts not provided by the manufacturer or by the elimination of any parts, except as provided in paragraph (q)(12) of this section. Additional counterweighting of fork trucks shall not be done unless approved by the truck manufacturer.
- Industrial trucks shall be examined before being placed in service, and shall not be placed in service if the examination shows any condition adversely affecting the safety of the vehicle. Such examination shall be made at least daily. Where industrial trucks are used on a round-the-clock basis, they shall be examined after each shift. Defects shall be immediately reported and corrected.
- Water mufflers shall be filled daily or as frequently as is necessary to prevent depletion of the supply of water below 75 % capacity. Vehicles with mufflers having screens or other parts that may become clogged shall not be operated while such screens or parts are clogged. Any vehicle that emits hazardous sparks or flames from the exhaust system shall immediately be removed from service, and not returned to service until the cause for the emission of such sparks and flames has been eliminated.
- When the temperature of any part of any truck is found to be in excess of its normal operating temperature the vehicle shall be removed from service and not returned to service until the cause for such overheating has been eliminated.
- Industrial trucks shall be kept in a clean condition, free of lint, excess oil, and grease. Noncombustible agents should be used for cleaning trucks. Low flash point (below 100 deg. F.) solvents will not be used. High flash point (at or above 100 deg. F.) solvents may be used. Precautions regarding toxicity, ventilation, and fire hazard shall be consonant with the agent or solvent used.
- Industrial trucks originally approved for the use of gasoline for fuel may be converted to liquefied petroleum gas fuel provided the complete conversion results in a truck which embodies the features specified for LP or LPS designated trucks. Such conversion equipment will be approved. The description of the component parts of this conversion system and the recommended method of installation on specific trucks are contained in the "Listed by Report."

Summary:

Forklift trucks can be hazardous, not only to the operator but also to employees working near the truck. For these reasons, strict operating and traffic rules will apply to all forklift operations and will be enforced by all supervisors. Only authorized personnel will be allowed to operate the trucks.

We Will:

- Ensure that pedestrian walkways are clearly defined throughout the facility.
- Provide regular maintenance on the vehicles monthly and keep maintenance records for each vehicle.
- Ensure that all trucks meet national standards and bear a label indicating approval by a testing laboratory.
- Request manufacturer's approval before modifications is made to the trucks.
- Safely conduct battery charging in locations designated for that purpose with appropriate personal protective equipment will be worn.
- Make sure that smoking is prohibited in battery charging areas and that any spark-producing activities are closely restricted.
- Strictly enforce all industrial truck operation procedures.
- Train authorized personnel in the operation of the trucks. Training will be conducted initially and every year after. Records of training will be kept by the supervisor.
- Training will include a driving and a safe material handling test.
- Train all other employees on the applicable pedestrian safety rules.
- Make sure that overhead guards are used to protect against falling objects.
- Remove from service any defective trucks.
- No unauthorized personnel will be allowed to ride on the trucks.
- Use a safe speed of not more than 15 mph at the worksite.
- Slow down and sound the horn at intersections and where vision is obstructed.
- Ride in reverse if the load obstructs forward view.
- When leaving a truck unattended, lower forks to ground level, neutralize controls, shut power off and set brakes. Wheels should be chocked if parked on an incline.
- Maintain a safe distance from the edge of ramps or platforms.
- Use a load backrest extension to prevent load from falling backward.
- Only stable or safely arranged loads should be handled.
- Only lift loads that are within the rated capacity of the truck.
- Never engage in stunt driving or horseplay.
- Never allow anyone to stand or walk under the elevated portion of the truck, even when empty.

Powered Industrial Trucks. - 1910.178

Stability of Powered Industrial Trucks

Definitions:

The following definitions help to explain the principle of stability:

Center of gravity is the point on an object at which all of the object's weight is concentrated. For symmetrical loads, the center of gravity is at the middle of the load.

Counterweight is the weight that is built into the truck's basic structure and is used to offset the load's weight and to maximize the vehicle's resistance to tipping over.

Fulcrum is the truck's axis of rotation when it tips over.

Grade is the slope of a surface, which is usually measured as the number of feet of rise or fall over a hundred foot horizontal distance (the slope is expressed as a percent).

Lateral stability is a truck's resistance to overturning sideways.

