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## Operating the Iron Horse: Safe Forklift Operations

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### Why forklift safety is a concern

The safe operation forklifts (a common type of powered industrial truck), as well as the standard operating procedures for these trucks, is often a subject of debate between lift truck operators and their company's safety personnel. We'll try to explain in simple terms the meaning of the often complex wording of OSHA forklift safety regulations found in 29 CFR 1910.178. We won't cover every forklift safety scenario that could possibly occur, but will address the more common OSHA safety regulations and general safe rules of operation. The first part contains general descriptions of the most common types of powered industrial trucks, while the final part describes the safe operating guidelines for industrial trucks.

### *Types of powered industrial trucks*

There are several types of powered industrial trucks used within warehousing and manufacturing facilities.

#### **Counterbalanced sit-down type lift truck**

The most common type is the *counterbalanced sit-down type lift truck*. This truck has a heavy counterweight over the rear steering tires that keep the back of the truck on the ground when carrying loads. The most common hydraulic options on this truck are the lift mechanism, which causes the forks to raise and lower; the tilt mechanism, which tilts the forks forward or backward; and the side shift mechanism, which moves the forks to the right or left. This type of truck is ideal for lifting heavy loads and, if fitted with pneumatic tires, can also be used in an outdoor environment. One disadvantage of this truck is that, due to its long length, it is difficult to use in narrow aisles. This front-wheel drive type truck can be powered by a large battery or an internal combustion engine.

#### **Electric narrow aisle stand-up type lift truck**

Another type of truck is an *electric narrow aisle stand-up type lift truck*. As its name implies, the operator stands up while lifting and stacking loads within narrow aisles. Even though it is very narrow in width, it gains its stability by the use of two small wheels extending out from the front of the truck, one on each side of the forks. Some of these trucks have a "reach" mechanism added to the forks so that the forks can actually be extended out several feet from the mast area.

#### **Narrow aisle order picker type lift truck**

A close relative of the narrow aisle electric truck is the *narrow aisle order picker type lift truck*. With this truck, the entire operator's compartment is raised with the forks. The forks generally have a pallet placed on them to allow the operator to stack the picked orders on. A disadvantage of this truck is that the cab may get somewhat unstable if raised to the maximum height.

#### **Electric motor hand truck**

The final type of common lift truck is the *electric motor hand truck*. This type of truck is generally identified by a large pivoting handle which controls the direction, speed, and steering of the truck. This truck will vary in style depending on the options requested by the user. The operator may or may not be able to ride on the truck, and some of these trucks are only able to lift pallets a few inches, whereas others will perform high lifts. This truck may also be equipped with a fork reach mechanism or tilt mechanism. Most of these trucks are equipped with an automatic reversing switch on the handle which reverses the direction of the truck if the operator should become trapped between the truck and an immovable object.

Why forklift safety is a concern. 1  
 Rules of safe operation ..... 2  
 Working in trucks and railroad cars ..... 3  
 Operator training ..... 5  
 Truck operations ..... 6  
 Traveling ..... 10  
 Loading ..... 12  
 Maintenance of industrial trucks ..... 14  
 General safety issues ..... 15  
 Conclusion ..... 17

## Rules of safe operation

### *General requirements*

**Lift trucks cannot be altered, modified, or have attachments added or removed without the approval of the manufacturer of the truck.**

This requirement means that it's up to the user of the lift truck to secure permission from the truck manufacturer before attempting to modify, add, or remove parts or attachments from the truck that would impact capacity or safe operation. It covers items such as back-up alarms, lights, fork attachments, or any of a number of modifications. Common infractions occur in this area when users remove or discard lighting systems, seat belts, or back up alarms, and when users alter the forks to fit their particular style of load or cut the overhead guard to make it lower or less wide so the truck will fit in tighter aisles.

**A powered industrial truck is only to be used for its intended purpose and only fitted with attachments approved by the manufacturer.**

Forklifts should not be used for any other than their intended purpose. Attachments that are added must be approved by the manufacturer and, if the load-carrying capacity of the truck changes because of a different lift attachment, a new capacity information plate must be affixed to the truck. The reason for this requirement is to prevent injury to operators due to using the truck for the wrong, and possibly dangerous, purpose. An example of a violation of this rule occurred when an operator tried using the forklift, with a dumpster attached to the forks, as a snowplow. The snowplow idea worked fine until the forks hit a raised section of the driveway causing the truck to overturn and costing the company thousands of dollars in damages.

Another example is using the forklift to *push* materials rather than *carry* them. As its name implies, most forklifts are only designed to lift materials. Further, it is unsafe to use fork *extenders* without knowing what the reduced load carrying capacity would be at the greater load-center-distance dimensions. Adding other attachments, such as barrel grabs, would reduce the carrying capacity in two ways; first, the added weight of the attachment itself would reduce the net weight that could now be lifted; and secondly, because the barrel grab attachment (and the barrels themselves) are carried at the end of the forks, the increased load-center-distance dimension would necessitate a greatly reduced lifting capacity.

Before picking up a load and pallet, check to make sure they are in safe condition. In addition make sure the load is secure. Securing the load before transportation may mean restacking, banding, or film wrapping the load before lifting with the lift truck. If the load cannot be stabilized, a supervisor or other manager should be contacted for assistance. It is especially important that if a stack of material is leaning dangerously, it must be restacked *before* being picked up and transported by the lift truck. Picking up and moving a leaning load poses a hazard – the slightest bump or too fast of speed around a corner may cause the whole load to topple.

### *Designated locations*

**Use only approved trucks in hazardous (explosion prone) areas.**

If operated in areas where there is the potential for explosions, then specially designed trucks must be used. Areas such as paint and petroleum factories, or feed mills where explosive dust is present, must use only trucks approved to operate in these hazardous areas. These trucks have special shielding on electrical components and on exhaust and intake systems so that no sparks or open flames can set off an explosion. When repairing these trucks, it is important to replace all guards and other electrical components with original equipment factory parts to ensure that the trucks stay explosion proof!

### *Changing and charging storage batteries*

**Only refuel lift trucks or re-charge their batteries in approved “no smoking” areas.**

It goes without saying that there should be no flames or sparks of any type near a propane or gasoline refueling area. But battery charging areas also fall under this same rule due to the explosive hydrogen gas given off during the charging process. Also, keep all metal tools away from the batteries because a metal wrench or other object could cause a spark-laden short circuit if it came in contact with an exposed battery post. This shower of sparks could set off an explosion.

The operator should also shut off the power at the battery charger *before* disconnecting the charger leads. Doing otherwise would produce a spark that could also trigger the battery to explode. Always disconnect the battery before performing any maintenance to the truck or the battery. When checking batteries, be sure that the electrolyte (water) level is up to specifications and wear safety goggles and gloves whenever working with the battery. In case battery acid comes in contact with eyes or other body parts, flush the affected area with plenty of water – make sure to know the location of the eyewash/shower. When changing batteries using a power lift, it is a good idea to have two people present to ensure smooth removal and installation.

### ***Control of noxious gases and fumes***

#### **Be aware of the carbon monoxide and fuel hazards of engine powered trucks.**

Carbon monoxide is an odorless, colorless gas given off by all engine-powered forklifts. Even though propane-type lift trucks give off less carbon monoxide (CO) than gasoline or diesel type trucks, they still emit enough of this deadly gas to potentially cause illness or death to workers. It is important that areas that use engine-driven forklifts have adequate exhaust ventilation as well as fresh air circulation.

