

## **FORKLIFT/POWERED INDUSTRIAL TRUCK SAFETY**

### **COURSE OUTLINE**

- **Powered industrial trucks" are rugged tools that are used to push, pull, carry, lift and stack materials.**
  - This category of machines includes the tractors that pull luggage carts at airports, the all-terrain reach-trucks on construction sites and, of course, forklifts.
- **All of these vehicles can save us effort, time and money.**
  - But if they aren't used correctly or maintained properly they can be dangerous.
- **To help us use these machines safely, OSHA created the "Powered Industrial Truck" Standard.**
  - One of the most significant parts of this regulation deals with training.
- **Before you can use any type of powered industrial truck, OSHA requires that you be fully trained, evaluated and certified by a competent instructor.**
- **Your certification process will include...**
  - Instruction on safety procedures.
  - Training on how to operate the industrial trucks that you'll be using.
  - Supervised driving practice.
- **Your knowledge and ability will be re-evaluated at least once every three years.**
  - At this time you will also receive any retraining that may be necessary.
- **Additionally, OSHA requires retraining any time you:**
  - Are observed being unsafe.
  - Have a close call.
  - Are involved in an accident.
- **Retraining is also required whenever there is a change in your workplace that may affect your ability to operate your truck safely.**
- **To help you choose the industrial truck that is right for your job, OSHA has separated them into seven classes.**

- **Classes 1 through 5 are forklifts and other "lift trucks".**
  - These machines often have massive counterbalance weights that allow them to lift very heavy loads.
- **"Class 1" trucks are counterbalanced forklifts that are powered by electric motors.**
  - Since these machines don't produce exhaust gas, they are a good choice for use inside warehouses and other buildings.
- **"Class 2" trucks are "narrow aisle lift trucks" and order pickers.**
  - Some of these machines raise their operators to where they can easily reach the materials they're after, so fall protection must be worn by workers who are using this equipment.
- **"Class 3" vehicles are electric-powered hand trucks that operators can ride, walk behind or lead.**
  - This class includes equipment such as "pallet jacks".
  - Even though you don't drive some of these machines, you must still be properly trained before you use them.
- **"Classes 4 and 5" are counterbalanced forklifts that are powered by gasoline, diesel or propane.**
  - "Class 4" forklifts are outfitted with solid rubber tires, so they can only be used on paved surfaces.
  - "Class 5" forklifts have pneumatic tires, which allows them to drive on unpaved surfaces as well.
- **In addition to these classes of "general" industry lift trucks, OSHA classifies two more types of vehicles as powered industrial trucks.**
- **"Class 6" trucks are "tractor-like" machines, such as the vehicles that pull luggage carts at airports.**
  - Since these don't lift loads, they are not counterbalanced.
  - This makes them lighter, and somewhat easier to drive.
- **"Class 7" trucks are counterbalanced, rough-terrain lift trucks.**
  - Unlike other lift-trucks, Class 7 machines have booms that allow them to pick up and place materials in locations that are difficult to reach.
  - Additional training is required to operate these trucks safely.

- **While each type of powered industrial truck has its own characteristics, there are some general rules to follow when using any of them.**
- **When maintaining or operating any type of powered equipment, keep track of where you're putting your "body parts".**
  - Never place your feet, hands or fingers where they could be crushed or amputated.
- **If you're operating a truck that's used "around the clock, you should inspect it at the end of your shift, as well.**
  - That way you won't leave any dangerous surprises for your coworkers.
- **If you find something wrong with your forklift during your inspection, you should...**
  - Take the key out of the ignition.
  - Put a sign on the vehicle that identifies it as “out of service.”
  - Then inform your supervisor of the problem.
- **It helps to create a checklist for your inspection.**
  - Make sure moving parts operate correctly, and safety guards are not bent or broken.
- **The air pressure in pneumatic tires must be kept up to specifications.**
  - Solid tires should not have any gashes or embedded debris.
- **Verify that the steering is not too tight or too loose.**
- **You should also make sure that your forklift has working...**
  - Warning lights.
  - Back-up alarms.
  - Horns.
- **Make sure that the brakes feel firm, and stop the truck effectively.**
  - Check the hydraulics and the oil level as well.
- **Examine batteries on all powered industrial trucks for leaks and corrosion.**
  - Make sure that their cable connections are tight.

