

# INSTRUCTOR VERSION

**Workbook pages found on even numbered pages.  
Instructor notes found on odd numbered pages.**

*Instructor version, workbook, and overheads are also available at  
[www.oro sha.org\Education](http://www.oro sha.org\Education)*

## Introduction

Whether you call them jitneys, hi los, forklifts, or lift trucks, powered industrial trucks are as widely used as your debit card. It seems everywhere you look these days, lift trucks are unloading trailers at department stores, tiering product in a warehouse, or loading material at a construction site. Powered industrial trucks are also moving lumber in a sawmill and dropping stock in a grocery store aisle.

With well over one million lift trucks in operation today, emphasis must be placed on both worker and pedestrian safety. This program will help you understand OR-OSHA safety and health regulations governing these pieces of equipment in addition to providing you with assistance in developing training for your lift truck operators and other affected employees.

### Objectives:

- Review OR-OSHA Div 2/Sub N 29 CFR 1910.178 Powered Industrial Trucks
- Discuss fundamental safe work practices for the operation of powered industrial trucks

*A special thank you to Norlift of Oregon, Inc., The Hyster Company, and The Halton Company for the use of their materials and extensive knowledge. Craig Hamelund, OR-OSHA Public Education*



## The Powered Industrial Truck

A powered industrial truck is defined as a mobile, power-driven vehicle used to carry, push, pull, lift, stack, or tier material. *Vehicles NOT covered by the Powered Industrial Truck standard are compressed air or nonflammable compressed gas-operated industrial trucks, farm vehicles, and vehicles intended primarily for earth moving or over-the-road hauling.*



Norlift of Oregon, Inc.



Manitou

**Please Note:** This material or any other material used to inform employers of safety and health issues or of compliance requirements of Oregon OSHA standards through simplification of the regulations should not be considered a substitute for any provisions of the Oregon Safe Employment Act or for any standards issued by Oregon OSHA.

Pictures on cover courtesy of Clark and Norlift of Oregon, Inc.

Emphasize the importance of educating operators on the fundamental safe practices surrounding forklift operations and also educating other affected employees on safe awareness.

This program basically overviews OR-OSHA's Powered Industrial Truck safety standard (Division 2/N 29 CFR 1910.178). Fed OSHA revised the operator training rule in 1998 and is explained in detail at the conclusion of this workshop.

Forklift-related fatalities can be found from the Fatality Assessment and Control Evaluation (F.A.C.E.) surveillance program at [www.cdc.gov/niosh](http://www.cdc.gov/niosh) (national) and [www.croetweb.com](http://www.croetweb.com) (Oregon).

Wonderful info on forklift safety found at the above two websites plus [www.osha.gov](http://www.osha.gov) and [www.orosha.org](http://www.orosha.org). Don't forget to review (and possibly provide) the guidance and clarification from program directives, compliance letters, and letters of interpretation (and there are many from both OR-OSHA and OSHA).

At times, I have used two videos during this program and both are available from our Resource Center:

1. [Forklift Handling: Safety in Dangerous Situations #1016](#) (usually shown after stability portion of program)
2. [Springfield - Lessons Learned #1009](#) (shown at the end of program)

Another recommended video on pedestrian safety is [Fields of Vision: How to Work Safely Around Lift Trucks #824](#).

The definition is pretty self-explanatory. Be sure to cover the exception to the rule below.

It is here where I recommend to train operators of similar type equipment (log loaders, loaders, Bobcats, etc.) in accordance with the revised forklift training rule. This revised forklift operator training rule (pp. 9-12 of the workbook) is much more comprehensive and detailed than most other OSHA vehicle standards.

# General Requirements

Design and construction of powered industrial trucks must be in compliance with the current revision of *ANSI B56.1. ASME B56.1-1993, Safety Standard for Low Lift and High Lift Trucks, is the latest revision.*

All nameplates and markings must be in place and \_\_\_\_\_.

All modifications and additions which affect the safe operation and capacity must be approved by the manufacturer.

- data labels must be changed accordingly
- the approval must be in writing

If using front-end attachments (other than the manufacturers'), the truck must be marked identifying the attachment and listing the approximate combined weight of the truck and attachment at maximum elevation with a centered load.



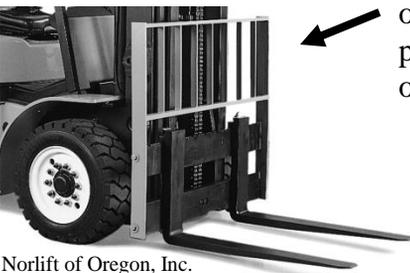
*A winch was welded on the boom of this telescoping truck without the manufacturer's approval.*

FOPS



Norlift of Oregon, Inc.

Most vertical mast forklifts are equipped with FOPS (Falling Object Protective Structure).



Norlift of Oregon, Inc.

A load backrest (LBR) must be provided when handling small objects or unbanded units. The LBR must be capable in size and strength to prevent the load, or any part of the load from falling toward the operator.

What does FOPS protect you from?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

What does FOPS **not** protect you from?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

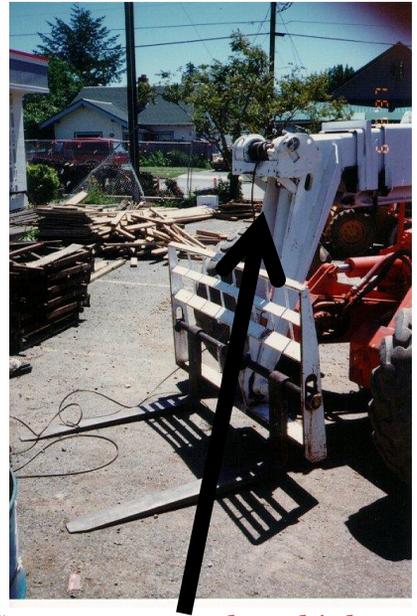
\_\_\_\_\_

*NOTE: Both the FOPS and LBR must not interfere with the operator's visibility and guard openings must not be larger than 6 in. in one of the two dimensions. More specifications can be found in OR-OSHA Div 2/Sub N OAR 437-002-0227(1) & (2).*

ANSI/ASME B56.1-93 is an industry consensus standard. Much more thorough (especially for manufacturers) than OSHAs'. We do have many available (including this one) in our Resource Center!