Accident reports have shown that entire shifts of workers have had to be hospitalized due to carbon monoxide poisoning caused by propane powered forklifts. If workers show signs of abnormal drowsiness, light-headedness, or illness, the CO levels in the workplace should be checked.

Another reason gasoline powered forklifts may be more hazardous than electric trucks is that they carry a large supply of flammable fuel on-board. If the fuel system isn't inspected and, if necessary, repaired immediately, forklifts can start a fire or start buildings on fire. If, for instance, the operator failed to securely tighten the propane line to the tank and then failed to smell the propane, failed to hear the hissing leak, or failed to see the frost forming around the leaky propane coupling, a fire could result.

Leaking fuel (whether propane, gasoline, or diesel fuel) is a major safety hazard and could easily cause a fire of catastrophic proportions. Because propane is heavier than air, as it leaks it forms a river of flammable vapor that flows to the lowest spot in the vicinity. If this low spot leads to a source of ignition, the vapor is ignited and a river of flame flows back toward the lift truck. When the flame arrives at the truck the whole truck can be engulfed in flames in a matter of seconds. It is important that all propane operated lift trucks be inspected for leaks before and during each shift. If a leak is detected, the propane tank should be shut off immediately and the cause of the leak investigated.

Whenever checking tanks for leaks or changing a propane tank, the operator should wear eye protection and gloves. Propane gas that is escaping is extremely cold, and touching any fixture near the escaping gas without gloves could cause a severe case of frost burn. It is recommended that operators who are replacing propane cylinders that are nearly empty, shut off the propane cylinder valve and let the still-running engine use up the remaining fuel in the line before disconnecting the propane coupling from the cylinder. This procedure will ensure that no propane will blast out of the line as the coupling is being removed. Waiting for the engine to shut off due to lack of fuel is also a good way to ensure that the fuel valve is truly in the "off" position and functioning properly.

### **Working in trucks and railroad cars**

#### **Use the correct procedures and extreme caution when driving a lift truck into a truck, trailer, or railroad car.**

One of the most dangerous operations involving lift trucks is that of loading or unloading trucks, trailers, and railroad cars. The reason for the danger is the change of environment from the stable, concrete floor of a warehouse to the unstable realm of a truck, trailer, or railroad car. Not only may the vehicle being entered be unstable, but the means of going from the warehouse to the vehicle (by way of a dock plate) can also be hazardous. Because of the dangers of loading these vehicles, strict guidelines have been set up to protect the well-being of all persons involved in the loading or unloading operation.

#### **Set the brakes**

The first rule is to be sure that the brakes are set on the vehicle to be unloaded. This could range from air brakes or spring-loaded brakes on larger semi-trailers to hand brakes on other vehicles. Generally the driver of the over-the-road truck will be the person that sets the brakes, but, as with all other rules listed here, it is the forklift operator's responsibility to check that the safety rules have been carried out.

### **Secure the vehicle to the dock**

Secondly, it's a good idea to secure the vehicle to the loading dock by the use of wheel chocks or a mechanical dock locking system. This is an especially important aspect of loading-dock safety that is sometimes ignored. By using wheel chocks or a dock-lock system, the trailer or truck is prevented from moving forward whenever the operator drives the forklift into the trailer and slams on its brakes to pick up or deposit a load. This rocking motion caused by the lift truck's braking action can cause semi-trailers and other trucks to creep forward, even if the vehicle brakes are set.

Another reason to have these vehicle restraint systems in place is to prevent the semi or truck driver from pulling away before the loading or unloading operation is finished. There are numerous accounts of semi-drivers pulling away from the loading-dock before the loading or unloading is complete. Using these vehicle restraint systems ensures that the semi-driver will at least have to get out of the cab to remove the chocks or dock-lock *before* driving away. If the loading dock has a dock-lock system with warning lights, the forklift operator should enter the truck only with the green interior light on, and the semi-driver should only drive away from the dock when the green exterior light is on. Forklift operators should not rely on the lights alone. They should visually check that the dock-lock has indeed engaged the ICC bar of the semi-trailer.

### **Install the dockboard or plate**

After the vehicle restraint system is in place, the next item to install and check is the dockboard. This metal plate makes a ramp between the warehouse floor and the trailer floor. After installation of the dockboard, the operator should walk out on it to ensure that it overlaps the trailer sufficiently and that the trailer is square with the unloading area so that the dockboard fits uniformly on the trailer. The operator should also make sure that the bed of the vehicle to be unloaded is the correct height so that there is not a steep angle to the dockplate. A dockplate that is too steep can cause the forklift's tires to spin, creating a loss of control. A dockplate tilted downward too far could cause product to slide off the front of the forks, possibly causing the truck to tip forward.

### **Check the condition of the trailer floor**

Once the dockplate is secure, the forklift operator should check the condition of the bed of the vehicle to be driven onto. If the bed of the trailer has weak, rotten, or otherwise unsafe areas on it, do not drive on it! Even an unloaded powered industrial truck is heavy enough to break through a weak floor. Many accidents, including injuries and fatalities, have occurred because the forklift operator did not check the floor condition prior to driving on to it. When unloading a full load where the floor condition cannot be seen, the lift truck operator should inspect the floor as it becomes visible by the removal of the load.

A lightweight *pallet jack* may have to be used to load or unload trailers if floor conditions warrant that the heavier weight lift truck stay out of the trailer. Forklift operators should be aware that even new-looking trailer floors may have weak boards that could break if the lift truck traveled over them. One particular accident of this nature happened to a brand new semi-trailer just two weeks after it was delivered from the manufacturer. Trailer floors made from aluminum also may have weak spots or holes. If any floor looks weak, don't drive on it with a lift truck.

### **Determine if the semi-trailer is still attached**

Another item that should be checked before driving into a semi-trailer is whether or not the semi-tractor is still attached to the trailer. If the tractor has been removed and the trailer is to be loaded or unloaded, place *supports* or *jackstands* under the nose of the trailer to prevent it from upending. Upending can occur if a heavy load is being placed in the nose of the trailer that has the tractor removed. The combined weight of the forklift and the load, driven *ahead* of the trailer's own dolly wheels, could shift the center of gravity of the trailer ahead of the dolly wheels, causing the trailer to tip forward. Even if the combined weight doesn't tip the trailer forward, sometimes just the hard braking action of the lift truck inside the trailer can cause the trailer's dolly wheels to collapse.

### **Check the lighting**

Last but not least, check to be sure that there is adequate lighting before driving into a semi-trailer or other vehicle. If the light is poor, turn on and position the loading dock lights. If the lift truck has lights, turn them on also. Loading dock safety can be achieved if the operators follow the correct procedures. By following these procedures, forklift operators' chances of being injured while working on the loading-dock will be reduced considerably.

## Operator training

### **Only trained and authorized personnel are permitted to operate a lift truck.**

This regulation, in 29 CFR 1910.178(l), requires that all personnel that operate a lift truck have been properly trained and authorized. Even if a person has to use the lift truck as little as once a month or once a year, that person has to be trained on the correct operation and safety concerns of that vehicle. If that person has to operate more than one type of vehicle, then he/she has to receive training on each different type of vehicle as well. Operators of multiple types of forklifts have to be trained on each type of vehicle they will be using.

However, if an operator has previously received training in a topic listed in the training program content, and such training is appropriate to the truck and working conditions encountered on the job, then additional training in that topic is not required (provided the operator has been evaluated and found competent to operate the truck safely).

### **How is the trainee to learn?**

A trainee can operate a powered industrial truck only:

- Under the direct supervision of persons who have the knowledge, training, and experience to train operators and evaluate their competence; and
- Where such operation does not endanger the trainee or other employees.