- **On electrically-powered trucks, test the battery's electrolyte level.**
  - Remember to wear personal protective equipment as you do it.
  - Eye protection, face shields, rubber aprons and rubber gloves are mandatory whenever you work with battery acid.
- **Industrial trucks with internal combustion ("I.C.") engines run on propane, gasoline or diesel fuels.**
  - These models require yearly emission tests, similar to the ones that are performed on automobiles.
  - You should verify that I.C. powered vehicles have passed this test before you use them.
- **Every time you refuel an I.C. powered industrial truck, you should also check the...**
  - Transmission fluid.
  - Motor oil.
  - Coolant levels.
- **The batteries in electrically-powered trucks can give off highly flammable hydrogen gas.**
  - So when you recharge or refuel your truck it should only be in designated "no smoking" areas, away from flames, sparks and electric arcs.
- **Safely recharging an electrically powered truck can vary depending on the truck's model.**
- **For older models, raise the hood and leave it open until the battery is finished charging.**
  - This will reduce the chances of an explosion, by allowing any hydrogen gas that is generated during the charging process to disperse.
  - Leave the hood open until the battery is finished charging.
- **Then, take the charger's plug and connect it to the battery plug that you disconnected from the truck itself.**
  - Remember, you have to connect the charger to the battery for recharging to occur.
- **It's possible to plug the charger directly into the truck, where the battery plug usually goes, but don't do it!**
  - It's an expensive mistake that can blow the truck's circuits.

- **You should leave the charger off until you have connected it to the battery.**
  - This is to ensure that you don't generate any sparks when you hook them up.
- **When the cables are properly connected, you can turn the charger on.**
- **Once the battery is charged...**
  - Turn the charger off before you disconnect the cables.
  - Then, close and lock the hood to keep the battery from coming out of its compartment if the truck ever tips over.
- **For newer electrical truck models, there is no need to lift the hood, or to start and stop the charger.**
  - Simply plug the charger's cable into the truck and it will start to recharge on its own.
  - When you're done recharging, or you are going to use the truck, unplug the cable and the truck is ready to go.
- **If you have questions, check your electrically powered truck's manual or talk to your supervisor.**
- **When you are refueling a propane-powered industrial truck there are a different set of steps that you should follow.**
  - First, start the engine.
  - Next, shut off the valve to the propane tank.
  - To use up any unburnt propane in the system, let the engine run until it stalls, then turn it off.
  - Then unscrew the gas line from the tank and roll the tank off the truck.
- **Position the new tank by aligning it with the "tank locating pin".**
  - This puts the fuel pick-up tube inside the tank at the best angle to withdraw the propane.
  - Secure the tank in place, hand tighten the fuel line, and open the valve.
- **Whenever you're operating a powered industrial truck, you need to follow safe operating procedures.**
- **Begin by entering the vehicle properly.**
  - To avoid slipping and falling, always use a "three-point mount".
  - Make sure that you have at least two hands and one foot, or two feet and one hand, in contact with the truck at all times.

- **Before you drive off, buckle up and adjust your seatbelt.**
  - While you're moving, keep your hands inside the vehicle.
  - Watch where you're going.
  - Stay alert for hazards.
- **Maintain safe speeds to avoid accidents.**
  - Look for posted speed limits.
- **Don't stop abruptly when you're carrying a load.**
  - The sudden jolt could cause it to fall, or slide off the forks.
- **Drive to the right of oncoming traffic and pedestrians, just as you would in a car.**
  - Don't tailgate.
  - Stay at least three truck-lengths behind other vehicles.
- **Make sure to maintain a clear view of where you are going.**
  - If you're moving a load that blocks your forward vision, drive in reverse.
  - Use a spotter to help you, if necessary.
- **Stop and sound your horn at corners and doorways, to let other drivers or anyone on foot know that you're there.**
  - Look both ways before you pull out.
- **There are basic procedures that you should follow in specific operating environments as well.**
- **If you're working indoors with a truck that has an internal combustion engine, make sure that there is plenty of ventilation to remove exhaust fumes.**
  - You can improve air flow by turning on fans and opening doors and windows.
  - In areas where the atmosphere can't be made safe, use an electrically-powered truck instead.
- **Because industrial trucks can generate heat and sparks, they can be dangerous to use around flammable and explosive materials.**
  - To combat this, some trucks have safety features added to the exhaust, fuel and electrical systems that prevent them from igniting these substances.