Make sure all nameplates and markings are in place, legible, and readable...keeping in mind of foreign-made models.

Employers and operators must know their new capacity when using front-end attachments - especially fork extensions! The manufacturer/dealer, engineers, qualified persons, and professional trade publications may help. And thanks to Cascade Corporation (right here in Portland, OR), the following link is a reprinted article that shows the calculation used to determine lost capacity when using a front-end attachment: [http://www.cascorp.com/americas/en/capacitycalcint\\_ro](http://www.cascorp.com/americas/en/capacitycalcint_ro)



*Common to use these high-reach models like a crane. This is an addition which affects safe use! Must have prior written approval from the mfr!*

### **What does FOPS protect you from?**

Small objects, small, unbanded units, small bagged material.

Remember, very small objects can still get through 6" openings (i.e. green pears, 2x4 stickers).

### **What does FOPS not protect you from?**

The impact of a falling capacity load; roll over, weather, really small stuff.

The overhead guard must be large enough to extend over the operator under normal circumstances, offer no interference with your vision, and guard openings must not be larger than 6 in. in one of the two dimensions. Also, the overhead guard is tested in foot pounds (marking should be on inside of canopy), round pipe or square tube construction, and clearance on sit down trucks must be at least 39", stand up trucks at least 74". No cardboard or plywood. Do not permanently attach clear substantial material (lexan, plexi-glass, etc.) by penetrating the overhead guard (fasteners, hinges, etc.) without mfr. approval.

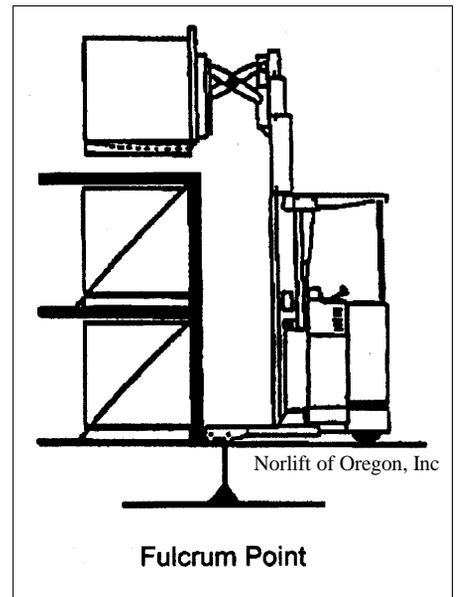
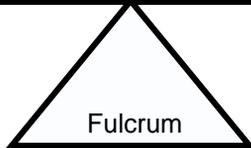
A safe work practice of accessing and egressing the lift truck is maintaining a "three point" contact: Grasping a handhold and FOPS structure while stepping up; grasping the steering wheel and FOPS/handhold while stepping up; or grasping the FOPS and seat/seat restraint while stepping up.

# Stability

## 1. Balancing Both Ends

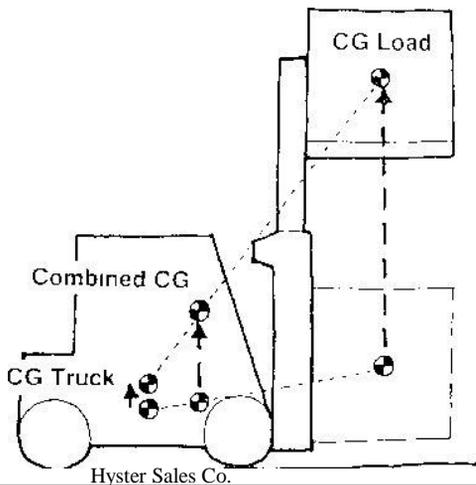
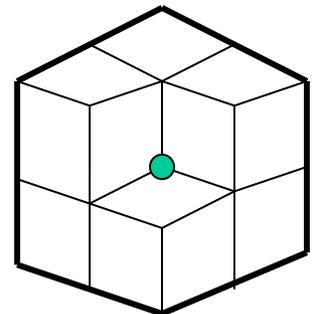
The lift truck is based on the principle of two weights balanced on opposite sides of a pivot point (\_\_\_\_\_). The forward wheels are the *fulcrum*. This is the same principle used for a teeter-totter. In order for this principle to work for a lift truck, the load of the forks must be balanced by the weight of the lift truck.

A properly loaded lift truck does not exceed the rated capacity of the truck (as listed on the truck's data plate).



## 2. Balancing In All Directions

The \_\_\_\_\_ (CG) of any object is the single point about which the object is balanced in all directions. Every object has a CG.



The lift truck has moving parts and therefore has a CG that moves. The CG moves forward and back as the upright is tilted forward and back. The CG moves up and down as the upright moves up and down.

## 1. *Balancing Both Ends!*

The lift truck is based on the principle of two weights balanced on opposite sides of a pivot (**fulcrum point**). The forward wheels are the fulcrum. This is the same principle used for a teeter-totter. In order for this principle to work for a lift truck, the load of the forks must be balanced by the weight of the lift truck.

A properly loaded lift truck does not exceed the rated capacity of the truck (as listed on the truck's (**data plate**)).

Trainers must dedicate some quality time when training/discussing stability - overturns are the leading cause of death to operators.

Remember, forklifts are designed and manufactured deliberately unbalanced (in theory). We need a proper load to balance our “teeter-totter”.

I describe forklift stability in four primary elements: fulcrum point, center of gravity, stability triangle, and load center. The article in the reference section of the workbook, titled [Forklift Safety: A Rule Revisited!](#), offers a little more on stability. Fed OSHA's Appendix A [Powered Industrial Truck Operator Training – Stability of Powered Industrial Trucks](#) offers some nice info as well. A summary can be found at [http://www.osha.gov/dcsp/ote/trng-materials/pit/app\\_a.html](http://www.osha.gov/dcsp/ote/trng-materials/pit/app_a.html)

## 2. *Balancing In All Directions!*

The **center of gravity** (CG) of any object is the single point about which the object is balanced in all directions. Every object has a CG. When the lift truck picks up a load, the truck and load have a new combined CG. The stability of the lift truck is determined by the location of its CG, or if the truck is loaded, the combined CG.

