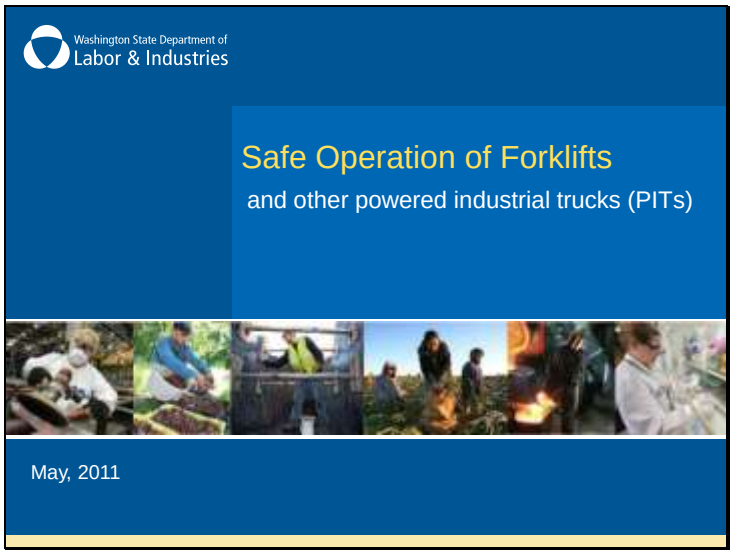
Slide 1



This course will partially satisfy the L & I – DOSH training requirements for forklift operators. After you have completed this course you will need additional hands-on training on the specific forklift you will be using.

Slide 2

Safe Operation of Forklifts
and Other Powered Industrial Trucks

The following topics will be covered:

- Forklift-related fatalities and injuries
- Types of forklifts
- How a forklift operates
- Hazards of forklift operation
- How to use forklifts safely

Wikimedia commons

This training will mainly cover standard forklifts – similar to one in the photo on this slide.

Slide 3

First thing – It is against the law for anyone under 18 to operate a forklift. This is both a Washington State and federal law.

Slide 4

Safe Operation of Forklifts
and Other Powered Industrial Trucks

The risk of ignoring forklift safety

Forklifts are extremely useful in a variety of
workplaces, but there is great risk of property damage, injury or death if you:

Source: WorksafeBC

- Are not trained on forklift safety
- Are not familiar with the specific forklift vehicle
- Operate the forklift in an unsafe manner
- Operate a forklift with a defect or missing parts


Source: Rolette Doors

Because the cause of so many forklift accidents is lack of proper training, this training is required by L & I regulations for any person who will using a forklift.

Slide 5

Safe Operation of Forklifts
and Other Powered Industrial Trucks

Forklift accident statistics

Fatal Accident Type	%
Crushed by vehicle tipping over	42%
Crushed between vehicle and a surface	25%
Crushed between two vehicles	11%
Struck or run over by a forklift	10%
Struck by falling material	8%
Fall from platform on the forks	4%

Approximately 35,000 serious injuries and 62,000 non-serious injuries involving forklifts occur in the United States every year. OSHA estimates 11% of all forklifts are involved in accidents every year.

Source: Monash University – Australia

View Fatality examples

This slide shows that forklifts can be dangerous. The link to fatalities investigated by federal OSHA are about 10 years old, but similar accidents still occur.

Slide 6

As you can see from these statistics, forklifts injure or even kill workers in our State and the reason is often due to lack of proper training. DOSH safety inspectors routinely ask if forklift drivers have had training during their workplace inspections and will cite a company if they don't. So, be sure to take this training seriously and get further hands-on training on the specific forklift you will be operating after you have completed this online course.

Slide 7

What is a powered industrial truck (P.I.T.)?

Definition: A powered vehicle used to carry, push, pull, lift, stack or tier materials.

Another way of describing powered industrial trucks is that they include standard forklifts and special use forklifts and industrial vehicles.

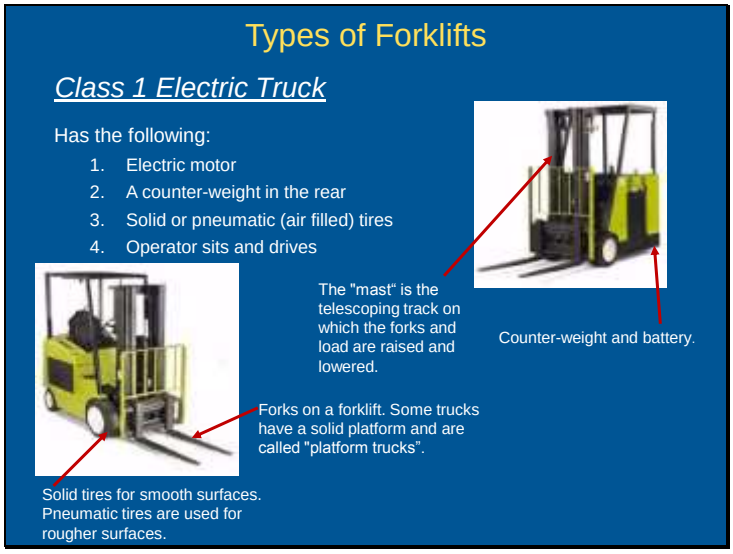
They are all regulated by the DOSH P.I.T. regulations – WAC 296 - 863

The Industrial Truck Association list seven classes of PITs:

- Class 1 Electric Truck
- Class 2 Electric Truck
- Class 3 Hand Truck
- Class 4 Truck
- Class 5 Truck
- Class 6 Industrial Tractor Truck
- Class 7 Rough Terrain Truck

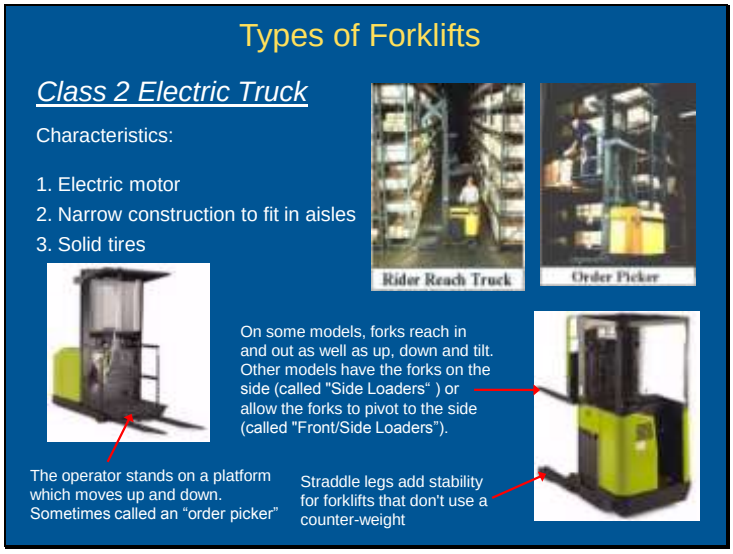
Forklifts are sometimes called powered industrial trucks or PITs. The most common type of PIT in use are the forklifts shown in the photos in this slide. Specialized PITs are used in warehouses, waterfront piers, logging and construction. The next few slides will describe the seven types of forklifts.

Slide 8



These battery-operated electric forklifts are typically used in warehouses where lack of ventilation makes the use of propane, diesel or gasoline powered forklifts, a carbon monoxide hazard.