- **To help you determine which trucks are safe to use around various types of hazardous materials, OSHA has separated powered industrial trucks into 11 different categories.**
  - These designations are marked on the nameplates of each truck, along with information such as classification, weight and lifting capacity.
  - By referencing Table N-1 in OSHA's Powered Industrial Truck Regulation (CFR 1910.178), you can see which trucks OSHA has approved for use around different types of materials.
  - Talk to your supervisor if you have any questions.
- **As you operate your industrial truck, you should also check the work area itself for potential hazards, such as...**
  - Limited aisle clearance.
  - The distance to overhead pipes and ductwork.
  - You don't want to get stuck, or cause damage.
- **If you have to temporarily leave your vehicle, put the engine in neutral, and set the parking brake.**
  - If you are on a forklift, lower the forks to the ground.
  - This will help to keep it from moving.
- **Whenever you will be more than 25 feet away, or your vehicle will be out of your sight, shut the power off and take the key with you.**
- **When parking, make sure that you don't block stairwells, exits or fire hydrants.**
  - They may be needed in an emergency.
- **Be sure to chock your wheels when you're on a slope.**
  - Runaway industrial trucks are dangerous!
- **If someone needs to talk to you when you're operating an industrial truck, don't let them come too close to the vehicle.**
  - Ask them to stand off at least three feet.
  - Explain to them that the extra distance will keep them safe if something unexpected happens with the truck.
- **Although all industrial trucks have similarities in how they're operated, forklifts have special handling requirements.**
  - One reason for this is the counter-balance weight in the back.
  - By preventing the forklift from tipping forward when it raises a load, this weight enables the machine to do some very heavy lifting.

- **A loaded forklift is like a see-saw.**
  - The front wheels are the fulcrum upon which the machine is balanced.
  - If a load is too heavy, or too far from the wheels, the forklift is likely to tip forward.
- **You should always check your forklift's nameplate to see what its lifting capacity is.**
  - Be sure to use a machine that is rated to handle the load that you want to move.
- **If you're picking up a loaded pallet, space the forks widely apart to better balance the load.**
  - Keep the forks level and a few inches off the ground.
  - Then move forward slowly until the pallet is seated all the way back on the forks.
- **Once the forks are fully inserted, slowly lift the pallet about 6 inches.**
  - Then tilt the mast back to secure the load for transport.
- **If you're lifting a pallet from an overhead rack, make sure that you lower the mast before traveling with the load.**
  - A forklift with a raised load is extremely unstable.
  - If you try to drive with the load in this position, you're likely to tip over.
- **Some loads may be naturally off-center.**
  - Be sure they're stabilized before moving them.
  - Find the load's center of gravity, and position your truck's forks accordingly.
- **Special attachments can be installed on the masts of forklifts to move barrels, carpet and other hard-to-grasp objects.**
  - Since these attachments can radically change the lifting capacity of a forklift, a new nameplate with revised specifications will have been installed on the vehicle.
  - Be sure you read the information on the plate before picking anything up.
- **Forklifts can even be used to elevate workers, but only on proper safety platforms that are securely fastened to the forklift's mast.**
  - Never drive a forklift when someone is on the platform.
  - Moving it even a few inches is dangerous, because workers could fall or be crushed.



- **When you're driving a forklift, you need to remember that it's not as stable as a car.**
- **Most forklifts are supported only at three points.**
  - On three-wheeled machines the first point is at the rear wheel.
  - On four-wheeled forklifts the first point is at the center of the rear axle.
  - The second and third points are the front wheels.
- **These three points form what is called the "stability triangle".**
  - Because a forklift is designed to handle loads, when it's not carrying anything its center of gravity falls towards the back of the stability triangle, close to the first point of support at the rear.
- **Since this is near two of the triangle's edges, it doesn't take much to make even an empty forklift unstable.**
  - In fact, just running over a two-by-four can push the center of gravity outside the stability triangle, causing the forklift to tip.
- **When you're lifting and carrying a load, a forklift's center of gravity will shift towards the front and the second and third points of support... the front wheels.**
  - Since the center of gravity is now well away from the sides of the stability triangle, the forklift is generally more stable.
- **Even a loaded forklift can have stability problems.**
  - A load that is too heavy can shift the center of gravity out of the stability triangle.
  - This can make the forklift hard to control and cause it to tip forward.
  - In a worst-case scenario, you may lose the load or damage the forklift.
- **Another aspect of the stability triangle involves a forklift's vertical stability, or "line of action".**
  - This is an imaginary vertical line that runs through the forklift's center of gravity.
  - As long as the "line of action" falls within the stability triangle, the forklift will be stable.
- **There are factors, however, that can shift the line of action outside of the stability triangle, causing the forklift to tip.**