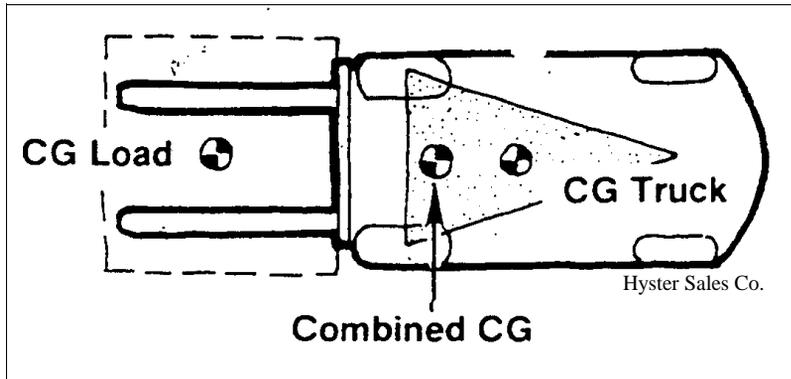
- ❑ Think of riding a tricycle around corners. If you lean forward you will overturn as you moved your CG to the narrowest portion of the tricycle. If you lean back, applying your CG over the two rear wheels, you are less likely to tip as you moved your CG to the widest portion of the tricycle.

# Stability

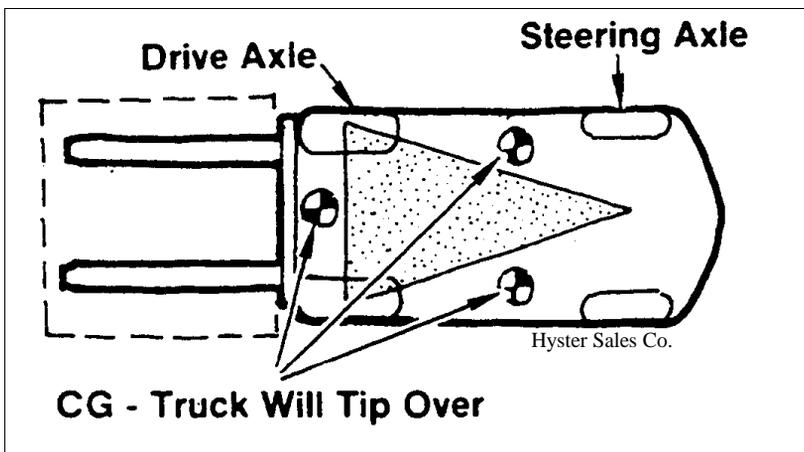
## 3. Our Triangle on Wheels

When the lift truck picks up a load, the truck and load have a new **combined** CG. The stability of the lift truck is determined by the location of its CG, or if the truck is loaded, the **combined** CG.

In order for the lift truck to be stable, the CG must stay within the area represented by a triangle drawn between the drive wheels and the pivot of the steering axle. This triangle is routinely called the \_\_\_\_\_.



- ❑ Think of riding a tricycle around corners. If you lean forward you will overturn as you moved your CG to the narrowest portion of the tricycle. If you lean back, applying your CG over the two rear wheels, you are less likely to tip as you moved your CG to the widest portion of the tricycle.



If the CG moves forward of the drive axle, the truck tends to tip forward (longitudinal). If the CG moves outside of the stability triangle, the truck tends to turn on its side (lateral).

What factors have caused trucks to tip forward?




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What factors have caused trucks to tip over on their side?




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# Stability

## 3. Our Triangle on Wheels!

In order for the lift truck to be stable the CG must stay within the area represented by a triangle drawn between the drive wheels and the pivot of the steering axle. This triangle is routinely called the **stability triangle**.

This “combined center of gravity” is the new center of gravity we create once we begin to handle a load. The operator should constantly visualize this combined center of gravity as a single point that is moving when operating and moving the lift truck.

Almost all counterbalanced powered industrial trucks have a three-point suspension system – the vehicle is supported at three points. This is true even if the truck 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.

The operator must keep this combined center of gravity within the stability triangle!

### What factors have caused trucks to tip forward?

Too much forward tilt; mast too high; inappropriate use of front-end attachments; heavy braking; load shifting outward; operating on a decline; too heavy a load; driving off docks, ramps, etc.

### What factors have caused trucks to tip over on their side?

Load shifting to the side; unequal tire pressure; turning; speeding; unlevel terrain; off-center loads; mast too high with rear tilt; etc.

# Stability

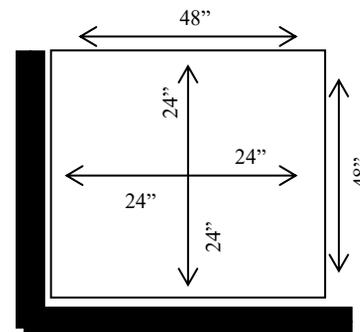
The center of gravity, and therefore the stability, of the loaded truck is affected by a number of factors including size, weight, shape, and position of the load. Also, the height to which the load is elevated, the amount of forward or backward tilt, tire pressure, and the dynamic forces created when the truck is moving. These dynamic forces are caused by things like acceleration, braking, operating on uneven surfaces or on an incline, and turning. These factors must be considered when traveling with an unloaded truck, as well, because **an unloaded truck will tip over to the side easier than a loaded truck** with its load in the lowered position.

*A recent test was done at a lift truck manufacturer's technical center involving a 5000 pound capacity, unloaded lift truck. The three-stage mast was fully extended and tilted back. One man was able to tip the truck over by simply grabbing and pulling on the overhead guard.*

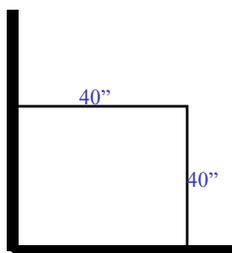
## 4. Load Center

The distance from the front face of the forks (or the load face of an attachment) to the center of the load is called the \_\_\_\_\_. The load center is determined by the location of the CG of the load. Most lift trucks are rated at a load center of 24 inches.

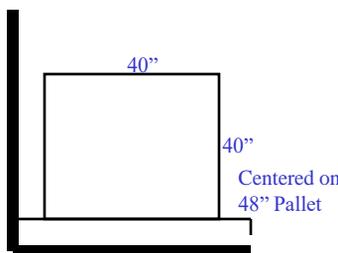
When the load is carried at a greater distance than the load center, the maximum capacity of the truck is \_\_\_\_\_. The use of special attachments instead of forks will also \_\_\_\_\_ the nominal capacity of the lift truck.