Line of action is an imaginary vertical line through an object's center of gravity.

Load center is the horizontal distance from the load's edge (or the fork's or other attachment's vertical face) to the line of action through the load's center of gravity.

Longitudinal stability is the truck's resistance to overturning forward or rearward.

Moment is the product of the object's weight times the distance from a fixed point (usually the fulcrum). In the case of a powered industrial truck, the distance is measured from the point at which the truck will tip over to the object's line of action. The distance is always measured perpendicular to the line of action.

Track is the distance between the wheels on the same axle of the truck.

Wheelbase is the distance between the centerline of the vehicle's front and rear wheels.

Determining the stability of a powered industrial truck is simple once a few basic

principles are understood. There are many factors that contribute to a vehicle's stability: the vehicle's wheelbase, track, and height; the load's weight distribution; and the vehicle's counterweight location (if the vehicle is so equipped).

The "stability triangle," used in most stability discussions, demonstrates stability simply.

Basic Principles.

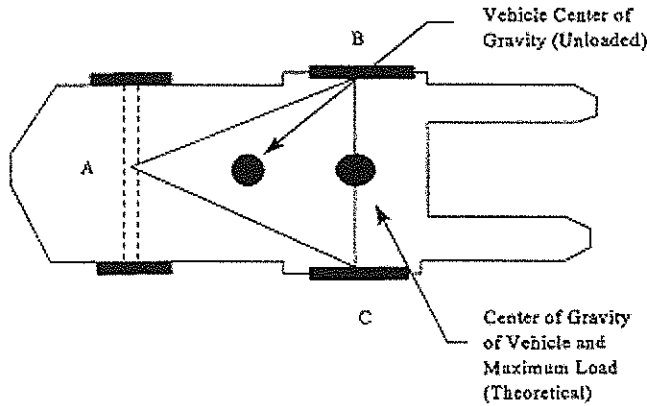
Whether an object is stable depends on the object's moment at one end of a system being greater than, equal to, or smaller than the object's moment at the system's other end. This principle can be seen in the way a see-saw or teeter-totter works: that is, if the product of the load and distance from the fulcrum (moment) is equal to the moment at the device's other end, the device is balanced and it will not move. However, if there is a greater moment at one end of the device, the device will try to move downward at the end with the greater moment.

The longitudinal stability of a counterbalanced powered industrial truck depends on the vehicle's moment and the load's moment. In other words, if the mathematic product of the load moment (the distance from the front wheels, the approximate point at which the vehicle would tip forward) to the load's center of gravity times the load's weight is less than the vehicle's moment, the system is balanced and will not tip forward. However, if the load's moment is greater than the vehicle's moment, the greater load-moment will force the truck to tip forward.

The Stability Triangle.

Almost all counterbalanced powered industrial trucks have a three-point suspension system, that is, the vehicle is supported at three points. This is true even if the vehicle has four wheels. The truck's steer axle is attached to the truck by a pivot pin in the axle's center. When the points are connected with imaginary lines, this three-point support forms a triangle called the stability triangle. Figure 1 depicts the stability triangle.

Figure 1.

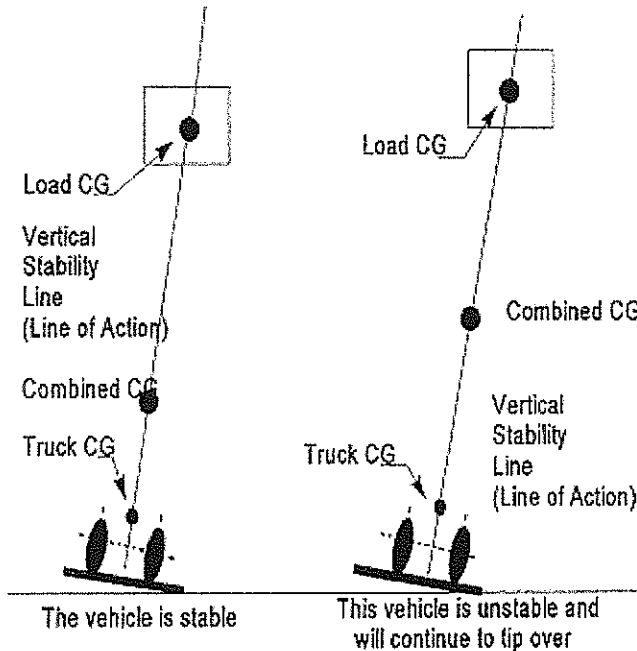


Notes:

1. When the vehicle is loaded, the combined center of gravity (CG) shifts toward line B-C. Theoretically the maximum load will result in the CG at the line B-C. In actual practice, the combined CG should never be at line B-C.
2. The addition of additional counterweight will cause the truck CG to shift toward point A and result in a truck that is less stable laterally.