### **What does the training consist of?**

The employer must provide a combination of:

- Formal instruction (e.g., lecture, discussion, interactive computer learning, video tape, written material);
- Practical training (demonstrations performed by the trainer and practical exercises performed by the trainee); and
- Evaluation of the operator's performance in the workplace.

The operator training and evaluation has to be conducted by persons who have the knowledge, training, and experience to train powered industrial truck operators and evaluate their competence. **Note:** OSHA does not define the trainer requirements further or set any specific certifications that trainers must have. OSHA says that a trainer may obtain the necessary knowledge, training, and experience in a variety of ways. Further, the trainer must have operated the equipment subject to the training at some point; the trainer does not have to operate on a regular basis, but must be familiar with how the truck handles and is controlled.

### **What makes up the training program?**

Powered industrial truck operators have to receive initial training in the following topics (unless the employer can demonstrate they are not applicable to safe operation of the truck in the employer's workplace):

- Truck-related topics such as vehicle capacity and stability, operating instructions, and vehicle inspection and maintenance requirement.
- Workplace-related topics like load manipulation, stacking, and unstacking; pedestrian traffic in areas where the vehicle will be operated; and narrow aisles and other restricted places where the vehicle will be operated;
- Any other requirements of the forklift training regulation.

### **Certification of employees**

In addition to being trained, employees also have to be certified by their employer to operate lift trucks. Forklift certification for the operator is the end result of a training program approved by the employer.

### **Employees may operate only an industrial truck that they are skilled, certified, and authorized to operate.**

The certification standards for forklift operators call for operators to be individually certified on each different type of truck that they are to operate. In the past, once operators received their certification on any particular type of lift truck it was interpreted that this certification then allowed them to drive all varieties of lift truck within their workplace.

As a result of this misinterpretation, many lift truck accidents occurred, not because the operators weren't certified, but because the drivers were not familiar with the truck they were operating. There are tremendous design differences among the many different styles of lift trucks. Even if a workplace has only one style of lift trucks, but they are of different brands, there has to be training geared toward the differences in each brand. Individual training may also be necessary on different *model year* trucks of the *same* brand. As technology updates and improves lift trucks, so must the operators be updated on these changes.

### **Refresher training**

It's the employer's responsibility to ensure that all their employees receive updated safety training as the company's fleet of lift trucks is changed or modernized. A certification for a sit-down lift truck does not allow the same operator to operate a stand-up type, or any other type of lift truck. He/she must also be checked out on that other style of truck.

In addition, refresher training, including an evaluation of the effectiveness of that training, must be conducted to make sure that the operator has the knowledge and skills needed to operate the powered industrial truck safely. This training must be conducted when the operator:

- Has been observed to operate the vehicle in an unsafe manner;
- Has been involved in an accident or near-miss incident;
- Has received an evaluation that reveals that the operator is not operating the truck safely;
- Is assigned to drive a different type of truck.

Also, if a condition in the workplace changes in a manner that could affect safe operation of the truck, then the refresher training must be conducted.

### **Evaluate the operator every three years**

Make sure an evaluation of each powered industrial truck operator's performance is conducted at least once every three years. This is required by OSHA.

## **Truck operations**

### **Never turn a lift truck steering wheel sharply or allow it to turn sharply.**

Most lift trucks have relatively small diameter tires that control the vehicle's steering. As a result, lift trucks have very "quick" steering compared to automobiles. For this reason it is important that turns are negotiated in a smooth and slow manner. A potentially dangerous problem can be caused by these small diameter tires if the operator runs over any type of debris on the floor. Because the tires are so small, they generally will not roll *over* most debris but will turn sharply and try to go around the obstruction in their path. This blocked path, and resultant involuntary sideways movement of the tire, may cause the steering wheel to spin forcibly out of the grip of the operator. When this happens, the truck will lurch quickly to one side or the other. If the load is raised or the speed is great enough when this sideways lurch occurs, the truck could overturn.

Therefore, forklift operators are reminded not to drive over debris, especially in reverse. If this situation should occur and the steering wheel starts spinning out of control, the operator is to grab tightly onto the steering wheel to prevent its quick turning. Driving a lift truck with wet or oily hands is also not recommended because it would be harder to grip onto a spinning steering wheel.

### **Do not raise or lower the forks unless the lift truck is stopped, braked, and aligned with the storage rack, and fork tips are 6 to 18 inches from the rack.**

Unfortunately, many operators feel that to speed up a job, they have to raise the forks well before they get to their pick-up or drop-off location. In the short term this may be true, but statistics show that when accident rates and down-times are figured in, it's quicker and more economical to follow this safe practice.

Besides proper training of the operators, the frequency of employees breaking this rule could be further reduced if companies purchased the right equipment for their storage area floor-plan. Too many companies are using sit-down type lift trucks in situations that demand narrow aisle reach type trucks. The sit-down trucks need a very wide aisle to execute the proper turn-stop-lift technique. As a result of using the wrong truck in narrow aisles, many of these sit-down truck operators are forced to lift the load *before* turning to square up with the storage rack. Turning the truck with a load high on the forks is a very dangerous maneuver which has cost many forklift operators their life. Company management

should be aware that if they want more shelf space and less aisle space, then they will have to purchase the correct trucks to do the job safely.

Besides the danger of tipping the truck if the operator is moving the truck with the forks high, another problem that occurs is running into objects suspended near the ceilings. Accident reports are, unfortunately, very common involving raised forks hitting objects such as overhead natural gas lines, sprinkler systems, wall partitions, and lighting fixtures. In some of these cases fires resulted, causing extensive damage to both the building and to the forklift operator. To re-emphasize this rule, *never raise or lower the forks when the truck is moving, turning, or not square with the load to be picked up.*

**Do not allow anyone to stand, work, or walk under or near elevated forks.**

A forklift is not designed to allow safe passage under elevated forks. A forklift does not have the safety locking system that automotive lifts incorporate. For this reason, raised forks could suddenly crash down without warning. A malfunctioning hydraulic hose, check valve, or other part could cause the forks to fall to the ground. Even unloaded forks are heavy enough to cause severe injury or death to anyone caught under them.

It is for these reasons that lift trucks are not to be used for any other purpose than lifting and lowering loads. If the threat of falling forks doesn't keep employees from beneath forks, then they should also be aware of the danger of the raised load falling on them. Many deaths occur each year not because the forks fell, but because part, or the entire load, fell from the elevated forks.

**Do not lift a load that extends above the load backrest unless no part of the load can possibly slide back toward the operator.**

This procedure protects the operators from parts of the load possibly sliding over the fork backrest and onto them. Even though most lift trucks are equipped with overhead guards, these guards are not strong enough to prevent a maximum capacity load from crushing the safety cage.

Many times, it's not so much the danger of the falling object that causes injuries, but what the operator does to try and avoid the object that causes injury or death. Sometimes when operators are confronted with part of the load falling at them, they panic and try to move the truck quickly out of the way. This quick action in a panic situation sometimes results in the truck tipping over or crashing into walls or other stationary objects. This situation is similar to the automobile driver who swerves to avoid a deer but crashes into a tree and is killed; the evasive action taken was more dangerous than the initial threat. With the forklift, if the regulation had been followed the load would not have fallen and the operator wouldn't have had to make a panic decision.

Loads that extend above the backrest are permitted if they are banded, wrapped, or otherwise secured to the main portion of the load. It should be noted that most forklifts also have a center of gravity *height* limit listed on the capacity plate. Loads that have a center of gravity higher than this limit should not be lifted.