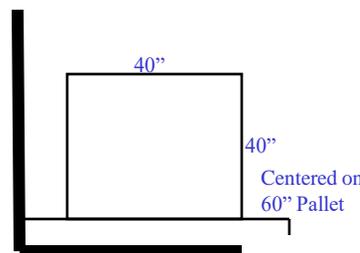
Let's take a look at this 7000 lb. load...



Load Center? \_\_\_\_\_  
Capacity = 8050 lbs.



Load Center? \_\_\_\_\_  
Capacity = 7350 lbs.



Load Center? \_\_\_\_\_  
Capacity = 6550 lbs.

The capacity is the maximum load the lift truck can handle. The capacity of the lift truck, at load center, is shown on the **data plate**. The capacity is listed in terms of weight and load center at a specified load height.

Load Center      →      *Reverse it*      →      **Center of the Load**

Have them underline!

The center of gravity, and therefore the stability, of the loaded truck is affected by a number of factors including size, weight, shape, and position of the load. Also, the height to which the load is elevated, the amount of forward or backward tilt, tire pressure, and the dynamic forces created when the truck is moving. These dynamic forces are caused by things like acceleration, braking, operating on uneven surfaces or on an incline, and turning. These factors must be considered when traveling with an unloaded truck, as well, because **an unloaded truck will tip over to the side easier than a loaded truck** with its load in the lowered position.

I believe the test was conducted by Hyster, Inc.

The distance from the front face of the forks (or the load face of an attachment) to the center of the load is called the **load center**. The load center is determined by the location of the CG of the load. Most lift trucks are rated at a load center of **24** inches.

When the load is carried at a greater distance than the load center, the maximum capacity of the truck is **decreased**. The use of special attachments instead of forks will also **reduce** the nominal capacity of the lift truck.

Plain & Simple - Leverage!!!

Rule of thumb: For every inch you move out from load center, your nominal capacity drops a few hundred pounds (6" = approx. 1000#; 12" = 2000#). This is without any type of attachment – that would be more!

It is here where I emphasize the importance of front-end attachments - even fork extensions. In addition to the additional weight of the attachment now introduced, don't forget this new load center (measured from the load face of the attachment).

i.e. 60in. fork extensions now provide a 30in. load center...to begin with!

Think of forklifts that handle rolls of carpet. The roll is handled parallel to the truck, like a joust. A 40 ft. carpet roll has a load center of 20 ft.! The carpet may not weigh much but a large capacity truck must be used to accommodate for this leverage.

Think of two kids on each end of a teeter totter balanced on a fulcrum. Both kids weigh 100# exactly. Now give one kid six inches more plank. He/she now has the leverage and will drop. *Of course, once this happens, the kid on the ground will either tease the other kid in the air or simply leave their position...dropping them.*

## Operator Seat Restraints

OSHA's Powered Industrial Truck safety standard does not *specifically* require the use of seat belts; however, employers are required to protect workers from serious and recognized hazards as well as require all employees to make full use of safety devices. The current version of ASME B56.1-1993 does contain provisions for operator restraint use.

Furthermore, employers are expected to strictly adhere to equipment manufacturer recommendations. Most (if not all) industrial truck manufacturers recommend the use of operator restraints and install operator restraint systems on new sit down trucks. Depending on the manufacturer, operator restraints normally include seat belts and side seat retention devices. Most (if not all) manufacturers offer *approved* conversion kits for older models.

If your truck comes equipped with seat restraints, **employees must use them when exposed to an overturn hazard or traveling in areas where an operator can be thrown from the operator's compartment.** If your existing trucks are not equipped with seat restraints and your employees operate the trucks in areas where overturning or being thrown from the truck is possible (i.e. the dynamic forces associated with an unloaded truck, unguarded docks & ramps, unstable loads, uneven terrain, other vehicle traffic, etc.), it is recommended to contact your manufacturer representative for an *approved* conversion kit.



Norlift of Oregon, Inc.

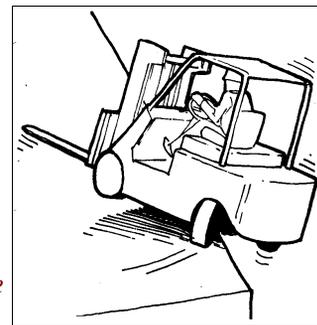
*OR-OSHA can cite employers for not requiring/enforcing seat restraint use when operators are exposed to hazardous areas where overturning or being thrown from the truck can occur. In addition to evaluating other contributing factors, the Compliance Officer will evaluate training and supervision to substantiate a citation.*

*OR-OSHA can also cite employers for not taking advantage of the approved retrofit kit if any of those hazards exist.*

Bottom Line - Effective Training & Supervision. Competent operators should be able to recognize those hazardous areas or exposures where overturning or being thrown from the truck can exist.

### Evaluating the potential hazards:

- ✓ Speed
- ✓ Loading docks
- ✓ Ramps/Inclines
- ✓ Other vehicle traffic
- ✓ Defined traffic lanes
- ✓ Driving surface (rough or uneven)
- ✓ Tight areas
- ✓ An unloaded truck is less stable than a properly loaded truck!
- ✓ Speed bumps
- ✓ Debris in roadway
- ✓ Tire pressure
- ✓ Railroad tracks
- ✓ Potholes
- ✓ Slick surfaces
- ✓ CG outside of stability triangle



Hyster Sales Co.

- Is my trainer(s) qualified? How have my operators been determined competent?
- Are we evaluating our operators and training program in regards to seat belt use?

Pretty self explanatory!

If the employer has not attempted to obtain a retrofit kit - encourage them. They may still be free.

Compliance officers can cite this a few different ways (but must first verify the hazardous exposure(s)) including: (a) The employer must make full use of all safety devices; or, (b) follow all manufacturer recommendations. Of course, the compliance officer may also consider training and/or supervision issues as well as OSHA's General Duty Clause.

Hazardous exposures (where one can be thrown from the truck or involved in an overturn/turn over) include: speeding, unguarded docks and ramps, unlevel terrain, quick turns, speed bumps, debris in the roadway, tire pressure, railroad tracks, other vehicles (creating a collision hazard), slick surfaces, and the dynamic forces causing an unstable truck (center of gravity outside of the stability triangle).