When the vehicle's line of action, or load center, falls within the stability triangle, the vehicle is stable and will not tip over. However, when the vehicle's line of action or the vehicle/ load combination falls outside the stability triangle, the vehicle is unstable and may tip over. (See Figure 2.)

Figure 2.



Longitudinal Stability.

The axis of rotation when a truck tips forward is the front wheels' points of contact with the pavement. When a powered industrial truck tips forward, the truck will rotate about this line. When a truck is stable, the vehicle-moment must exceed the load-moment. As long as the vehicle-moment is equal to or exceeds the load-moment, the vehicle will not tip over. On the other hand, if the load moment

slightly exceeds the vehicle-moment, the truck will begin to tip forward, thereby causing the rear to lose contact with the floor or ground and resulting in loss of steering control. If the load-moment greatly exceeds the vehicle moment, the truck will tip forward.

To determine the maximum safe load-moment, the truck manufacturer normally rates the truck at a maximum load at a given distance from the front face of the forks. The specified distance from the front face of the forks to the line of action of the load is commonly called the load center. Because larger trucks normally handle loads that are physically larger, these vehicles have greater load centers. Trucks with a capacity of 30,000 pounds or less are normally rated at a given load weight at a 24-inch load center. Trucks with a capacity greater than 30,000 pounds are normally rated at a given load weight at a 36- or 48-inch load center. To safely operate the vehicle, the operator should always check the data plate to determine the maximum allowable weight at the rated load center.

Although the true load-moment distance is measured from the front wheels, this distance is greater than the distance from the front face of the forks. Calculating the maximum allowable load-moment using the load-center distance always provides a lower load-moment than the truck was designed to handle. When handling unusual loads, such as those that are larger than 48 inches long (the center of gravity is greater than 24 inches) or that have an offset center of gravity, etc., a maximum allowable load-moment should be calculated and used to determine whether a load can be safely handled. For example, if an operator is operating a 3000 pound capacity truck (with a 24-inch load center), the maximum allowable load-moment is 72,000 inch-pounds (3,000 times 24). If a load is 60 inches long (30-inch load center), then the maximum that this load can weigh is 2,400 pounds (72,000 divided by 30).

Lateral Stability.

The vehicle's lateral stability is determined by the line of action's position (a vertical line that passes through the combined vehicle's and load's center of gravity) relative to the stability triangle. When the vehicle is not loaded, the truck's center of gravity location is the only factor to be considered in determining the truck's stability. As long as the line of action of the combined vehicle's and load's center of gravity falls within the stability triangle, the truck is stable and will not tip over. However, if the line of action falls outside the stability triangle, the truck is not stable and may tip over. Refer to Figure 2.

Factors that affect the vehicle's lateral stability include the load's placement on the truck, the height of the load above the surface on which the vehicle is operating, and the vehicle's degree of lean.

Dynamic Stability.

Up to this point, the stability of a powered industrial truck has been discussed without considering the dynamic forces that result when the vehicle and load are put into motion. The weight's transfer and the resultant shift in the center of gravity due to the dynamic forces created when the machine is moving, braking, cornering, lifting, tilting, and lowering loads, etc., are important stability considerations.

When determining whether a load can be safely handled, the operator should exercise extra caution when handling loads that cause the vehicle to approach its maximum design characteristics. For example, if an operator must handle a maximum load, the load should be carried at the lowest position possible, the truck should be accelerated slowly and evenly, and the forks should be tilted forward cautiously. However, no precise rules can be formulated to cover all of these eventualities.

Forklift maintenance: What does OSHA mean by “in need of repair”?

OSHA recently issued a Letter of Interpretation to clarify the Powered Industrial Truck (1910.178) standard's use of the terms “in need of repair,” “defective,” and “unsafe.”