It is important to keep the center of gravity low when moving a lift truck, so it is recommended to keep the forks as close to the ground as possible when traveling. Four to six inches from the ground is the highest an operator should raise the forks when traveling. Not only is it important to keep the load low to prevent tipping over when cornering, but it is also important to have a low load when the brakes have to be applied abruptly. The sudden forward weight transfer caused by quick braking can tip an otherwise properly loaded truck forward. If this occurs, and the forks are raised a foot or so off the ground, the operator can expect the rear wheels to come off the ground a foot or so before the forks finally touch the ground and stop the nose-diving vehicle.

On the other hand, if the forks are raised the proper distance of a few inches, and the truck tips forward, there will be very little nose-diving due to the close proximity of the forks to the ground. Of course, operators should prevent this nose-diving situation altogether by traveling slowly and avoiding sudden stops.

**Always check for adequate overhead clearance when entering an area or raising the forks.**

An all too common forklift accident occurs when the lift truck's raised forks strike an overhead object. These accidents generally happen because the lift truck operators were disregarding the rules and traveling with the load raised. It's not a case that these operators drive with the load raised all the time; most of them were just raising the forks as they neared their pick-up point or had just dropped off a load, and were dropping the forks as they motored to their next destination. The point is that the forks

are only to be raised while the truck is stopped and braked, and only while it is at the pick-up or drop-off location!

The list of overhead items that have been crashed into includes: sprinkler systems, light fixtures, natural gas pipelines, electrical conduit lines, overhead doors and walls, and many others. In addition to causing property damage, many of these types of accidents also involve personal injury or death. A broken overhead natural gas line will also cost the company valuable "down time" because the facility usually has to be evacuated till the flammable gas fumes are removed or the fire is put out.

### **Always keep hands, arms, feet, and legs inside the confines of the lift truck.**

The outer perimeter of any lift truck is considered to be a "crash bumper" of sorts. This tough steel outer shell of the truck eventually hits everything from steel shelves to pallets to concrete walls. Yet many forklift operators continue to place their extremities on the forklift's "bumper" as they negotiate tight aisles or forklift-congested areas. These same operators wouldn't dare place their hands on their automobile's bumper in heavy traffic, but they think nothing of putting hands, arms, or fingers on the "bumper" of the lift truck.

One of the most common incidences of this occurs when traveling in reverse. Many times, to get a better view toward the rear, the truck operators will wrap their hand around the rear overhead guard support beam. While this may afford them a more comfortable view, they have placed their hand in an extremely dangerous location. If the truck then collides with a steel rack or other structure, the operator's fingers could easily be severed or crushed to the point that they would have to be amputated. The same scenario holds true for feet or legs that would be placed outside the truck's cab area. The operator's hands could also be crushed if they were placed on the outside of the truck in an attempt to support the driver as he/she leaned out to see around a bulky load. Rather than leaning out to see around a large load, it is a safer practice to drive in reverse (but don't put fingers on the outside of the truck).

### **Only the operator is to ride on the lift truck that is designed for riding.**

Many times it would seem convenient and neighborly for a forklift operator to give his/her co-workers a ride on the forklift. This may involve having these riders hopping on to a pallet positioned on the forks. Unfortunately, the forklift operator would be doing a great disservice to his/her co-workers due to the extreme danger to which they would be subjected. Because the lift truck has no spring suspension, the riders on the forks would have to hold on to the mast just to keep from being bounced off. If the truck operator was to lift the forks while these riders were holding on to the mast, the riders' fingers and hands would be crushed by the moving chains and other parts.

Finally, even if they didn't get their fingers or hands crushed, the bouncing forklift could easily dislodge them from their pallet and propel them under the moving truck where their arms or legs could get crushed. Because of all these potentially dangerous situations, a forklift is designed to carry only one person—the operator!

### **Use only approved lifting platforms that are properly secured to the forks when raising workers with a lift truck.**

It should be noted that most lift truck manufacturers do not recommend fitting conventional lift trucks with platforms for raising humans. Nonetheless, if a truck is to be fitted with an attachment, the attachment must conform to approved safety standards and the manufacturer (or professional engineer) must approve the use. The platform for raising humans must have rails or guards on all four sides to minimize the chances of the person working on the platform falling off. This requirement therefore renders a pallet unsuitable for the use of lifting people. A lock bolt system, combined with a safety chain wrapped around the forks, must also be used to hold the platform in place. In addition, the operator must stay with the truck at all times and know the controls. Finally, the mast should not be used as a ladder to reach the platform. If any of these safety guidelines are not followed a serious accident could occur.

There have been a number of accidents resulting from the improper use of lifting platforms. A worker was seriously injured when the platform he was in slid off the forks from fifteen feet up. The next day the company decided it was time to put the safety chains back on their platforms. Unfortunately for the injured worker, the repair came a day late.

Another injury occurred when an employee was told to use a forklift with a pallet on its forks to change burned out light bulbs in the plant. Not knowing the regulations, the worker put the pallet on the forks, started the engine of the forklift, engaged the handbrake, and then hopped on the pallet and proceeded to raise himself in the air by pushing on the "lift" lever with a broomstick handle! His idea worked fine until the broomstick handle got caught in the lifting mechanism which then caused the forks (and him)



to be pushed through the ceiling. Luckily the worker's only injuries were to his pride. His co-workers came to his rescue and lowered the forks.

These two accidents point out how important it is to *know* and *follow* the exact safety guidelines required for each type of truck, as well as for each type of attachment used on that truck.

**Forklift trucks are not to be driven up to anyone standing in front of a bench or other fixed object.**

This is intended to prevent injuries caused by lift trucks pinning people between the truck and an immovable object such as a wall or bench. A fully loaded forklift may weigh 13,000 pounds or more. The distance required to bring a heavy vehicle to a stop is much greater than the distance required to bring an unloaded, light-weight vehicle to a stop. Unfortunately many operators are not aware of this change in stopping distance and, as a result, may crush someone who isn't able to get out of the way in time.

This type of accident occurred when one worker was checking on the condition of the nose area of a semi-trailer and a loaded forklift came barreling in. Even though the forklift operator saw the worker inspecting the trailer, the forklift was not able to stop in time and injured the worker. This forklift regulation requires that if a forklift is approaching a worker who potentially could be trapped, the forklift must drive off to one side of that worker. In other words, an operator should never drive directly up to someone and assume that the brakes will stop the lift truck in time. In many documented cases the brakes *haven't* stopped the vehicle in time and deaths and injuries have occurred.

**Never operate a lift truck near the edge of a ramp, dock, or otherwise elevated surface.**

Due to a lift truck's high center of gravity, these trucks are very susceptible to falling off edges of ramps, docks or otherwise elevated surfaces. An automobile can have one of its wheel go off a dock edge but still not fall off due to its low center of gravity. A forklift, on the other hand, has no chance of staying on top, if one tire goes over the edge, the rest are right behind. The best ways to prevent falling accidents are to be sure all elevated surfaces have protective guarding (either chain or steel gate type fencing), and more importantly, make sure all operators keep their mind on *what they are doing* so that they won't accidentally drive off an elevated surface.

**Know the rules for leaving a lift truck unattended.**

From time to time when operating a lift truck the operator may have to get off the truck to attend to another matter. *Where* the operator goes and how *far* away he/she goes determines what procedures must be followed when leaving a lift truck. A lift truck is considered to be *unattended* if the operator gets off the truck and is either out of sight of the truck or more than 25 feet away from the truck. First, if a truck is left unattended, the operator must park in an approved location. An approved location means *away* from fire exits, fire extinguishers, stairways, or any other areas deemed inappropriate for parking of a lift truck.