Slide 9

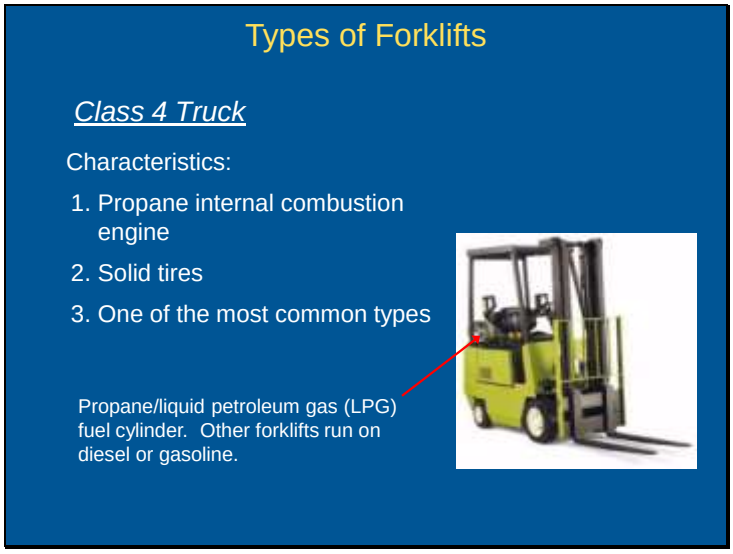


These specialized electric forklifts are used primarily in warehouses with high stacks of stored goods.

Slide 10

These electric vehicles are sometimes called walkie-riders and are typically used in warehouses.

Slide 11



This propane-powered forklift is one the most common types of forklifts in use.

Slide 12

Types of Forklifts

Class 5 Truck

Characteristics:

1. Gasoline, diesel or propane engines
2. Pneumatic tires
3. Used outdoors in many cases.

Pneumatic (air filled) tires with tread are used for traction and stability on rough or wet surfaces.

This is another common type of forklift often used outdoors.

Slide 13

Types of Forklifts

Class 6 Industrial Tractor Truck

Characteristics:

1. Electric or internal combustion engine
2. Solid or pneumatic tires
3. Specialty vehicles
4. Pull or carry loads (no forks)

Yard Tractor

Industrial Tractor

Straddle carrier

These specialty PITs will not be covered in this training.

Slide 14

Types of Forklifts

Class 7 Rough Terrain Truck

Characteristics:

1. Used outdoors in uneven or muddy locations
2. Pneumatic tires
3. Gasoline or diesel-powered

Rough Terrain Reach Forklift

Log Yard Forklift

Rough Terrain Mast Forklift

These heavy duty vehicles will not be covered specifically, but most of the information in this course would apply to them as well.

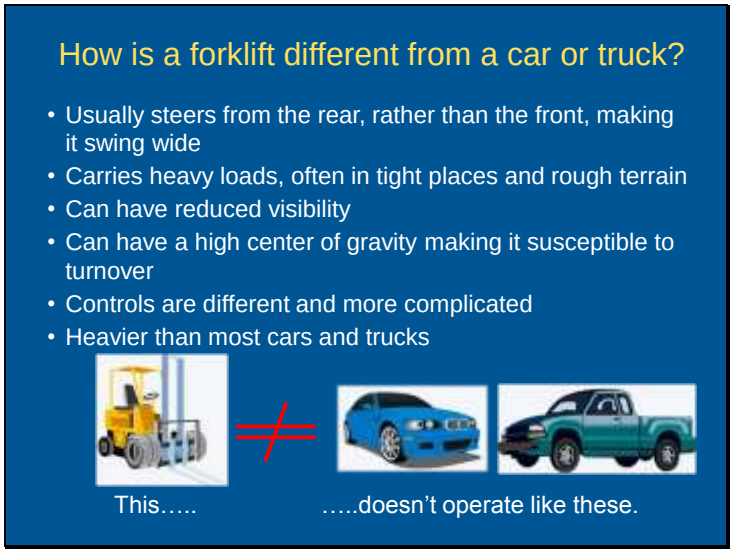
Slide 15

This training will not cover these specialized PITs in detail. Even though these vehicles are much larger than standard forklifts, their safe operation are governed by the same general principles.

Slide 16

Sometimes these examples are confused with PITs since they can be used to perform similar tasks.

Slide 17



While the average automobile weighs around 3,000 pounds, the average forklift weighs around 9,000 pounds. Also, forklifts are heavier in the rear to counter the weight of items being carried in the forks. And, while cars have brakes on all four wheels, most forklifts only have stopping power in their front drive wheels. For that reason, forklifts are harder to stop, so they should be driven slowly.

Slide 18

This photo show the parts of a standard forklift. Other types will vary. All use hydraulic fluid to operate the forks. Most have a large counterweight in the rear to help balance a load on the front. Most have an overhead guard to protect the operator from falling objects. The main lifting work of the forklift is done with the forks and the mast, powered by the motor. Sometimes, older forklifts will develop a leak of hydraulic fluid. Without sufficient hydraulic fluid the forks will not operate properly, especially with a load. And a puddle of hydraulic fluid on a cement floor is a slipping hazard.

Slide 19

Forklift Nameplate

The nameplate will list the type of forklift and the capacity

Type

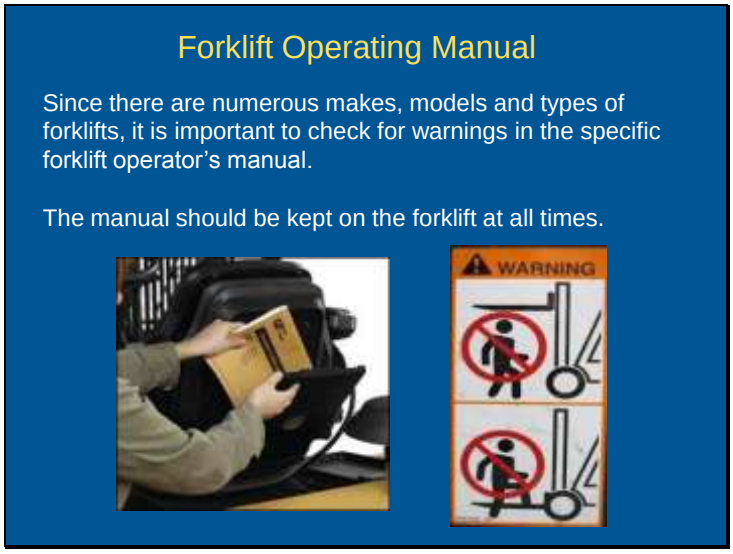
Weight

Load capacity

This forklift is a propane (LP) powered forklift, weighing 8680 lbs. with a lifting capacity of up to 4500 lbs.

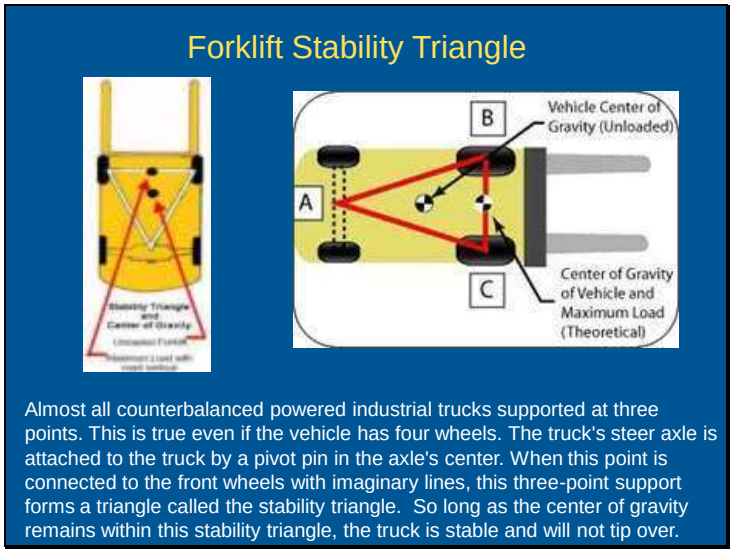
The nameplate gives important information about the capacity of the forklift. These must be readable at all times so any one who operates the forklift will know it's capacity and to not overload it.