Issue: The language of 29 CFR 1910.178(p)(1) requires that “[i]f at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the truck shall be taken out of service until it has been restored to safe operating condition.”

Question 1: Can OSHA provide specific definitions of “in need of repair” and “defective?”

Reply: Neither 29 CFR 1910.178, its source standard ANSI B56.1-1969, nor the current ASME B56.1-2000 defines any of the words for which you request clarification. However, in determining whether a truck is “. . . in need of repair, defective, or in any way unsafe,” OSHA would take a variety of factors into consideration. These factors include, but are not limited to, the condition of the truck itself, the manufacturer's limitations on the truck, and other safety issues, such as those considerations found in consensus standards like ANSI B56.1. While specific definitions of these words are not available, in this context OSHA will consider the totality of the circumstances surrounding a powered industrial truck in determining whether it is “in need of repair” or “defective.”

Question 2: What does OSHA mean when the word “unsafe” is used in the standard, and can OSHA provide examples of an unsafe condition on a powered industrial truck?

Reply: "Unsafe," as used in 1910.178(p)(1), carries the general connotation of presenting a harm or risk. As stated above, OSHA will consider a number of factors in determining whether a powered industrial truck is unsafe. For example, all gauges must be functioning properly for the truck to be considered safe. Should a gauge not be functioning properly, that truck will usually be considered defective and in need of repair, thereby making the truck unsafe. Broken welds, missing bolts, or damage to the overhead guard would indicate that a truck is unsafe. Tires that are missing large pieces of rubber would present a risk to the truck operator, thereby making the truck unsafe. Such conditions must be repaired and corrected before the truck is placed back in service. It must be noted, however, that these are simply examples of unsafe conditions on a powered industrial truck; this list is not inclusive and there are certainly other conditions that would render a truck unsafe.

Prevent shocks, spills and burns when charging forklift batteries

How do you safely charge forklift batteries?

Lead acid forklift batteries should be charged for a period equal to the time they were used. For example, charge the battery for eight hours after an eight-hour work shift. They also should be allowed to cool for a period equal to the charging time before being put back in service.

Two types of fork batteries are in use today. The first is a recently developed sealed battery. This type does not require any attention from the user-except recharging-and cannot be accessed by the user. The more common type contains liquid sulfuric acid electrolyte. Before charging this type of battery, check and adjust the level of the electrolyte in each cell by removing the cap and adding water to bring the level slightly above the plates. Make sure the water is from a clean container.

In most of the United States, tap water is fine to use. However, in some areas of the Southwest, where the water is alkaline, distilled water is necessary.

Always wear eye protection when working with batteries because even a small amount of sulfuric acid can cause serious damage to the eyes.

After the electrolyte level has been adjusted the battery can be connected to the charger. At this point, be sure the charger connector is plugged into the battery. With the frequently used "SB" connectors, many mistakenly plug the charger into the forklift plug instead of into the battery.

Many of the chargers in use today have automatic start/stop. All that needs to be done with these chargers is to plug them into the battery. They automatically will sense the requirements of the battery and will charge it accordingly. Older chargers have a timer that must be set manually. The timer dial is normally marked "daily charge" and "weekly charge." The weekly charge is used to ensure equalization of the cells and is most often used over the weekend when the forklift will not be in use.

When a liquid electrolyte lead acid battery is being charged it liberates both oxygen and hydrogen. Both of the gasses are flammable. Therefore, make sure that the charging area be well ventilated. Ensure that no smoking, no open flames and no sparks occur near where batteries are being charged.

Leave the cell caps on the battery during charging. If the battery has a cover, it should be open. If the forklift has covers that enclose the battery, those covers should be opened or removed.

Make sure the charger is the correct one for the battery you are about to connect. In many plants with multiple forklifts, you may have batteries of four or five different voltages. Each cell of a forklift battery nominally produces two volts. In order to be certain of the battery and charger match, count the cells in the battery and read the nameplate on the charger.

In some plants, the batteries are taken out of the forklift to be charged. Always keep in mind that lead acid batteries are mostly lead. Batteries that weigh between 3,000 and 4,000 pounds are not unusual. Be certain that the equipment being used to handle the battery is able to support the weight.