Lots of good stuff out there on this – studies, alerts, bulletins, etc. A quick Internet search using key words like “forklift danger”, “forklift overturn”, “forklift tipping”, etc. will yield tons of links.

Fed OSHA has some compliance directives and letters of interop on this as well.



# Safe Operations

## Picking up a load

- Ensure the load does not exceed the forklift's capacity
- Ensure forks are positioned properly
- Ensure the load is balanced and secure
- Ensure bottom of the load is \_\_\_\_\_ to the proper traveling height
- Drive as far into the load as possible
- Slightly tilt \_\_\_\_\_ and lift
- Back, stop, and lower load 2-6 inches from the floor

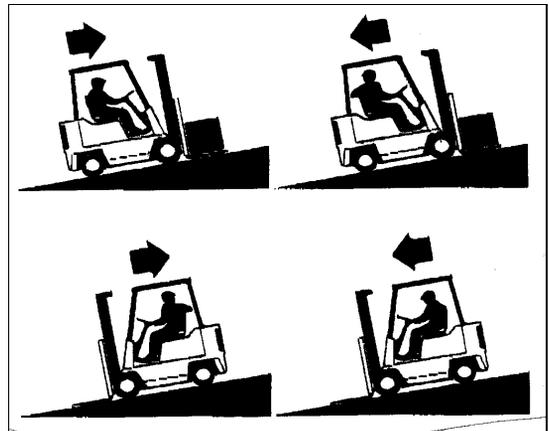


Earthworks Training and Assessment Services

Before backing up, check \_\_\_\_\_ and on both sides for pedestrians or other traffic

## Traveling with a load

- The operator and pedestrians must \_\_\_\_\_
- No riders/passengers
- Travel at walking speed
- All traffic regulations must be met, including plant speed limits (if established)
- Maintain at least \_\_\_\_\_ truck lengths
- Be aware of the traveling surface
- Keep the load slightly off grade
- Avoid sudden braking
- Turn in a sweeping motion
- Keep the load slightly tilted back
- Sound \_\_\_\_\_ when approaching corners and blind areas
- Lift and lower the load only when stopped

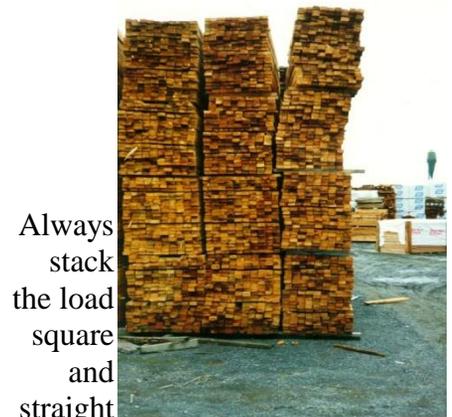


Hyster Sales Co.

When traveling with a load, drive up and back down inclines and ramps

## Placing and stacking a load

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



Always stack the load square and straight

## ☛ Picking up a load

Ensure bottom of the load is **raised** to the proper traveling height.

Slightly tilt **back** and lift.

Before backing up, check **behind** and on both sides for pedestrians or other traffic.

## ☛ Traveling with a load

The operator and pedestrians must **communicate!**

Maintain at least **three** truck lengths.

Sound **horn** when approaching corners and blind areas.

## ☛ Placing and stacking a load

Never walk, stand, or allow anyone to pass **under** a raised load.

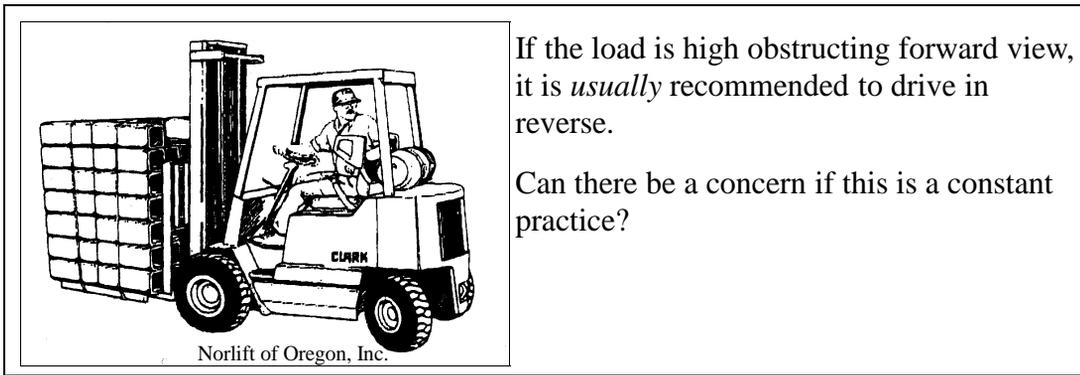
Before backing up, check **behind** and on both sides for pedestrians or other traffic.

I like a policy on honking the horn a few times when backing out – after checking **behind** and on both sides for pedestrians or other traffic. If trucks are equipped with backup beepers, encourage employer's to do a double check and simply ensure they are still serving a purpose. I have seen two things happen when forklifts of all sizes are equipped with backup beepers: (1) Pedestrians don't hear them or are not listening for them because they've tuned them out...after hearing them so much, and (2) the forklift operator is no longer looking behind them and checking their blind spots because they believe the beeper is doing that for them.

If these things are happening, something must be done. OR-OSHA requires backup beepers, flashers, or the use of a spotter on vehicles having obstructed view to the rear. Many backup beeper-equipped forklifts in industry today do not have obstructed view to the rear. Employer's may want to consider removing the beepers on the smaller trucks (if they're not serving their intended purpose) and establish the horn honking practice or something equivalent. Seems to me many folks become more attentive to a few honks of a horn than a long, constant, and monotone beeper.

## Safe Operations

- Only loads within the rated capacity must be handled
- Trucks equipped with \_\_\_\_\_ must be operated as partially loaded trucks even when unloaded
- Avoid running over loose objects
- Under all travel conditions, the truck must be operated at a speed that will permit it to be brought to a stop in a safe manner
- No horseplay or stunts
- Cross railroad tracks \_\_\_\_\_
- Never park closer than eight feet from tracks
- Right of way must be given to emergency vehicles
- Keep arms and legs from the mast and within the running lines of the truck
- Never drive up to someone standing next to a fixed object
- Powered hand trucks must enter enclosed areas load end forward
- Never pass another truck traveling in the same direction at blind corners, intersections, or other dangerous areas
- Lower forks, neutralize controls, shut off, and set brakes (block if on an incline) if truck will be unattended



## Lifting People

- A work platform equipped with a standard railing firmly secured to the carriage or forks must be used
- Falling object protection must be provided if a hazard exists
- An operator must attend the forklift while workers are on the platform
- The operator must be in the normal operating position while raising/lowering the platform
- A guard must be provided between the worker(s) and the mast if exposure to the chains and/or shear points exist
- Maintain stability of the truck and ensure the load capacity is not exceeded (account for platform, workers, materials, etc.)