Slide 20



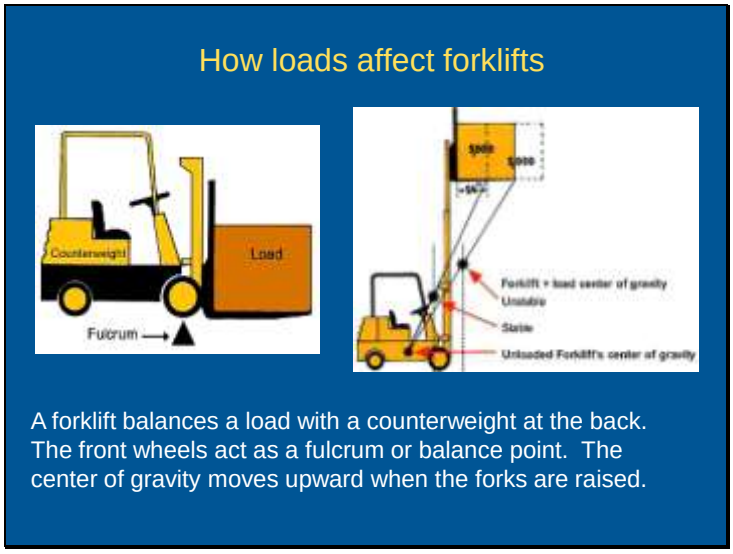
If several people will be using the same forklift, or there is frequent changes in forklift operators over time, keeping the operation manual on the forklift is really important.

Slide 21



The stability of a forklift is important when you are handling heavy loads. The stability triangle is a way of describing how to keep the forklift stable and prevent it from tipping over with a heavy load. The next slide illustrates this idea further.

Slide 22

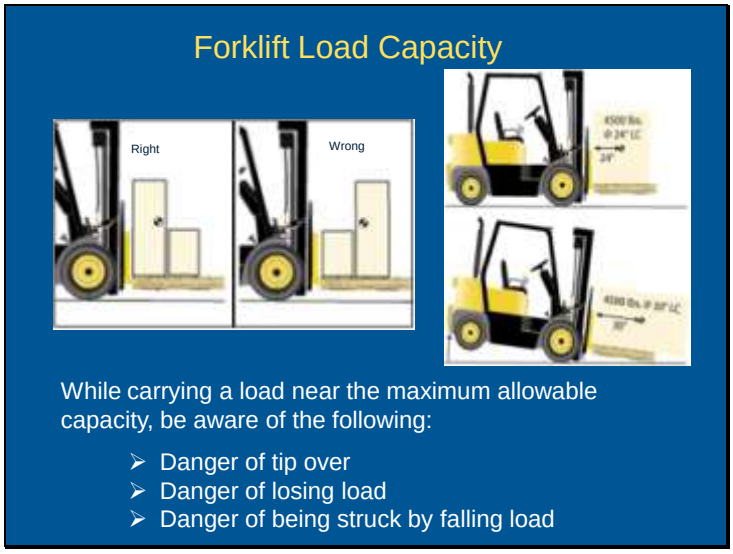


As the load is raised up and away, the center of gravity also shifts up and away from middle of the forklift. If it moves outside the triangle formed by the front wheels and the center of the rear axle, the forklift will tip forward or fall to the side.

Slide 23

A forklift with a raised load tends to be very unstable, especially with a load near the forklift’s lifting capacity. So as soon as the load is picked off the upper shelf in this photo, the load should be lowered before traveling or moving forward or backward.

Slide 24



As you can see from these illustrations, the center of gravity of the load should be as close to the forklift wheels and mast as possible.

Slide 25

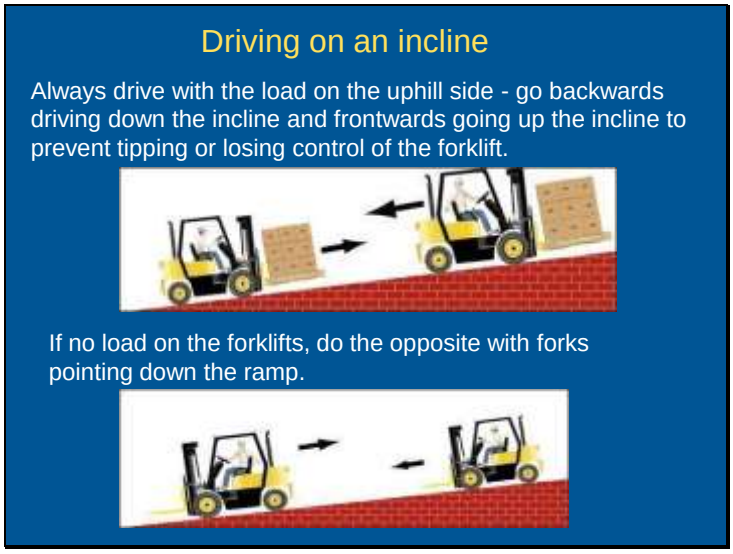
Moving the load

Use extra caution when handling loads that approach the truck's maximum rated capacity:

- Tilt the mast & forks back and position the heaviest part of the load against the carriage.
- Travel with the mast tilted back to keep the load stable. Never travel with the load tilted forward. Tilting the load forward increases the load distance and makes the load less stable.

In addition to the points on this slide, you should not pick up a load with just the tip or front part of the forks. Place the forks all the way under the load and <u>then</u> tip it back slightly. You may need to tilt the forks forward slightly to get under the load and later to deposit the load. But at all other times the forks need to be tilted back.

Slide 26



When you drive on an incline with a load, always have the load on the uphill side. L & I rules requires these procedures be followed if the incline is 10% or more. In addition, its especially important to tilt the load backward and keep it low. Raise the forks just enough to clear the surface.

Slide 27

More reasons why forklifts tip over

- Driving too fast around a corner
- Driving off edge of platform, ramp, road or other surface
- Driving an indoor forklift outdoors on rough, uneven ground outdoors
- Operating on an incline or hill

Source: RiteHite Doors

Forklifts can turn over for all the reasons shown on this slide.

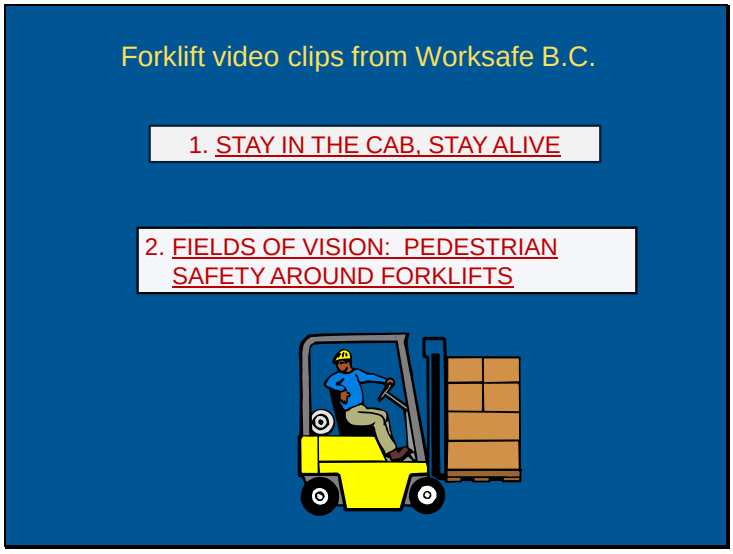
Slide 28

In the case of a tipover, whatever you do – don't jump. Hold on and lean away from the direction of the fall. You may be shook up and banged up a bit, but you will survive.