- **Placing a load near the end of the forks can shift the center of gravity further forward than is safe.**
  - So you need to check your forklift's nameplate for the proper "load centers" you should use to keep it stable.
- **Raising a load too high when the forklift is stopped on an angled or uneven floor can shift the combined center of gravity out of the stability triangle on the "downhill" side.**
  - The same thing can happen when you drive with a raised load onto a surface that is angled, like a ramp.
  - Any surface that is uneven might cause the truck to shift its stance suddenly.
- **Remember, any load will change a forklift's center of gravity.**
  - To stabilize a forklift when you're driving with a load, the best approach is to tilt the mast back and keep the forks low.
- **If your forklift does begin to tip, don't jump out.**
  - You could be crushed beneath the machine.
- **Instead, brace your feet, grab onto the steering wheel and pull yourself tight up against it.**
  - Lean in the opposite direction from the way the vehicle is tipping.
  - Don't try to get out of the forklift until it has come to a complete stop.
- **There are several important things you need to remember about driving a powered industrial truck.**
- **Many powered industrial trucks, including forklifts, have rear-wheel steering.**
  - You need to be careful going around corners, because the forks and the rear of the vehicle will both swing wide.
  - Be especially cautious when you're turning on a loading dock, so you don't go over the edge.
- **Cross curbs and railroad tracks slowly, and at an angle.**
  - This will keep at least two wheels in contact with the ground at all times, and help to prevent the forklift from tipping over.
- **You also need to pay special attention to slopes and ramps.**

- **When you're transporting a load, always keep the forks (and the load) uphill.**
  - This means you should back down a slope.
  - Otherwise, you could lose the load.
- **If you aren't carrying a load, the opposite is true.**
  - Always keep the forks pointed downhill, to maintain the forklift's balance.
  - This also gives you better control of the vehicle, since it puts more of the weight on the front drive wheels, where the brakes are located.
- **Before driving on a ramp, clear away any obstacles that are in your path.**
  - Litter and liquid spills can cause a forklift to tip or skid.
  - Check outdoor ramps for puddles and ice or snow.
  - Be especially careful on steep inclines.
- **Always watch your speed.**
  - Don't let the forklift accelerate if you're going down an incline.
- **Never cross a slope at an angle, with or without a load.**
  - Driving across even a slight grade can cause a forklift to tip.
- **Some lift trucks should be used only on flat surfaces.**
  - Consult your operator's manual or talk to your supervisor if you're not sure whether your truck is suited for the environment you're working in.
- **Many of the ramps you'll encounter are made of concrete, which will be inherently stable.**
  - But if you are using a temporary ramp, like a metal bridgeplate, make sure that it's securely positioned and can handle the weight of both the truck and the load you're carrying.
- **Before you drive onto a railcar, truck or trailer, set its brakes and block its wheels, so that it won't shift under the added weight of the forklift.**
  - Check the strength of the floors, as well.
  - Don't forget to look for indentations and holes that could cause your forklift to tip.

- **If you're dropping your load on the floor, drive straight ahead until the load is a few inches short of the drop-off point.**
  - Then tilt the mast forward, so the forks are parallel to the floor and the load is directly over where you want it to land.
  - Gradually lower the forks until the load is in place and the forks move freely.
  - When you back away, do it slowly.
  - Don't drag the forks across the floor.
- **Pallets are also often placed in racks, or stacked, to save space.**
  - Ask your supervisor how high you can safely stack the loads you'll be handling.
- **And whenever you are loading, unloading or stacking, make sure that other workers and pedestrians are a safe distance away.**
  - You never know when a load might slip.

**\*\*\* SUMMARY \*\*\***

- **When powered industrial trucks are used incorrectly, or aren't properly maintained, they can become very dangerous.**
- **Read your truck operator's manual, and if you still have questions, refer to OSHA's Powered Industrial Truck Standard or ask your supervisor about proper operating procedures.**
- **Inspect your truck thoroughly before you use it.**
- **Pay attention to your lift truck's weight capacity, and its "stability triangle".**
- **Stay alert, drive safely, and always make sure that other workers are a safe distance away whenever you are operating your truck.**
- **By using common sense, and following the correct operating procedures, you can harness the power and strength of forklifts, and get them to work for you... safely!**