**Lower the forks or load**

Second, the operator should lower the forks or load to the floor. Having the load on the floor makes the truck less likely to roll away and it also prevents pedestrians from walking under or near elevated forks. Next, the operator should put the controls in neutral. This is important in case untrained, unauthorized personnel turn the key on or start the motor. The truck will not move forward or backward or possibly strike other workers. Once the controls are put in neutral, the parking brake should be applied. The parking brake will prevent the truck from accidentally rolling away. The parking brake also prevents the trucks from moving if the gear selector lever is accidentally put in gear while the engine is running. The parking brake should constantly be checked for correct cable tension. The operator should feel resistance every time that the parking brake is applied. If no resistance is felt when applying the parking brake, the brake cable tension should be adjusted by the maintenance department. In some cases, the brake tension can be adjusted by simply turning the parking brake handle in a clockwise (tightening) rotation.

**Turn off the motor**

The last thing to do before leaving a lift truck unattended is to turn off the motor switch. This is important to prevent unauthorized personnel from operating the controls of a still-running lift truck. If the truck is propane-powered, it's a good idea to shut the engine off *whenever* the operator gets off the truck for more than a few seconds to prevent the buildup of carbon monoxide gas. To prevent accidental propane leaks, it's also sound advice to turn the propane cylinder valve to the "off" position. In many cases when leaving a lift truck unattended, it is also recommended that the operator take the ignition

keys with him/her. This is especially important if the truck is left in an outdoor location or in a location where unauthorized persons may be tempted to board the truck.

While the above rules pertain to leaving a truck unattended, three of these rules apply *anytime* the operator steps off of the truck. The three procedures that must be done *every time* a lift truck operator dismounts the truck are the following:

- lower the forks or load to floor,
- put the controls in neutral, and
- set the parking brake.

## Traveling

### **Plan ahead for the existing conditions and for the unexpected conditions you might encounter, such as ice or rain on an outdoor ramp.**

Forklift operators always have to be thinking of the conditions ahead of them. If they let down their guard, even for a minute, an accident can happen. An example of this type of letdown occurred to a forklift operator in Wisconsin. He had been traveling outside down a dry concrete ramp all morning. After lunch, as he continued his trips outside, he was shocked to find that a slick coating of ice now covered the outdoor ramp. As he tried to drive down the ramp the truck instead slid sideways and overturned at the bottom of the ramp. Luckily the operator survived the incident and was able to tell others about the necessity of thinking ahead. Thinking ahead also means remembering that most forklift tires are small in diameter and constructed of hard rubber compounds that give minimal traction on wet or slippery floors. Slow down on these types of surfaces.

### **When approaching a place where vision is limited or blocked, stop, sound the horn, and proceed slowly.**

Intersections of aisles or other blind spots are another area where accidents happen frequently. Forklift operators should be aware of these danger spots and adjust their speed accordingly. If an operator is following another lift truck, he/she must let that truck proceed through the intersection first; passing another truck at an intersection is against regulations. Sounding the horn, while stopping the truck, is the best way to avoid collisions at intersections. Mirrors put in strategic locations at intersections also can help prevent collisions.

### **Slow down at corners and watch the swing of both the back end of the lift truck as well as the outer parts of the load.**

A lift truck has rear wheel steering that enables the truck to turn in very tight circles. As a result of this rear wheel steering, whenever the truck is turned in one direction, the rear end swings out in the opposite direction. Operators have to be careful not to hit things with the back of the truck as they turn corners. Many accidents are caused because operators steer their forklift as if it were an automobile.

They forget that, unlike an automobile, the back of a lift truck swings out in the opposite direction of the turn. When anticipating a right hand turn at an intersection, the operator should be as far to the right as possible to give ample room for the rear end of the truck to swing to the left. If staying to the right is not possible, then the operator cannot start turning the truck until the rear of the truck has cleared any obstacles. Operators should also watch the swing of the load when cornering, particularly when a wide load is being transported.

### **When operating on an inclined surface such as a ramp, use extreme caution.**

When traveling on a ramp, always travel straight up or down the ramp. Traveling at an angle or making a U-turn on a ramp can cause the top-heavy forklift to tip over--load or no load. When traveling with a load on a ramp, the load should always be on the uphill side of the truck. This means that an operator should travel forward up a ramp, and reverse down a ramp. Operating in these directions will ensure that the load is always cradled toward the back of the forks, and if the load should start sliding, it will slide toward the back of the forks, not toward the front. The operator may need a helper to guide him/her up the ramp if the load is too large to see around it.

An additional safety tip is never park a forklift on a ramp, but if for some reason it is necessary, be sure to block the wheels with wheel chocks. This is necessary because many of the parking brakes on forklifts are not strong enough to hold the truck from rolling down the ramp. Use extreme caution whenever traveling on a ramp, especially if the ramp is wet or slippery. Remember, most forklift tires are not designed for outdoor use or on wet surfaces.

**Always travel in a forward direction unless the load blocks your view, in which case you must travel in reverse.**

Traveling in a forward direction is the recommended procedure when traveling without a load or with a load that does not block the view of the operator. It is important to adhere to this recommendation to prevent accidents. Many forklift accidents have occurred when lift truck operators were traveling in reverse because the operators were not *scanning* entirely to both sides in the direction of travel. This "looking over one shoulder" approach leaves a large blind spot that can lead to accidents occurring. Scanning to both sides is much easier when traveling forward, even when looking around and through the mast, thus the recommendation is to always travel in a forward direction unless the load blocks the view.

In the event that the load does block the forward view, and traveling in reverse is necessary, the operator must look in the direction of travel. In addition, the horn should be sounded before proceeding. This is important, even if the truck is equipped with a back-up alarm, because many people grow "immune" to hearing the back-up alarms, and only the sound of the manual horn blasting away will alert them to the truck's presence. Also, it is recommended that the truck be driven at a slower speed than when in forward. This is due to the increased blind spot in reverse.

**Be alert for dangerous floor and roadway conditions.**

Forklifts are always to be operated within company regulated speed limits. At certain times though, even these speed limits may be too fast. If a travelway has a buildup of oil, water, or other slippery substance, the operator must slow down considerably or face the possibility of tipping the truck over. Slowing down is especially important if the slippery area is on a corner or on a inclined surface. The forklift's high center of gravity combined with its hard rubber tires spells disaster for any operator traveling too fast over slippery floors.

Another potential problem to be alert for on travelways is poor floor conditions. Many older factories have floor conditions that rival a pot-hole filled city street. Not only do some floors have holes to watch for, they may also have variations in floor heights. This is particularly true at the spot where new building additions join the existing structure. Be careful also where outdoor ramps join the building; there is usually a large bump located here caused by frost lifting the ramp during winter months. Not only do operators have to pay attention to floor conditions, they also have to watch for debris and other objects that have been left on the floor. If one of the truck's steering tires strikes a piece of debris, the tire (and lift truck) may make a sudden and unintended sharp turn. If this should occur when the load is raised, there is a good chance that the truck would overturn.

**Whenever possible, avoid operating the lift truck in congested areas or in heavy pedestrian traffic, and stay three truck lengths behind other trucks.**

In noisy, manufacturing environments, pedestrians have difficulty hearing *anything*, much less a lift truck. For this reason, forklifts should avoid areas of heavy pedestrian traffic. If the lift truck is being operated near pedestrians, the operator should sound the horn to alert the pedestrians of the lift truck's presence. Operators should use extreme caution, and again sound the horn, if passing pedestrians who are traveling the same direction as the lift truck. Many times these pedestrians may be startled when the lift truck suddenly appears and may accidentally fall into the path of the oncoming truck. When a group of people is walking across the route the truck is traveling, the truck operator should stop, lower the load to the floor, and not proceed until all the people cross. When operating in multi-truck environments, forklifts should stay three truck lengths behind other trucks. If operating on a ramp, slippery surface, or otherwise dangerous location, this following distance should be increased.