Slide 29

Forklift fatalities have occurred when the operator was either thrown out of the forklift or they tried to jump out when the forklift overturned. Seat belts prevent that.

Slide 30



The links to video clips is from Worksafe B.C. – the safety and health agency in British Columbia, Canada. The first covers the consequences of jumping from a forklift that is tipping over. The second one covers the real danger to pedestrians working in the same area as forklifts.

Slide 31

Forklift inspection and maintenance

All forklifts be examined at least daily before being used. Forklifts used on a round-the-clock basis must be examined after each shift. Check the following:

- ✓ Fluid levels -- oil, water, and hydraulic fluid.
- ✓ Leaks, cracks or other visible defect in hydraulic hoses and mast chains.
- ✓ Tire pressure and tire cuts or gouges.
- ✓ Condition of the forks, including the top clip retaining pin.
- ✓ Safety decals and nameplates in place and legible.
- ✓ All safety devices working properly including the seat belt.

U.S. Army


MSHA

A vehicle that is damaged, defective or otherwise unsafe must be removed from service. Report the problem to your supervisor immediately.

If your company has no assigned person to do forklift inspection and maintenance, the responsibility is yours. You should double check even if the company has maintenance personnel. If you operate a propane powered forklift indoors, check for noticeable propane or exhaust odors which mean an engine tuneup is required to keep carbon monoxide levels low. More about that in the slides following.

Slide 32

Refueling a propane powered forklift

Liquid propane is extremely cold when released to the atmosphere. If your skin is exposed to propane while refueling, you can get frostbite.

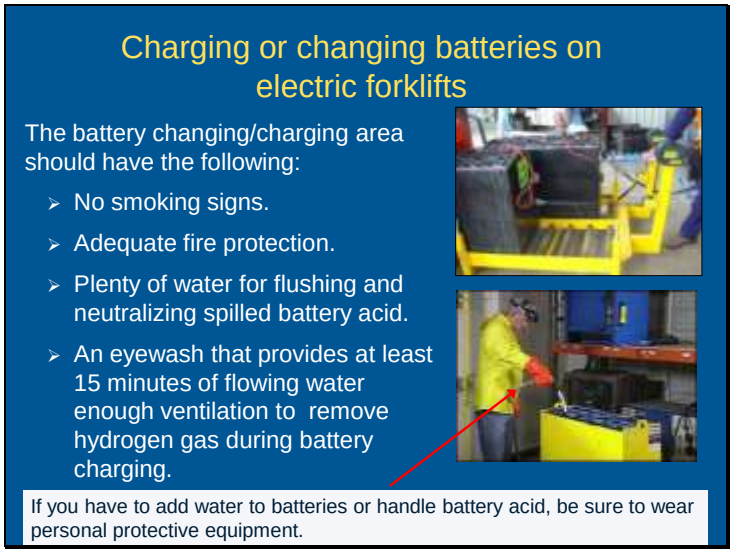
Shut off the engine before refueling.

Don't leave propane-powered forklifts near high heat sources. When parking propane-powered forklifts for a long period of time, turn the tank valve off.

Any propane leak must be taken seriously. Propane vapor is heavier than air and will tend to sink to the lowest lying area. If not adequately dissipated, it will ignite when exposed to a spark or flame.

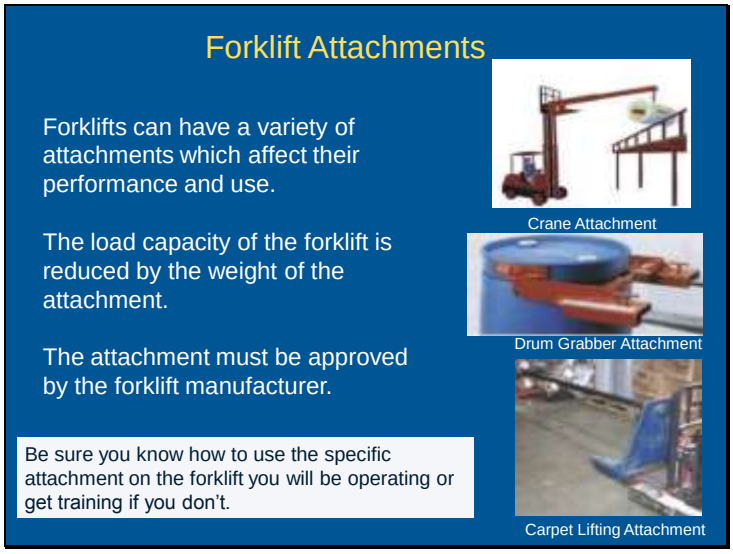
Propane is safe to use as long as it is contained. However, as this slide indicates, a large leak is a major hazard that could result in a fireball with severe burns to you or nearby workers. Some companies may have a propane cylinder exchange system where a propane vendor supplies full cylinders in exchange for empty ones. If you switch out empty cylinders with full ones, just remember to make sure all valves on the cylinders are closed.

Slide 33



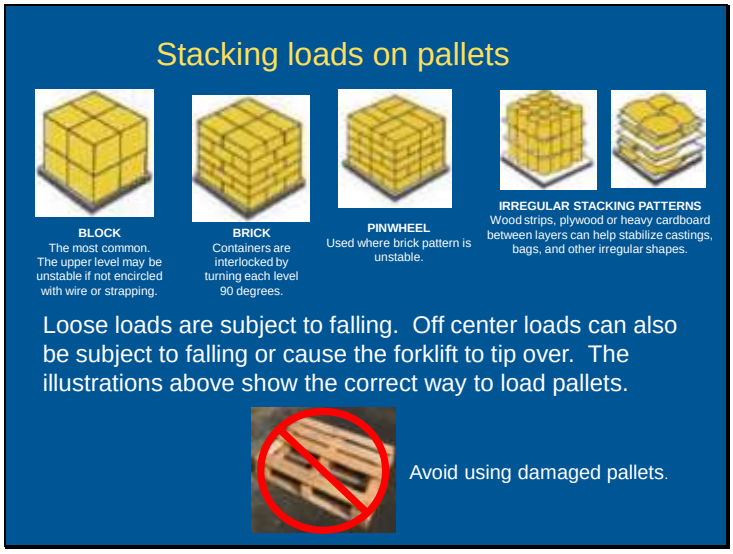
If you have to change or charge batteries on your electric forklift, you could be exposed to the hazards of burns from battery acid or fire from hydrogen gas. Because of their weight, batteries are typically lifted with a hydraulic hoist. If you are the one that has to do that, be sure you know how to operate the hoist correctly.

Slide 34



Using an unapproved attachment can alter the forklift's lifting and balance characteristics and lead to the forklift overturning. The forklift must be marked in some way to show the weight of the attachment. This is usually found on the nameplate, unless it has been altered by a user without consulting the manufacturer. Doing so is actually a violation of forklift safety regulations.