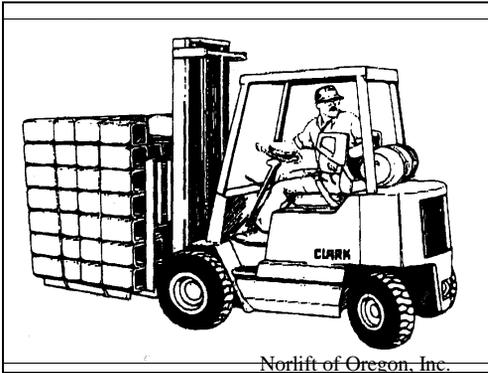


Some trucks are designed to lift workers.



Trucks equipped with **attachments** must be operated as partially loaded trucks even when unloaded.

Cross railroad tracks **diagonally**.



Operating in this position over an extended period of time can result in significant injury to the lower back, shoulders, neck, etc. Try to reduce these ergonomic risk factors through engineering controls (e.g. seat design, manufacturer interventions, etc.) and/or management controls (reduce high loads, job rotation, rest periods, conditioning, etc.).

## Lifting People



Top Rail = approx. 42"

Mid Rail = approx. 21"

Shear point guard

Make sure the platform is secured to the forklift's carriage! And don't forget a new load center for longer/wider platforms – reducing the nominal capacity.

I recommend to use an aerial lift or another piece of equipment that is designed and manufactured to lift humans! Most forklifts were never intended to lift people.

Most manufacturers of high-reach, rough terrain lift trucks specifically prohibit this practice. Fed OSHA has a few letters of interpretation on this.

# Training

*Federal OSHA proposed the revised training rule in the Federal Register on 12/1/98. Oregon OSHA adopted this rule by reference effective 5/26/99. The date by which employers were required to be in compliance with this revised rule was 12/1/99. OR-OSHA's revised operator training requirements {Div 2/Sub N 29 CFR 1910.178(l)} apply to general industry, construction, and maritime activities.*

*OSHA estimates compliance with this revised training rule will prevent fatalities and injuries to the nearly 1.5 million employees who operate forklifts. Furthermore, complying with this revision will reduce the significant risk of death and injury to others caused by the unsafe operation of powered industrial trucks driven by untrained or inadequately trained operators.*

*Based on the number of forklifts (1 million), approx. 2/3 are involved in a mishap during their normal 8 year work life.*

*Studies showed a 70% reduction in operator errors following training.*

*OSHA estimates this revised rule will prevent 11 deaths and 9,422 injuries per year in general industry workplaces and 3 to 4 deaths and 463 to 601 serious disabling injuries each year in the construction industry.*

## The rule before the 1999 revision:

“Only trained and authorized operators shall be permitted to operate a powered industrial truck. Methods shall be devised to train operators in the safe operation of powered industrial trucks.”



Wow.  
That was it.

## The rule after the 1999 revision:

- Clarifies training methods and content
- Requires evaluation and retraining
- Requires “certification”
- Provides an avoidance of duplicative training
- Includes info on stability!



Wow!  
Much better.

The first change occurs early in the revised rule. It basically replaces the word “trained” with “competent”.

**Each powered industrial truck operator must be competent to operate a powered industrial truck safely.**

The employer should determine that each potential operator of a powered industrial truck is capable of performing the duties that are required of the job.

What is your definition of competent?	What abilities should be considered?
---------------------------------------	--------------------------------------

OSHA has now helped you define ‘trained’ (changing to “competent”) and has given you ‘methods’ (combination) to train operators. OSHA still has not, and NEVER WILL, ‘authorize’ operators! Only the employer can ‘authorize’ their operators. This is important when it comes to OSHA’s use of the word “certification”. A big part of OSHA’s definition of “certification” as it pertains to forklift operator training is the authorization piece. Nobody but the employer should be authorizing the employer’s forklift operators.

Much discussion will normally transpire when asking the question, “Is there a difference between the words *trained* and *competent*? In other words, is a trained forklift operator competent? Is a competent forklift operator trained? You can easily spend 15 minutes on this.

Bottom line: A competent forklift operator can – from knowledge, training, and/or experience - effectively identify existing and potential forklift-related hazards and knows how to appropriately correct them. Someone YOU feel comfortable with operating your forklifts. He/she must effectively demonstrate their skills and knowledge! Another way to say a “qualified” operator.

**What abilities should be considered?** A good place to begin is having the mental and physical abilities to operate the truck safely...

- conscious awareness
- demonstrated skill
- hazard recognition
- knowledge of safe principles
- knowing where to go to get more info
- prior training
- tested
- solid, safe experience
- safe and conscious problem-solving ability

# Training

Prior to permitting an employee to operate a powered industrial truck (except for training purposes), the employer must ensure that each operator has successfully completed the training required by this rule, except as permitted under *Duplicative Training* (p. 11 ).

## The Trainer

The person(s) training your powered industrial truck operators must have the **knowledge, training, and experience** to train operators and evaluate their competence.

What do you look for when determining your trainer?

## Training Methods

Operator training must consist of a combination of:

1. Formal training

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Practical training

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Evaluation of their performance in the workplace

\_\_\_\_\_  
\_\_\_\_\_



## Retraining

When must retraining be conducted?