**Use extreme caution when operating a lift truck on or near railroad tracks.**

Due to the roughness of railroad tracks, several guidelines have been established for safe operation of forklifts when crossing these tracks. The forklift should cross only at approved crossings where there is an adequate road grade on both sides of the tracks as well as in the center of the tracks. Due to the low ground clearance of many forklifts, trying to drive a truck across an unapproved crossing could result in the truck getting hung up or stuck on the tracks—not a good place to be stuck. The lift truck operator is also required to approach and cross the tracks at a low speed. Even when crossing at an approved area, the impact of the tracks on the tires causes a severe jolt to the operator and the load. Any speed other than slow could cause product to spill off of the forks when crossing the tracks.

When crossing railroad tracks, approach and cross the tracks at an angle. This technique will allow three of the four tires to be in contact with the road, while only one at a time contacts the tracks. This technique is important because sometimes hitting the rails straight-on will cause the lift truck to stop dead in its tracks; which in turn causes the load to slide forward, possibly off the forks, or causing the

truck to tip forward. Never *park* a lift truck closer than eight feet from the center of the railroad tracks. This is important to prevent possible contact between a moving train and a parked lift truck.

### **Horseplay or any other type of vehicle misuse is strictly forbidden.**

A lift truck, as the name implies, is to be used only for the lifting of products and materials. Many accidents occur due to operators driving these trucks in a reckless fashion. Accidents happen when forklifts are driven faster than speed limits, when operators don't sound the horn at intersections or in crowded areas, or when operators engage in horseplay such as racing or spinning in circles. All these acts are strict violations of the forklift safety regulations, and the offending operators should be held accountable for any injuries, property damage, or deaths caused. The workplace, especially the operation of forklifts, is no place to be horse playing with people's lives.

## **Loading**

### **Know the recommended load limit of the lift truck and never exceed it.**

The lift limit of the truck is found on the vehicle capacity plate. Unfortunately many truck operators don't even know where the capacity plate is located on the truck, much less know how to interpret the data on it. The main item listed on the capacity plate is the maximum vehicle lifting capacity. This weight capacity is listed in pounds. In addition to showing the weight the vehicle can safely lift, the load center distance of that weight is also listed on the capacity plate. The *load center distance* dimension tells the operator the maximum distance—from the back of the forks—that the *center* of the load can be in order to lift the rated load capacity.

For instance, if the truck had a rated load capacity of 8,000 pounds at a load center of 24 inches, but the operator was carrying the 8,000 pound load toward the *tips* of the forks, the truck would most likely tip forward. This is why all operators should carry the load as far to the rear as possible. The load center distance dimension applies only for a mast in the vertical position. As an operator tilts the mast forward, the center of gravity of the load also shifts forward, possibly causing the truck to tip forward—even if the actual load weight and center distance are within the safe limits. Another limit listed on the capacity plate is the *lift height limit*. This dimension tells the operator to what safe height the truck can raise the maximum capacity load. Sometimes multiple height limits and load center distances are given for different length and weight loads. Be sure to check the capacity plate information before operating the lift truck.

### **Overloading a lift truck will cause a loss of steering control.**

If a lift truck is loaded beyond capacity (either by exceeding the weight capacity, or having the load beyond the safe load center distance dimension) a dangerous steering condition results due to the lifting of the rear, steering wheels, off the ground. Because the rear wheels provide the steering for fork lifts, once the wheels are off the ground, all steering control is lost. Sometimes this loss of steering control doesn't occur until the operator is trying to brake the vehicle or tilt the load forward; both of these actions cause the vehicle weight to transfer forward, causing a loss of steering.

A way to tell if you are coming close to losing steering control is the feel of the steering wheel. If, upon lifting a heavy load, the steering feels "light" or it feels as if power steering was just added, chances are the load is too heavy or too far forward. If a loss of steering is encountered, the load must be reduced, or a larger capacity truck shall be used. In addition, putting extra weight (or people) on the back of the truck to counterbalance an overload is strictly forbidden! This extra weight overloads the vehicle's chassis, puts people in danger if they are the extra counterbalance, and the extra heavy load on the forks puts undue strain on the hydraulic lift system.

### **Know how the “stability triangle” affects forklift operation and stability.**

The stability triangle is a term used to describe the suspension system of most forklift trucks. Its name comes from the triangular shaped suspension of the truck. Most lift trucks have the load placed evenly on both front tires, but the rear suspension is loaded at one point, the center of the rear axle. The rear axle of a lift truck is attached to the frame by way of a pivot pin in the center of the axle. This pivoting (or floating) rear axle allows all four wheels to be in contact with the floor at all times. Because a forklift has no suspension springs and the wheels are mounted solidly to the frame, this floating rear axle is the only way to allow all four tires to be in contact with a irregular floor surface at all times.

While this three point suspension is great for keeping all the wheels in contact with the floor, it has one distinct disadvantage—the vehicle has very poor lateral stability. The poor lateral stability occurs because any time that the vehicle's center of gravity goes outside the stability triangle, the vehicle will most likely tip over. The stability triangle area of a lift truck is a triangular shaped area made if a

person were to draw lines between the two front wheels, and from each front wheel to the center of the rear axle. As long as the center of gravity of the vehicle and the load being carried stays within this triangle, the truck will not tip over. But, if the center of gravity of the truck and the load move outside this stability triangle the truck will tip over.

The center of gravity of the vehicle can go outside this safety zone for many reasons. Overloading, for instance, will cause the center of gravity to move in front of the front axle causing the truck to tip forward. On the other hand, going too fast around a corner would allow the vehicle's center of gravity to shift outside the stability triangle to the left or right causing a sideways tip-over. It should be noted that an empty truck's center of gravity is located to the rear of the triangle near the rear axle. This means that this empty truck is easier to tip over, if rounding a corner, than would a properly loaded truck (assuming, of course, that the load is two to three inches from the floor). So be especially careful while driving unloaded trucks.

**Before picking up a load and pallet, check to make sure they are in safe condition.**

The forklift operator is required to check the load and pallet for safe condition before transporting them. If a knowingly unsafe load should topple during transportation, the forklift operator (not the employer) is responsible for the damage caused. Securing the load before transportation may mean restacking, banding, or film wrapping the load before lifting with the lift truck.

If the load cannot be stabilized, a supervisor or other manager should be contacted for assistance. It is especially important that if a stack of material is leaning dangerously, it must be restacked *before* being picked up and transported by the lift truck. There is probably no safety hazard worse than picking up a leaning load, and then transporting that leaning load. The slightest bump or too fast of speed around a corner may cause the whole load to topple.

**When inserting forks into a pallet, adjust them so they are level and wide apart as possible.**

The forks should be level so that they enter the pallet without touching it. Forks that are not level can break the pallet or push it ahead, making the load difficult to put fully on the forks. Forks should be as wide apart as possible so that the pallet "sags" in the middle and thus the load also sags toward the middle making for a very stable load. If the forks are too narrow, the portions of the pallet on the outside of the forks sag down causing the load to also sag to the outside. Any small bump will then cause the product on the outside to spill off the pallet. When it comes to fork width, wider is better.