Slide 35

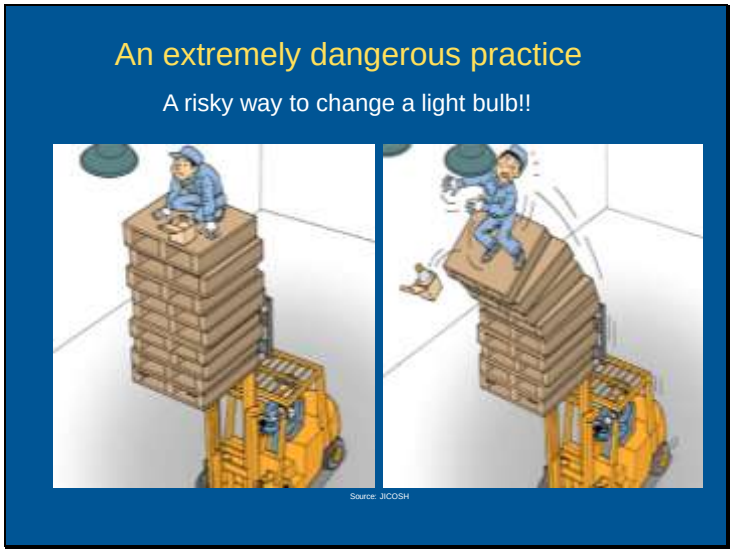


Pallet loads are often shrink-wrapped or otherwise secured with strapping or other devices, especially in warehouses. But sometimes one-time or short-term jobs or other work conditions make that impossible. In those cases, proper stacking on a pallet is important. In addition, damaged pallets are subject to collapsing suddenly and the load being dumped or dropped.

Slide 36

Lifting someone on the forks of forklift is an extremely risky operation and often done “just for a minute” to accomplish some quick task. Don't allow yourself to be talked into it or think you can get away with it.
When a work platform is used, the forklift operator must always be in attendance – no further than 25 feet away, with the brake set. If the platform needs to be moved more than a few inches, the worker on the platform must get off first. No driving along with workers in the platform.

Slide 37

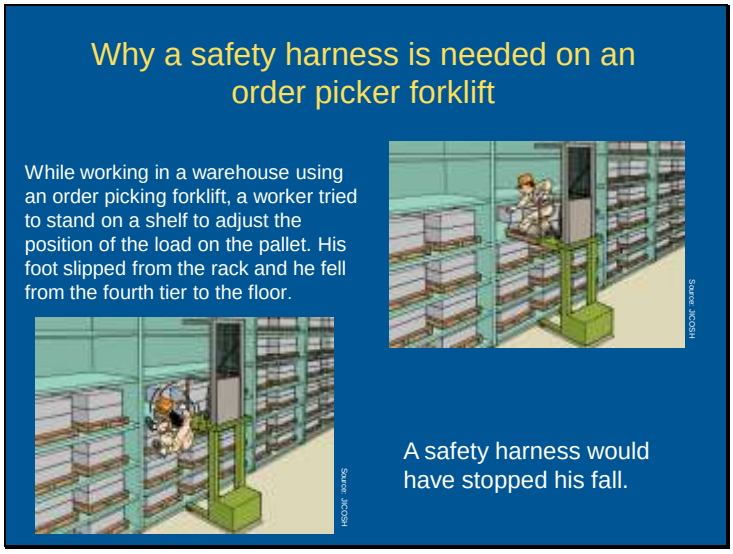


Sometimes people will try to use a forklift with a stack of pallets on the forks to gain access to something out of reach. Don't be a part of this practice, since the worker on the pallet can easily fall off.

Slide 38

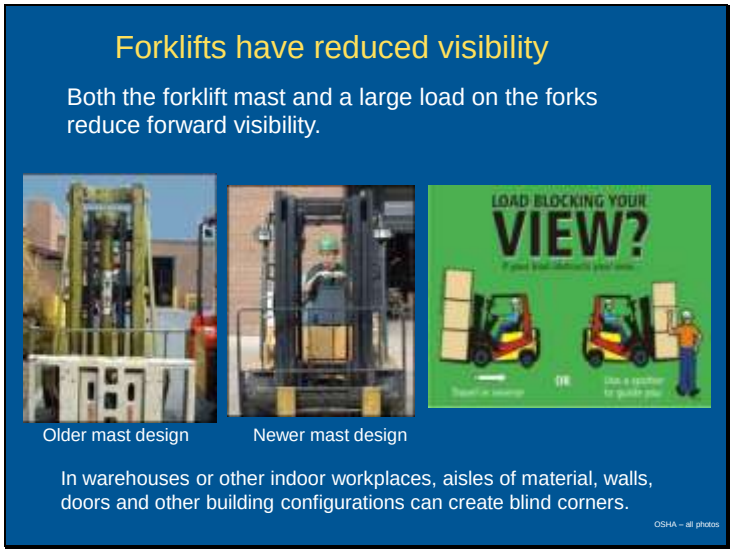
Order picker forklifts used in warehouses where the worker stands on the platform that raises and lowers presents a fall hazard. Workers who use this type of equipment must be protected by either a guard rail or the appropriate fall protection harness as shown. Waist-only harnesses, also called “body belts”, are not acceptable unless they completely prevent the operator from falling off the order-picker.

Slide 39



This is an example of what can happen if a safety harness is not available or used.

Slide 40

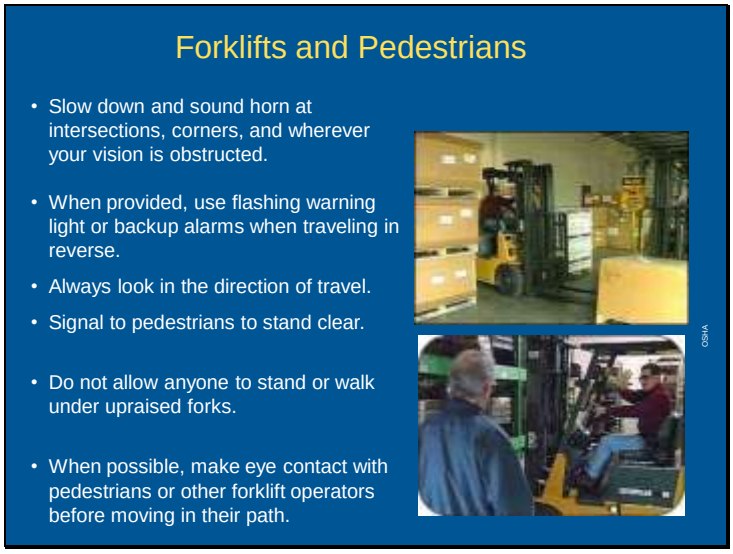


Mast configuration can affect the operator's visibility. Newer mast designs use two side cylinders with a gap in the middle which provide much improved visibility compared to older mast designs that have a single central cylinder. But with a tall load, your forward view will be blocked, making it necessary to travel in reverse or use a spotter.

Slide 41

When moving forward, the mast will block part of your view, even when the load is lowered.

Slide 42



Your employer may have restricted lanes for other workers – pedestrians – but people don't always pay attention. You are often moving faster than a pedestrian and forklifts can't stop suddenly, especially with a load. 10% of all fatalities involving forklifts are from workers being struck or run-over by a forklift. Don't let it be your fault.

Slide 43

In this example of a real accident, the pedestrian walked behind the forklift without catching the attention of forklift operator even though the back-up alarm was sounding. The forklift operator failed to look backwards, so the forklift hit the pedestrian, knocked him down and badly injuring his leg.

Slide 44

Driving in and out of a trailer or railcar can cause either the ramp or the trailer itself to move. Securing truck trailer wheels prevents trailer movement and keeps dockboard secure. Dockboards or bridgeplates have various methods or attachments to keep them secure.