- When the operator has been observed to operate the vehicle in an \_\_\_\_\_ manner
- When the operator has received an \_\_\_\_\_ that reveals unsafe operation
- When the operator has been involved in an \_\_\_\_\_ or \_\_\_\_\_
- When the operator is assigned to operate a \_\_\_\_\_ type of truck
- When a \_\_\_\_\_ in the workplace changes in a manner that could affect safe operation of the truck

The trainer must have the knowledge, experience, and/or training to train powered industrial truck operators on safe operation and must be able to judge their competence. Many folks have become the company's appointed forklift operator trainer simply from years of experience operating forklifts. With all due respect, many of these individuals have never received formal training on how to operate these trucks safely. They were thrown the keys one day to move a pallet because the other operator was busy and *WAA LAA* – they're a new operator. It's wise to qualify the person's experience before deciding on them becoming the trainer. They may have been operating a forklift for 15 years and been incredibly lucky not to have been injured or killed. Plus, what comes with experience but short cuts, bad habits, and possibly overconfidence. Sometimes, very experienced folks are disseminating their short cuts and bad habits to newcomers...and they don't even realize they're sharing what they know and do - because that's all they know...and do.

It also helps (not required) if the trainer has knowledge/experience in training methodology, use of demonstration/media, adult learning principles, etc.

This rule does not require outsourcing the training or using a "certified" trainer or training vendor. Vendors can certainly be used to assist or reinforce the training but they cannot 'certify' the employer's operators because they cannot 'authorize' them. Plus, the vendor may not cover the site-specific or truck-specific issues that are still needed to be covered.

In order to determine their competency, the trainee must demonstrate (explain and show) their 'new'/reinforced knowledge and skill to the trainer. Sounds a lot like O.J.T.! But there must be some classroom too.

Trainees must operate the truck in areas where it does not endanger the trainee or other employees.

Training must consist of Formal (classroom - lecture, workshops, video, computer, tests, etc.); Practical (Hands-On - demonstrations by the trainer and demonstrations and exercises by the trainee); and Evaluation (evaluation of their performance IN the workplace (addressed again a few pages from here)).

When must retraining be conducted?

- unsafe
- evaluation
- accident or near miss
- different
- condition

# Training Content

The following topics must be covered unless they're not applicable to the particular workplace:

## Truck-Related Topics:

- \_\_\_ All operating instructions, warnings, and precautions for the types of trucks the operator will be authorized to operate (operator's manual)
- \_\_\_ Differences between the truck and the automobile
- \_\_\_ Controls and instrumentation (location, what they do, 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 (weight and load center)
- \_\_\_ Vehicle stability (with and without load and attachments)
- \_\_\_ Vehicle inspection and maintenance the operator will be required to perform
- \_\_\_ Refueling and/or charging and recharging batteries
- \_\_\_ Operating limitations

*Other items to consider:  
Variations and characteristics from other trucks in the plant; data plates; braking methods (with and without loads); guarding; vehicle traffic; approved methods of when to remove a truck from service; parking and shutting down; docks; loading/unloading trailers & railcars; and dockplates.*

## Workplace-Related Topics:

- \_\_\_ Surface conditions where the vehicle will be operated
- \_\_\_ Composition of probable loads and load stability
- \_\_\_ Load manipulation, stacking, and unstacking
- \_\_\_ Pedestrian traffic in areas where the vehicle will be operated
- \_\_\_ Narrow aisles and other restricted places where the vehicle will be operated
- \_\_\_ Operating in hazardous (classified) locations
- \_\_\_ Operating the truck on ramps and other sloped surfaces that could affect the vehicle's stability
- \_\_\_ Other unique or potentially hazardous environmental conditions that exist or may exist in the workplace
- \_\_\_ Operating the vehicle in closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust
- \_\_\_ All other requirements found in the standard

## Duplicative Training

If an operator has previously received training in a topic specified above, and such training is appropriate to the truck and working conditions encountered, additional training in that topic is **not** required if the operator has been evaluated and found competent to operate the truck safely.

How have you evaluated them?

How have you found them competent?

## Truck-Related Topics (highlights):

- ⇒ Visibility (including restrictions due to loading).
  - Lift trucks have blind spots - even when unloaded
- ⇒ Fork and attachment adaptation, operation, and use limitations.
  - Reiterate the importance of attachments and how they decrease the nominal capacity
- ⇒ Vehicle capacity (weight and load center).
  - Again - using attachments...and the importance of the data plate
- ⇒ Vehicle stability (with and without load and attachments).
  - Center of gravity. Visualize that “combined center of gravity”. Don’t forget the dynamic forces of the truck when unloaded.
- ⇒ Vehicle inspection and maintenance the operator will be required to perform.
  - Make sure all operators are on the same page on when to remove a truck from service.

## Workplace-Related Topics (highlights):

- ⇒ Surface conditions where the vehicle will be operated.
  - All SURFACES (gravel, asphalt, RR tracks, bumps, waxed floors, etc.)
- ⇒ Composition of probable loads and load stability.
  - Including off-center loads

## Duplicative Training

*Who must evaluate and find the operator competent?*

Employer

*How have you evaluated them?*

Observe them perform first, quiz them, orient them

*How have you found them competent?*

Testing, evaluate/observe, performance demonstration, assigning lead, etc.

The burden of proof is on the employer’s shoulders. The operator must first demonstrate their competence. If any concern/question at all - retrain them. I recommend to retrain them anyway (train them in your policies, rules, site-specific conditions/hazards, etc.). OSHA allows this ‘exception’ to save employers time and resources.

# Evaluation

An evaluation of each powered industrial truck operator’s performance must be conducted at least once every **three** years.

What should this evaluation look like?

Observe/audit their performance while they’re working

– performing the duties they get paid to do:

- loading
- stacking
- fueling/charging
- inspecting
- pedestrians
- parking/shutting down
- maneuvering
- horn
- driving in reverse
- ramps/inclines
- ALL traveling
- using attachments
- tiering
- visibility
- lifting/lowering
- docks
- floor surfaces
- accessing/egressing truck



What does your evaluation look like?

Follow this up with Q&A, quizzes, etc. This may take an hour (or less) or occur at different times of the week - you must evaluate their primary tasks. This is basically a continuing demonstration of safe skill and knowledge.



OSHA’s training rule also requires you to evaluate the **effectiveness** of your training. How is this accomplished?

## Certification

Employers are required to “certify” that each operator has been trained and evaluated as required by this rule.

What does “certify” mean?

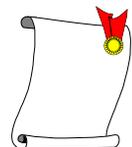
What must be documented? (*at a minimum*)

\_\_\_\_\_

\_\_\_\_\_

What else can you document?

*This rule **does not require** the employer to use outside training services.*



This is a ‘performance-based’ rule. The employer has flexibility when complying with the intent of this rule. In other words, it’s up to the employer on what the evaluation will eventually look like as long as it meets the intent of the rule (think of this as a continuing demonstration of the operator's skill set and knowledge base (a “requalification”).