**When picking up a load, insert the forks all the way under the load; and lift the forks before tilting the load.**

It is important to *lift* the forks and pallet before *tilting* the mast back. Lifting the forks immediately after driving all the way under the pallet will ensure the pallet stays tight against the back of the forks during the second procedure, which is tilting the load backward. If mast were tilted first, the backwards moving mast would create a large gap between the load and the back of the forks. This large gap could mean that, when the load is lifted, the load center distance may be too far forward, possibly causing a forward tip of the truck. Loads should always be tilted slightly back before moving the truck to the next destination so that the load is stabilized and any bumps encountered on-route will actually "bounce" the load closer to the back of the forks.

**When moving a load, keep the forks four to six inches off the ground.**

It is important to keep the center of gravity low when moving a lift truck, so it is recommended to keep the forks as close to the ground as possible when traveling. Four to six inches from the ground is the highest an operator should raise the forks when traveling. Not only is it important to keep the load low to prevent tipping over when cornering, but it is also important to have a low load when the brakes have to be applied abruptly. The sudden forward weight transfer caused by quick braking can tip an otherwise properly loaded truck forward. If this occurs, and the forks are raised a foot or so off the ground, the operator can expect the rear wheels to come off the ground a foot or so before the forks finally touch the ground and stop the nose-diving vehicle. On the other hand, if the forks are raised the proper distance of a few inches, and the truck tips forward, there will be very little nose-diving due to the close proximity of the forks to the ground. Of course, operators should prevent this nose-diving situation altogether by traveling slowly and avoiding sudden stops.

**An elevated load shall not be tilted forward except when the load is in a deposit position over a rack or stack.**

This requirement is so that the operator will not inadvertently tip the truck forward. An elevated load being tilted forward causes the vehicle's center of gravity to shift forward as well. The same action would occur if a maximum capacity load was suddenly moved from the rear to the front of the forks. A forklift operator is allowed to tilt the load forward at the deposit site because the rack or stack that the load is being placed on would halt the truck's tipping forward.

In most cases there is no reason to tip the load any more forward than "level" because that's the position the forks will have to be in to back out of the load properly. When traveling with a load it's best to have the forks tilted "back" slightly to ensure that the center of gravity of the load is as close to the truck as possible. Note also, that the load-center-distance dimension found on the vehicle inspection plate is only valid when the mast is in a vertical or tilted-back position.

**When depositing a pallet or load, be sure the forks are level and free of the load before backing.**

Many forklift operators have a lack of depth perception and as a result have a difficult time determining if the raised forks are level, tilted back, or tilted forward. This poor depth perception causes all kinds of problems when trying to back out of a load without dragging the pallet along. The proper way to deposit a loaded pallet is to:

- raise it to the correct height (usually a little higher than the spot where it's going);
- drive forward to within six inches of the pallet's final position;
- tilt the mast forward until the mast is vertical;
- drop the forks to set the pallet on the rack (not so much that the forks are dragging on the bottom of the pallet);
- check behind the truck; and
- then back out from the pallet, watching to be sure the forks are free of the load and that the pallet stays on the rack.

## **Maintenance of industrial trucks**

**Do a pre-start safety inspection before the start of each shift.**

This requirement is designed to lessen the frequency of workplace accidents caused by malfunctioning trucks. Lift trucks are often involved in accidents because the *truck* was not functioning properly. An operator may have jumped on the truck, preceded to drive away, only then to find that the brakes are not working properly.

Many times an equipment defect may go unreported because the operator knows how to "circumvent" the problem (i.e., if the operator *knows* he/she has to pump the brakes three times before the brakes begin to work, why report the defect?) The reason it should be reported, of course, is that other employees may not know about the poor brakes and wouldn't find out until too late. There are documented cases of lift trucks that went for weeks with the brakes not working properly because "everyone here knows to pump the brakes to build up pressure before trying to stop."

Other common areas of vehicle neglect are leaky hydraulic systems, kinked or collapsed hydraulic hoses, tires with large pieces missing, and leaking fuel systems. Operators should check the owner's manual of their particular truck to see what parts and systems need to be inspected. The owner's manual will also tell the operator the frequency these checks need to be made.

**Any time a major mechanical or safety defect is found on a truck, remove it from service until repaired.**

Examples of this type defect would be an improperly running engine, a faulty cooling system allowing the engine to overheat, a malfunctioning hydraulic lift system that either "leaks" down or fails to operate correctly, or an inoperative braking system such as a brake pedal with no hydraulic pressure that could be pushed to the floor board of the vehicle. Once noted, a vehicle with this type of malfunction has to be removed from service until repaired.

### **Repairs to lift trucks are only to be made by authorized personnel.**

Because of the inherent danger that malfunctioning lift trucks present, it is required that only properly trained and authorized personnel repair lift trucks. This regulation does not require that all forklift repairs be made by an authorized service technician from the selling dealership, but it does require that whoever does perform the repair is knowledgeable of the particular area being serviced. Many companies find it in their best interests to out-source lift truck repairs to a factory authorized lift truck dealership. Letting an authorized dealer's service technician perform lift truck repairs and routine checks is one way to assure that the correct repair parts are installed and that correct repair procedures are followed.

## **General safety issues**

### **Know the personal protective equipment (PPE) requirements in the workplace.**

While OSHA does not specify any PPE as mandatory for forklift operation, it does however, say that the forklift operator must wear any personal protective safety equipment that anyone else working in that environment must wear. If, for example, safety glasses are required for everyone working in a manufacturing plant, the forklift operator also must wear the glasses. Employers are allowed to enact more stringent safety measures for forklift operators, such as steel-toe shoes.

### **Seat belt use is required if the truck is equipped with a safety belt.**

Seat belts are required to be used by forklift operators if the truck is so equipped. Whereas modern automobiles have air bags, padded dash boards, side impact protection, safety glass, as well as seat belts, a forklift has only the seat belt to keep the operator safe. As a result, a forklift, especially when the operator is not wearing a seat belt, is not user friendly in case of an accident. There are documented cases where deaths have occurred from operators hitting their heads on the steel support of the forklift's overhead guard during a collision. The simple use of a seat belt would have prevented such deaths and injury.

Another reason why it is important to wear a seatbelt is in case of a vehicle overturn. Statistics show that about 42 percent of forklift overturns result in a fatality. This percentage could be reduced considerably if operators wore seat belts. Most forklift fatalities during overturns were caused because the operator was thrown from the driver's seat and was crushed by the overhead guard of the truck. Wearing a seatbelt ensures that the operator will stay safe in the cab during an overturn.

### **When lifting or tilting a load, watch carefully to see that the load does not catch on adjacent loads or obstructions.**

Anytime a load is being hoisted, there is a danger that other pallets or materials may inadvertently be lifted also. Whenever possible, the operator should check both sides and behind the pallet before attempting to lift the load. This is especially important if the operator is picking up a short pallet or load. The extra distance that the forks stick out beyond the short pallet can cause damage to other pallets or walls. Also, if there is very little clearance between the top of the load and the next higher shelf, use caution that the load isn't tilted too far back causing the load to strike the rack above. In some instances, accidental striking of the storage rack support from below will completely dislodge it from the vertical support, perhaps causing it to collapse.

### **Never use a forklift to raise an overhead door.**

Although this may seem like a rule from the ages before electric door openers, it still has some applications today. The main abuse of this comes from maintenance mechanics repairing overhead doors and uses a forklift to raise the door to its elevated position. Remember that forklifts are not to be used in any situation that calls for workers to walk under or near the elevated forks or load. Repairing an overhead door spring or other mechanism should be performed with the proper tools and equipment—a forklift is not the proper tool.