Slide 45

Wide or irregular size loads

Source - New York Dept. of Health

OSHA

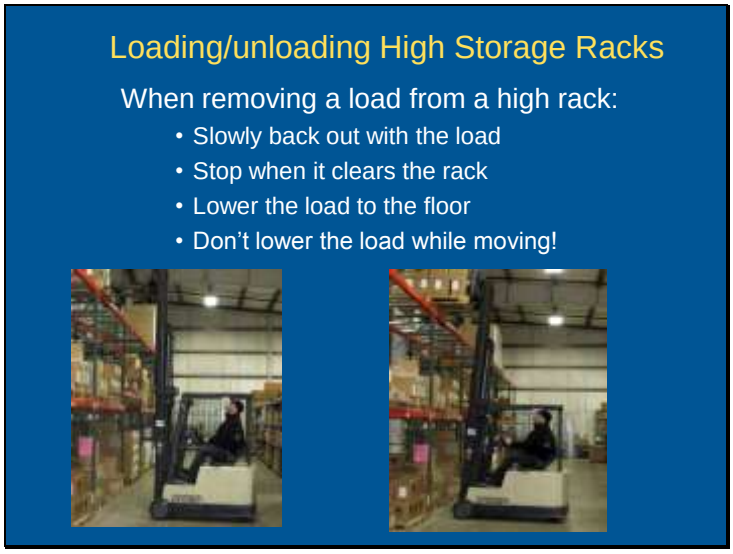
Distribute the weight evenly when carrying irregular sized loads.

Keep the center of gravity of the load as near as possible to the center going horizontally across the forks.

Keep the center of gravity of the load as near to the front wheels as possible.

Wide loads are susceptible to shifting or sliding off the forks and of course make it difficult to maneuver in tight places. Irregular size loads can shift the center of gravity in unexpected ways. Caution in handling these types of loads is necessary. It is often safer to move a wide heavy load with a crane rather than a forklift.

Slide 46

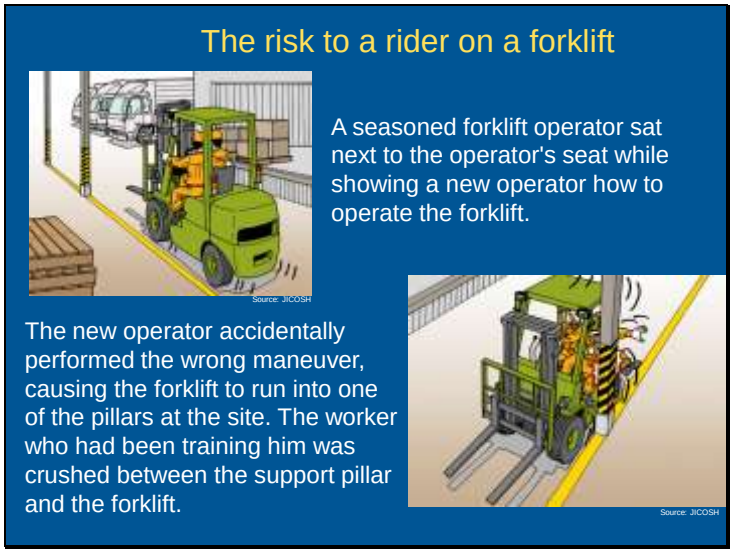


In warehouses with high storage racks, the lightest loads should be placed on the top racks, and the heavier loads on the bottom racks. Remember a forklift is less stable with a load raised high, especially while moving.

Slide 47

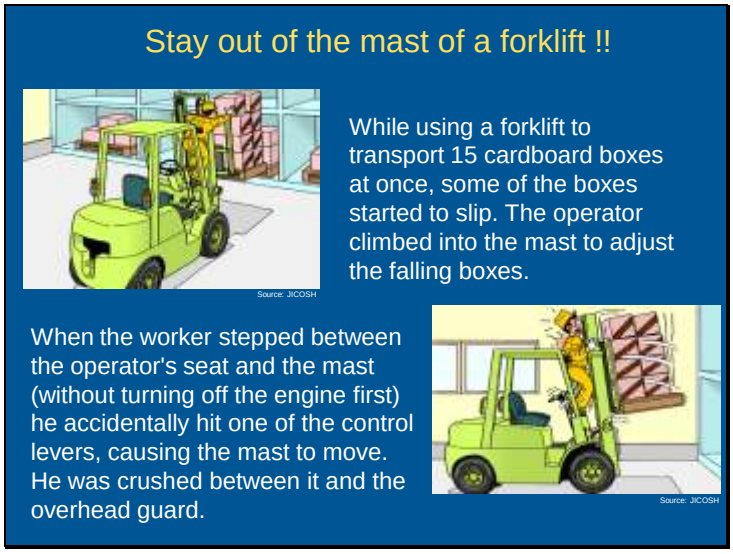
The link to the Yale forklift company poster at the bottom of the slide is a good list of forklift safety practices. It can be simply viewed or printed out.

Slide 48



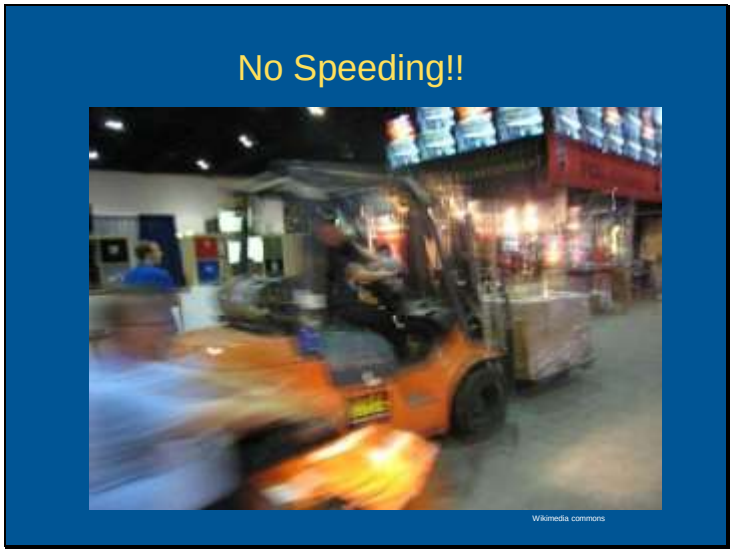
This example shows one reason why riders on a forklift is dangerous. The other reason would be that the rider could easily slip off the forklift since he has no seatbelt and is not sitting in a seat.

Slide 49



This is another example of an actual accident. The safer way this operator should have handled this situation was to slowly lower the load to the ground, set the brake and then dismounted the forklift and re-adjusted the boxes.

Slide 50



It goes without saying – just like any other moving vehicle, watch your speed. It's especially dangerous in a workplace with nearby workers and walls, doors, racks or stored material that block your view. As mentioned before, it's harder to stop a heavy forklift with a load than a car, even at low speeds.

Slide 51

Don’t leave your forklift unattended

A forklift is considered "unattended" When the operator is 25 ft. or more away from the vehicle even if it remains in his view, or whenever the operator leaves the vehicle and it is not in his view.

When a forklift is left unattended, forks must be fully lowered, controls neutralized, power shut off, and brakes set. Wheels must be blocked if the truck is parked on an incline.