Observe/audit their performance while they’re working (performing the duties they get paid to do - loading, stacking, fueling/charging, inspecting, pedestrians, parking/shutting down, maneuvering, horn, ramps, ALL traveling, using attachments, tiering, visibility, lifting, lowering, etc.). Page 11 of the workbook can help as a checklist. Also, the operator’s manual might provide some insight into training/qualifying operators.

Follow this up with Q&A, quizzes, etc. May take an hour(s), all day, or different times during the day/week - depends on your operations/exposures. I would say if one of the operator’s primary duties is to load and unload low-boy trailers, and a true-to-life simulation cannot be conducted, the evaluation isn’t complete until he/she is observed loading/unloading the next low-boy trailer. You must evaluate as many of their anticipated duties/tasks as reasonably expected.

OSHA’s training rule also requires the employer to evaluate the **effectiveness** of the training program. Again, this is a performance-based rule – it doesn’t prescribe when, where, how, etc. It is up to the employer on how to meet its intent. I encourage to solicit feedback from the trainees to determine how effective the training has been – who would know better? Also, use past training records to help determine what and what hasn’t been covered. Of course, this means to add more info on the training records than what the OSHA rule requires (see below).

**What does “certify” mean?** In this case, “certify” means document and authorize.

**What must be documented?** Name of trainee & trainer/evaluator, and date(s) of training & evaluation.

**What else can you document?** The specifics they were trained on (truck and workplace-related topics – p. 11 of workbook).

There has been much confusion surrounding the use of the word “certification” as it pertains to this forklift safety standard. “Certification”, in this case, basically means the combination of documentation & authorization – both done by the employer. Neither OR-OSHA, nor any other outside vendor, can truly “certify” an employer’s operators. Many folks take it to mean OSHA must ‘certify’ operators, or even trainers. Employers authorize their operators after they have been trained and evaluated (found competent). Hopefully, employers are using their qualified operators to train and evaluate them. Vendors can help but can’t authorize them either. For example, trainees can pass the vendor’s course and receive a card or certificate indicating “certification of completion” but their employer must subsequently, and truly “certify” (authorize) them.

# Operating Around Pedestrians

What safety instruction would you provide employees exposed to lift truck traffic?



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Emedco

The following is taken from a very informative NIOSH Alert (Pub. # 2001-109) titled: Preventing Injuries and Deaths of Workers Who Operate or Work Near Forklifts. *This 12 page document can be downloaded at [www.cdc.gov/niosh](http://www.cdc.gov/niosh)*

## Workers on Foot

- Separate forklift traffic and other workers where possible
- Limit some aisles to workers on foot only or forklifts only
- Restrict the use of forklifts near time clocks, break rooms, cafeterias, and main exits, particularly when the flow of workers on foot is at a peak (such as at the end of a shift or during breaks)
- Install physical barriers where practical to ensure that workstations are isolated from aisles traveled by forklifts
- Evaluate intersections and other blind corners to determine whether overhead dome mirrors could improve the visibility of forklift operators or workers on foot
- Make every effort to alert workers when a forklift is nearby. Use horns, audible backup alarms, and flashing lights to warn workers and other forklift operators in the area
- Flashing lights are especially important in areas where the ambient noise level is high

## Work Environment

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

What safety instruction would you provide to the employees exposed to lift truck traffic?

- Report hazardous practices (ped. or truck operation)
- Report crashes and near misses
- Listen for horns and look in mirrors (if provided)
- Look in all directions
- Stay in delineated pathways
- Always wear high visibility garments (if provided)
- Stop and watch at blind corners
- Always be aware
- PAY ATTENTION!
- Establish positive communication with the operator
- Understand and follow the company's right-of-way policy (if they have one...and they should!)

A very important factor relating to forklift/pedestrian safety is to ensure everyone knows and follows the site's right-of-way policy. In my opinion, the only way to measure this is to interview every single person affected...and they all better provide the exact same answer. Don't forget visitors, other contractors, surveyors, vendors, etc., who might also be exposed.

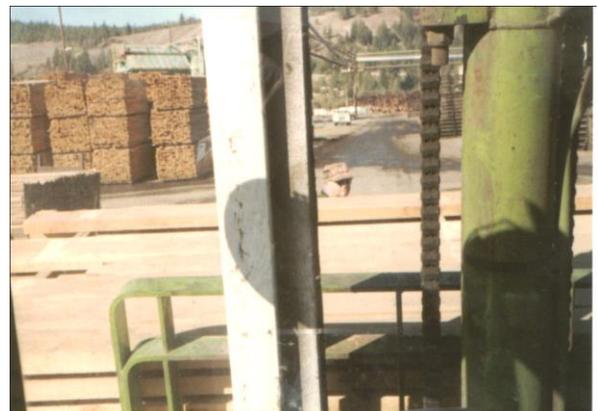
A very good, local, and effective video to support this important piece of forklift safety is available through OR-OSHA's Resource Center:

[Springfield - Lessons Learned #1009](#)

Another good video on pedestrian safety is [Fields of Vision: How to Work Safely Around Lift Trucks #824](#)



See his arm?



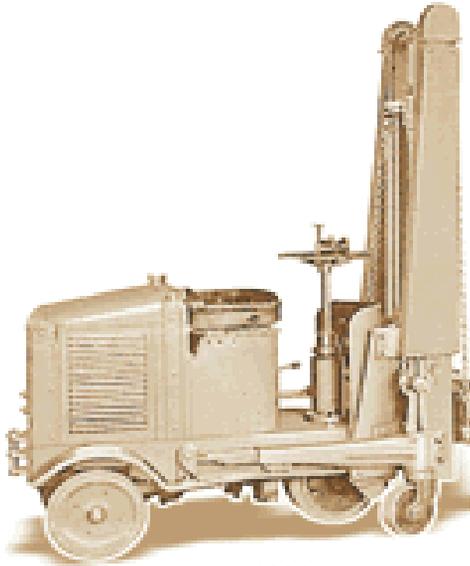
See him?



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# ***Forklift Safety***

*A review of safe operations and work practices when operating and working around powered industrial trucks.*



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Presented by the Public Education Section  
Oregon OSHA  
Department of Consumer and Business Services



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