

PRESENTER'S GUIDE

"FORKLIFT SAFETY: INDUSTRIAL COUNTERBALANCE LIFT TRUCKS"

**Training for the
OSHA POWERED INDUSTRIAL TRUCKS STANDARD**

OUTLINE OF MAJOR PROGRAM POINTS

OUTLINE OF MAJOR PROGRAM POINTS

The following outline summarizes the major points of information that are presented in the program. The outline can be used to review the program before conducting a classroom session, as well as in preparing to lead a class discussion about the program.

- **Moving materials around the workplace both quickly and efficiently takes a lot of skill, and it's a big responsibility.**
 - Your primary tool for the job is a specialized piece of "materials handling" equipment that OSHA calls a "powered industrial truck".
- **This category includes vehicles such as:**
 - The tractors that pull luggage carts at airports.
 - The heavy-duty boom-lifts used on construction sites.
- **But the "industrial counterbalance lift truck" is the most common type of powered industrial truck.**
 - It's what most of us call a "forklift".
- **While forklifts make our jobs a lot easier, they can also be very dangerous.**
 - More than 100 workers are killed and thousands severely injured in forklift accidents every year.
 - The people who get hurt include both pedestrians and forklift operators themselves.
- **In addition to the human cost, there's also the damage these accidents do to materials, facilities and the forklifts themselves.**
- **You and a forklift can make a productive team.**
 - But to do that you need to understand the machine's limitations and how to operate it safely.
- **Contrary to what many people think, driving a forklift is not like driving a car.**
 - Forklifts have different controls.
 - They are heavier than cars.
 - They steer with their rear wheels.
 - They are naturally unstable.

- **Forklifts are designed so that they can raise, transport and lower heavy loads.**
 - Because of the counterweight it carries to balance these loads, a forklift can weigh twice as much as an automobile.
 - Forklifts have also been designed to get in and out of tight places easily, so they have a very narrow wheelbase.
- **This all means that forklifts "handle" in a very unique way.**
 - When they are "mishandled" they can be dangerous.
- **Most forklifts have the counterweight at the back and the forks at the front, which puts the machine's "center of gravity" somewhere in the middle.**
 - In terms of stability, the vehicle acts like a seesaw.
- **When you put a load on the forks, you add its weight to the forklift, and shift the forklift's center of gravity forward.**
- **If the load on the forks weighs less than the machine, the center of gravity will be behind the front wheels, and the forklift will still be stable.**
- **If the load and the truck weigh the same, the center of gravity will be on the front wheels.**
 - This means the forklift could easily become unstable (if you had to stop quickly, for example).
 - When the center of gravity is so far forward, the rear wheels that do the steering have very little traction.
 - If the rear wheels skid, you could lose control of the truck.
- **If the load that is on the forks weighs more than the counterweight, the center of gravity shifts to in front of the front wheels.**
 - This can cause the back wheels to come off the ground.
 - And the forklift can tip forwards.
- **This all sounds kind of complicated, so let's look a little closer.**

- **Draw an imaginary line connecting the two front wheels and the pivot-point of the rear axle.**
 - This is what's called the "stability triangle".
 - It's a "map" of a forklift's suspension.
- **To keep the forklift stable, its center of gravity must stay within the stability triangle.**
 - This sounds easy, but remember that the forklift's center of gravity can move depending on how you load it, and how you drive it.
 - The closer you keep the center of gravity to the middle of the stability triangle, the more stable a forklift will be.
 - That's how you keep it safely upright.
- **Driving a forklift safely begins before you even climb onto the machine.**
 - It starts with you asking yourself if you're ready to drive.
 - If your back is giving you trouble or you're angry about an argument you had with a coworker, or you're taking medication for a head cold or had a drink at lunch, be careful.
- **Anything that could distract you from operating a forklift safely should give you second thoughts about getting into the driver's seat in the first place.**
 - And you should never drive a forklift if you may be under the effect of drugs or alcohol.
- **Always be sure to buckle up before you turn the key.**
- **Before you drive off, look around to make sure the way is clear. Follow the normal "rules of the road":**
 - Keep to the right.
 - Give pedestrians the right of way.
- **Always face in the direction you're traveling.**
 - Keep your arms and legs inside the cab.
- **Keep the forklift under control at all times.**
 - Jerky and erratic driving can cause accidents.
 - Never engage in horseplay behind the wheel.