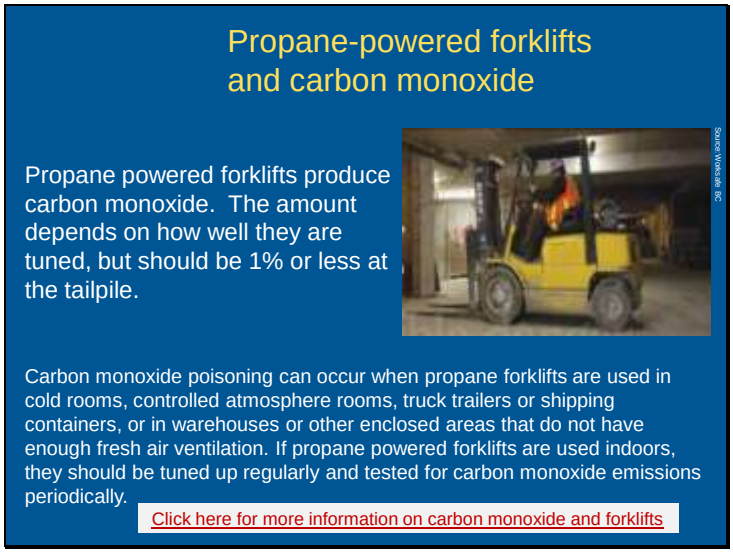
Wisconsin Dept of Health Services

Where’s the operator??

When the operator of a forklift is within 25 ft. of the truck still in his view, the load engaging means must be fully lowered, controls neutralized, and the brakes set to prevent movement, but the power does not need to be shut off.

Not leaving an operating forklift unattended is another requirement of the L & I safety regulations on forklifts.

Slide 52



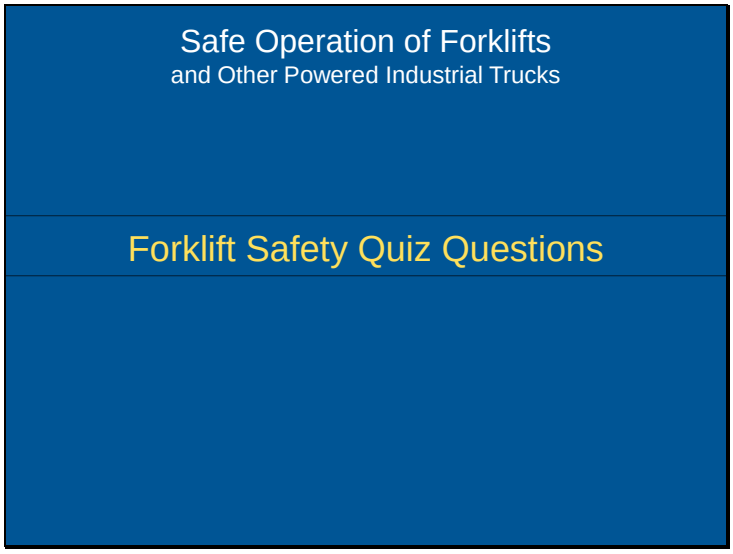
You may have heard or been told that propane powered forklifts “burn clean” or don’t emit carbon monoxide. Although the amount is much less than a gasoline engine, they still do produce carbon monoxide and the levels can be quite high on poorly tuned forklifts. In fact carbon monoxide poisoning from indoor forklift operations is a common occurrence in Washington state, especially in the fall or winter when warehouse doors are closed up or ventilation is turned off or malfunctions. Symptoms of carbon monoxide poisoning are typically a severe headache, nausea or even collapse in worst cases.

As you might expect, carbon monoxide poisoning is an even greater hazard with gasoline powered forklifts and diesel powered forklifts as well, in confined or unventilated areas.

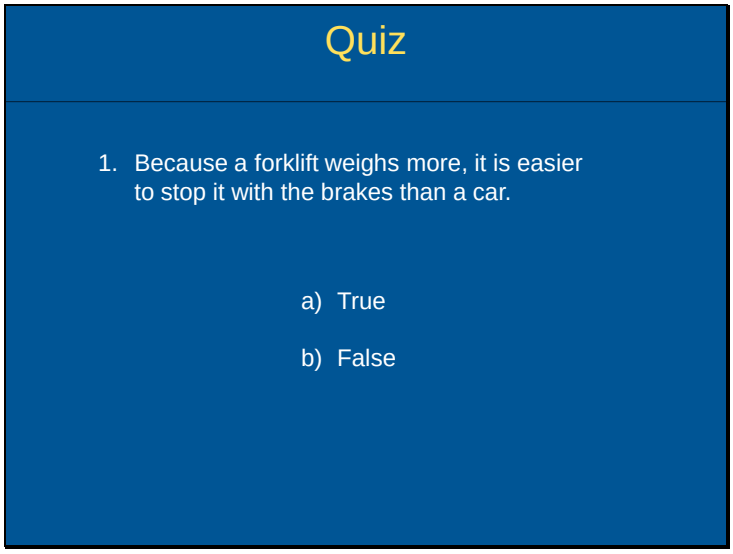
Slide 53

Your training is not complete with this online course. This is just the beginning to give you some general information on forklifts, how they work and the hazard associated with operating them. You also need supervised hands-on training with the specific forklift you will be using. This is required by L & I regulations as well as making common sense.
An 8 question quiz follows this slide. To show that you have completed this course, you must answer all the questions in the quiz, and print out the quiz results with your name. Click the submit button after you select your answer to each question. You get two tries on each question and a passing score is 75% or 6 or more correct answers. The printed results of the quiz will be your document that you have taken this course. You do not need a special printed certificate to operate a forklift, just the appropriate training.

Slide 54

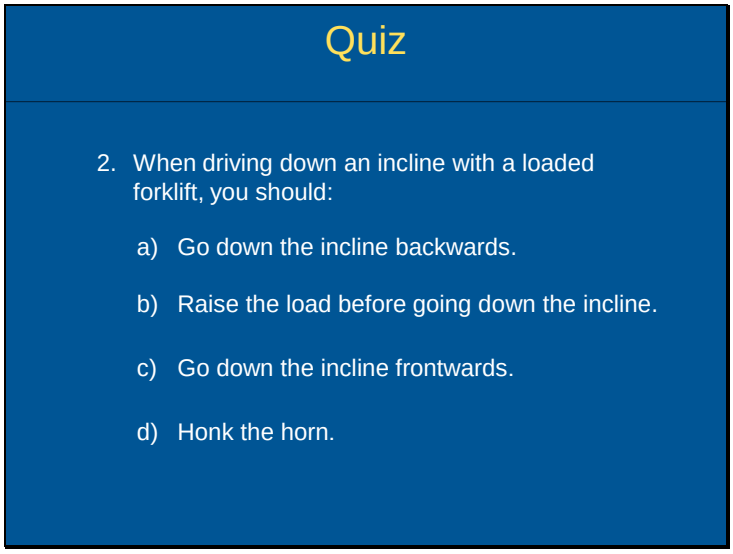

Safe Operation of Forklifts
and Other Powered Industrial Trucks
Forklift Safety Quiz Questions

Slide 55



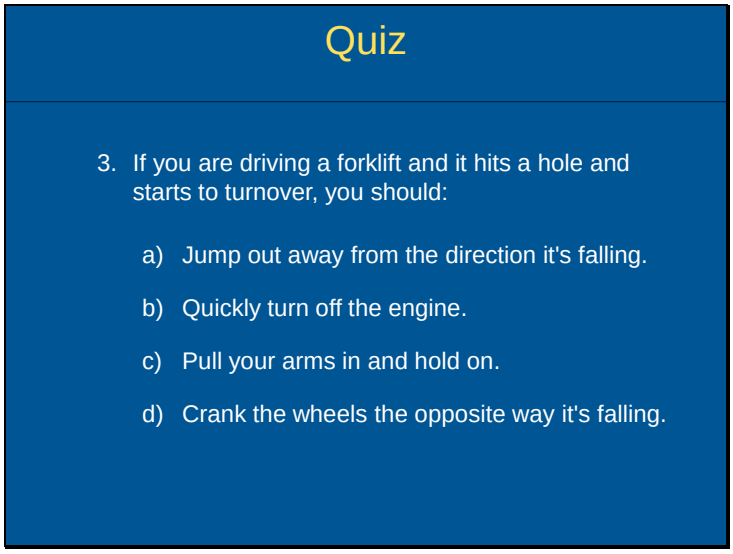
Correct answer is “false”.