### **Concentrate—don't get distracted.**

It is reported that about half of all forklift accidents happen to operators having less than one year of forklift operating experience. One reason given for these rookie mistakes is that they are not fully aware yet of the dangers of the lift trucks, and consequently they are prone to daydreaming while working. Many of these operator's daydreams turn into nightmares when they realize, too late, that they have made a fatal mistake. Driving off the side of ramps or other elevated structures is a common daydreaming type accident.

**When entering a freight elevator with a walk-behind forklift, always enter with the forks first.**

The technique of entering a freight elevator *forks first* puts the operator *behind* the truck, preventing the possibility of him/her being pinned between the lift truck and the opposite wall of the elevator in case the brakes or throttle malfunction. This same *forks first* safety precaution should be used anytime a walk-behind forklift approaches a wall or other immovable object. There is definite reason why the manufacturers call these types of lift trucks *walk-behinds*.

**Only operate the truck and its controls when in the appropriate operator's position.**

Untold injuries have occurred when forklift operators, standing next to their truck, tried to start the motor or raise or lower the forks. What the operators may not have known was that the truck was in gear, and as soon as they started the motor, the truck chugged forward, possibly over their leg, foot or hand. Before operating any type of truck or machinery, the operator should be in the correct operator's position and be ready for any unexpected jolt or other malfunction that may occur as the truck is started.

**Always position the truck as close as possible to the load or rack before extending or retracting the "reach" mechanism.**

Many narrow-aisle stand-up type lift trucks have a scissors or "reach" type mechanism which allows the operator to move the forks forward several feet. The problem that may occur with this system is that many operators *fully* extend the reach mechanism *before* positioning the truck as close to the rack as possible. This "backwards" technique puts the load an extremely long distance away from the truck's center of gravity. If the load being lifted is near the truck's capacity, the truck may tip forward due to the extreme forward shift of the center of gravity caused by the forks being extended too far out. To prevent tipping forward this type of vehicle, only extend the reach mechanism *after* the truck has been driven as close as possible to the rack or pallet.

**Never try to move or adjust any part of the load, the lift truck, or the surroundings when on the vehicle.**

Occasionally when a lift truck operator is moving his/her load, part of the load may shift and threaten to fall off the forks. If this should happen, the operator should bring the truck to a smooth stop, lower the load to the floor, set the hand brake, then get off the truck and restack the load while the truck is stopped. Never try to hold a tipping or unstable load with your hands while moving the truck.

**In the event of an overturn, stay in the truck.**

Forklift accident statistics show that 42 percent of forklift overturns result in a fatality. This percentage could be reduced considerably if operators followed the proper procedures when dealing with an overturning truck. The operative solution for surviving an overturn is to *stay in the truck*—hold on to the steering wheel, brace yourself in the opposite direction of the falling truck, and above all, wear a seat belt. Trying to jump out of an overturning forklift is like trying to jump out of an overturning race car, it's foolhardy because of the superior protection afforded to you by staying *inside* the steel cage. Jump out, and you'll probably be crushed by the steel cage that was built to protect you. To prevent overturns in the first place, drive slowly around corners, never turn the truck while the forks are elevated, never make a turn on a inclined surface such as a ramp, and stay away from unguarded edges of loading docks or other elevated structures.

**Immediately report any collision, damage, or near-miss to a supervisor.**

Some areas of a manufacturing environment may be more "accident prone" than others. Safety officers within companies need to know where these areas are so that they can take the necessary steps to prevent future accidents. Therefore, it is important that all accidents or near-accidents be reported immediately. Unfortunately many accidents and near-misses go unreported because the person or persons involved thought that they may be reprimanded for the incident; when in truth, if the correct safety equipment *had* been in place, the accident probably wouldn't have occurred.

**Whenever anything develops that affects the normal operation of the lift truck, make a note of it on the pre-use check list and tell a supervisor immediately.**

Generally, if a lift truck starts to malfunction or sound differently, it occurs during the work shift. When this happens, the operator should note the problem on the vehicle checklist, and tell his/her supervisor immediately. The operator should not ignore the problem or assume it will be spotted when the next shift does their pre-service vehicle inspection. The regulation requires that anytime a vehicle has a major safety defect, that vehicle be taken out of service immediately, not at the end of the work shift. If



the problem does not appear to be a major safety defect, the shift supervisor should still be notified and made aware of the problem.

**When parking the lift truck, the forks should be lowered and tilted forward to prevent accidental tripping over the tips.**

The tips of lift truck forks are very thin compared to the heel area next to the mast. For this reason it is advised that forks should be lowered and tilted forward slightly when parking the truck to prevent pedestrians from tripping on the otherwise raised fork tips.

**Use the correct mounting and dismounting technique when getting on and off a lift truck.**

It is recommended that operators getting on or off their truck use a *three point* mounting and dismounting technique. This technique involves the operators grabbing the lift truck in two secure places with their hands, and positioning one foot in another secure place, *before* carefully pulling themselves into the truck.

The three point mounting ensures that if one hand or foot slips, the operator still has two other points of holding power. This technique will prevent the operator from possibly tumbling to the hard floor. It is especially important to use this technique on wet or slippery surfaces where the operator could easily slip and get hurt if he/she was just jumping on or off the truck. Being sure that operators have dry shoes is another way to prevent these slips and falls from occurring. One accident study on forklifts showed that as many people were injured getting on and off lift trucks as were injured from improper operation of the trucks. Use extreme care when getting on and off the lift truck.

**Know and abide by the company's forklift safety rules.**

No matter how many rules and regulations are put forth by government agencies, the rules will never cover all the scenarios that could occur at any particular workplace. For this reason, each company should come up with its own set of rules that pertain to operating a lift truck within its own workplace setting. These rules may list areas where extreme caution should be used, or it may list rules that are of particular importance to the company. Many companies also have forklift operators sign a copy of these rules so that the drivers are on record as knowing the danger spots or rules that the company thinks are important. These same company rules many times also list the disciplinary action to be taken if operators fail to follow the listed safety rules.

**The professional forklift operator follows safe operating procedures, even when no one is watching.**

Too often, forklift operators know the correct procedures for operating their lift truck, but refuse to follow these rules for a variety of reasons. For one, their supervisor or safety director may not be watching, so why put on a seat belt or lift the load only when stopped? Other operators think that it takes too long to follow the correct rules, so they short circuit the rules to fit their own timetable. Operators sometimes forget that the reason all forklift regulations were established was to prevent operator injury and death. The regulation that says *an operator should only raise the load while stopped and braked* was not enacted to make it harder for operators to get a job done, it was enacted to prevent the great many deaths and injuries caused as a result of operators traveling with a raised load.

OSHA has a relatively "easy" job coming up with new regulations because they keep track of the different causes of workplace injuries and deaths. If, for instance, 150 workers were killed in the past few years because the workers were walking under a raised load, then it's easy to see the cure, make a law that says people are not allowed to walk under raised forks. All of the current forklift regulations were put into effect in an attempt to prevent the alarming number of forklift accidents from occurring. Before forklift operators question the usefulness of a particular safety regulation, they should be reminded that, even though they may be accident free in regards to this particular regulation, many other people were injured or died performing the exact same maneuver and that's why the regulation was enacted.

## **Conclusion**

The powered industrial truck, the forklift, is the backbone of our modern industrialized society. While it is important that these trucks continue to serve the workplace, it is more important that the operators who run these trucks operate in a safe manner. Getting a job done quickly is no excuse for side-stepping important safety issues. It is through increased awareness of forklift safety regulations that our workplaces will become the safest possible.

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