Slide 56



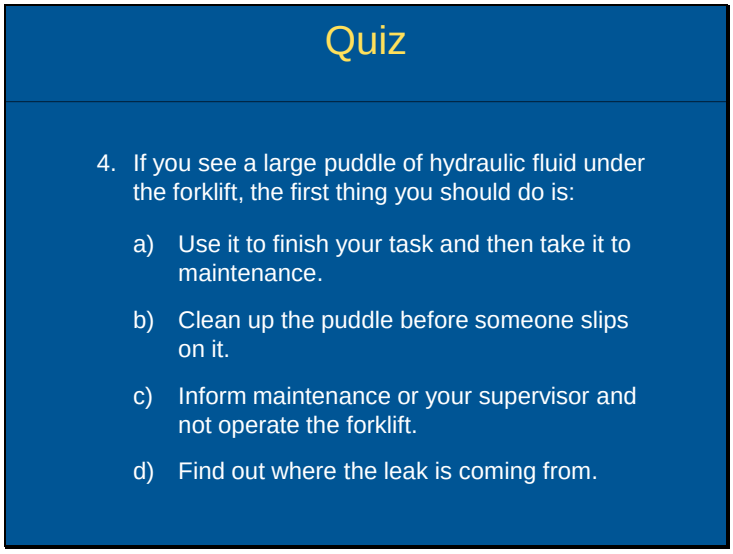
Correct answer is “go down the incline backwards”

Slide 57



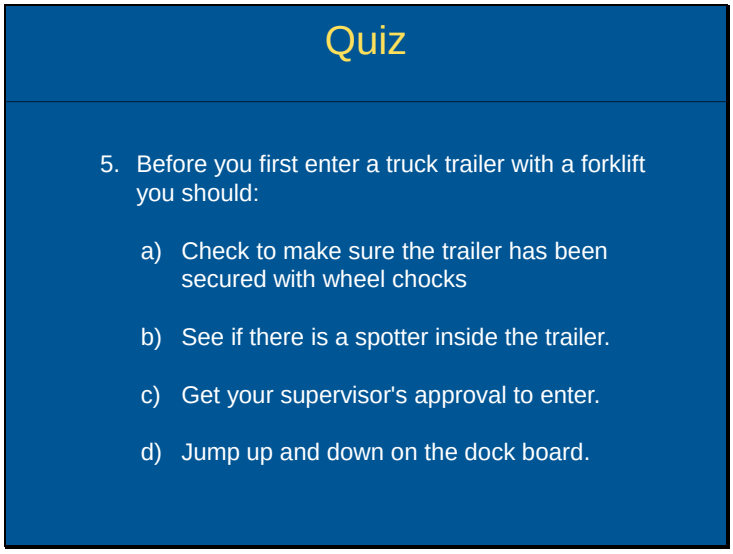
The correct answer is “pull your arms in and hold on”

Slide 58



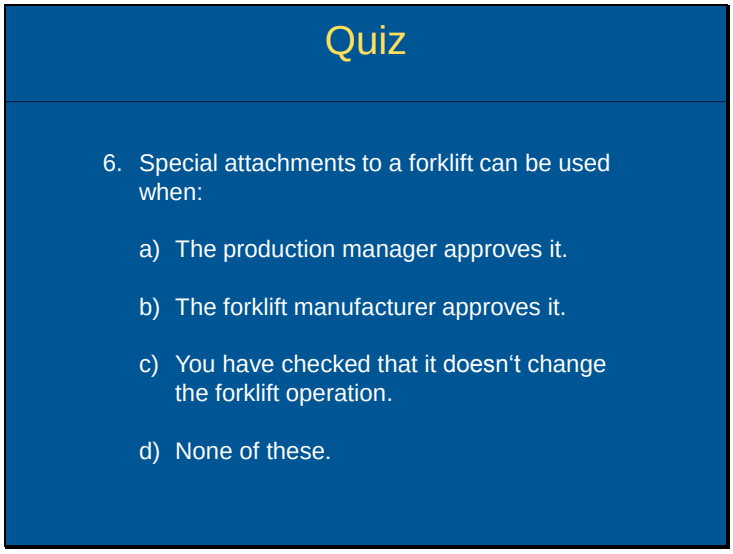
The correct answer is “inform maintenance or your supervisor and not operate the forklift.”

Slide 59



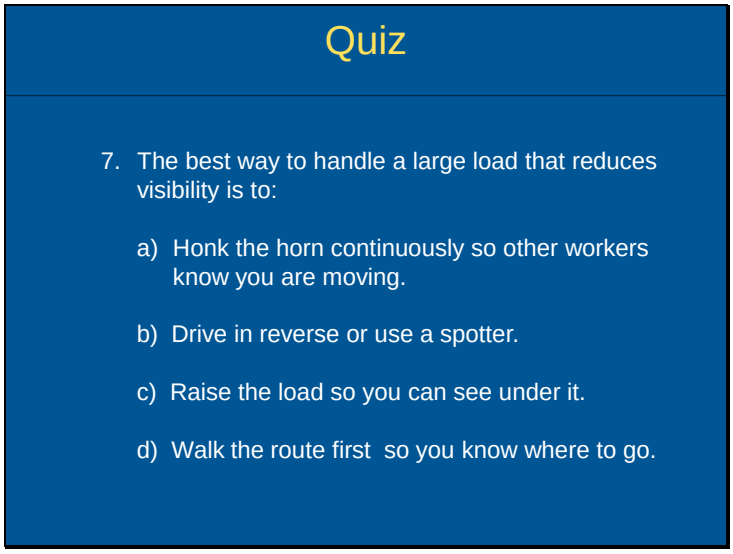
The correct answer is “check to make sure the trailer has been secured with wheel chocks.”

Slide 60



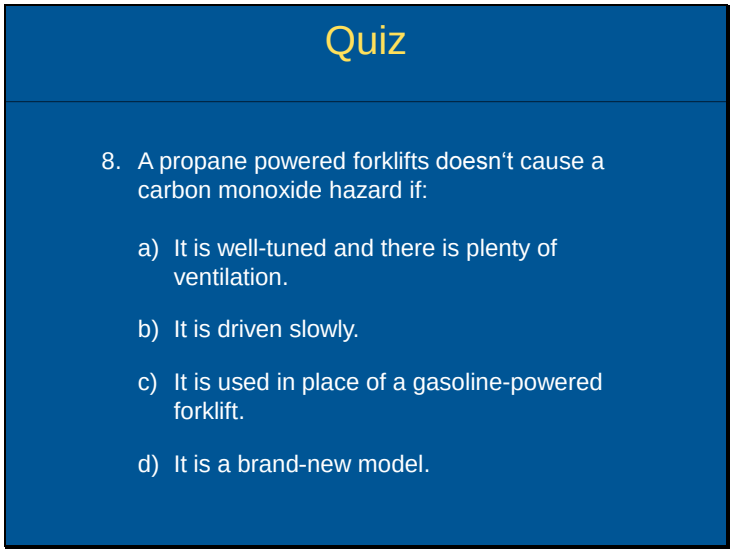
The correct answer is “the forklift manufacturer approves it”.

Slide 61



The correct answer is “drive in reverse or use a spotter”.

Slide 62



The correct answer is “it is well tuned and there is plenty of ventilation”.