- **With or without a load you should always drive with the forks lowered to between 4 and 6 inches off the ground, with the mast tilted back.**
- **Don't drive any faster than a normal walking speed, about 5 miles per hour.**
 - This helps to keep the forklift stable and gives you more time to respond to what's going on around you.
 - It also makes it easier to come to a safe stop.
- **When making a turn, remember that a forklift's center of gravity will shift to the outside of the turn. To maintain stability:**
 - Brake carefully to slow down gradually.
 - Come to a complete stop before changing directions.
 - Then proceed slowly through the turn.
 - Turn the steering wheel in a slow, smooth, sweeping motion.
 - Never make a turn with the forks raised more than 4 to 6 inches off the ground.
- **Keep an eye on the surfaces that you're traveling on.**
 - Grease, water and other liquids will make any of them more slippery.
 - Even dry materials like sand, gravel or trash can cause a forklift to skid.
- **Take care to keep some space between your truck's wheels and the edges of ramps, elevated platforms and loading docks.**
 - Running even one wheel off the side could easily tip the forklift over.
- **Accidents can happen, even to careful operators.**
 - So you need to know what to do in case your forklift tips over.

- **Do not try to jump out of the forklift (studies show that will probably get you killed). 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 and hang on.

- **When your shift is over, or any time you're going to leave a forklift unattended, be sure to secure it.**
 - Lower the forks to the ground.
 - Set the parking brake.
 - Turn off the motor.
 - Take the keys with you.

- **If you have to park on an incline, chock the wheels to make sure the forklift stays right where you left it!**

- **Keeping a forklift's center of gravity within the "stability triangle" is important, and how the mast and forks are positioned can affect its stability significantly.**
 - Raising a payload, or even just the forks, raises the truck's center of gravity, too.
 - The higher you raise its center of gravity, the more unstable a forklift becomes.

- **Every forklift has a maximum weight it can lift, known as its "load capacity".**
 - You need to know this weight limit, so you don't overload the truck.

- **The "load capacity" will also indicate how far back on the forks a load's center of gravity should be for the truck to lift the load safely.**
 - This distance, from the vertical part of the forks or the backrest to the load's center of gravity, is known as the "load center".

- **The standard load center for most forklifts is 24 inches, half the depth of a pallet.**
 - But many loads can be "non-standard", and can come in different shapes and sizes, with different load centers.
 - For instance, while a forklift may be rated to safely lift 4000 pounds on a 24 inch load center, if you pick up a 4000 pound load that has a 36 inch load center, it will shift the forklift's center of gravity further to the front, and cause it to tip forward.

- **So for some types of loads you may have to rearrange the materials on their pallet or the forks to get the correct load center.**
 - Be sure to adjust the width of the forks to give a load even support as well (wider is usually better).

- **Any load that has been badly stacked, or that has a damaged pallet, is naturally unstable regardless of how you support it.**
 - This can make your forklift unstable as well, so you should have these loads restacked on new pallets to prevent trouble.

- **To engage a load on the floor or on top of a stack, make sure to position the forklift "square" with the pallet.**
 - Drive forward slowly, sliding the forks into the pallet until it touches the vertical portion of the forks or the backrest.
 - The length of the forks should be two-thirds the length of the load at a minimum.
 - Center the load side-to-side whenever possible.

- **Raise the load only as much as you need to, with only enough backward tilt to stabilize it.**
 - Before you move off, lower the forks to between 4 and 6 inches off the ground.

- **If the load obstructs your forward vision, operate the forklift in reverse, with the load trailing, so you have a clear view in the direction you're traveling.**

- **Always check your overhead clearance when your forklift is in motion, as well as when you are raising and lowering the mast.**
 - Obstructions like lights, sprinkler systems, pipes and low doorways can be damaged if you hit them, and could cause a tipover as well.
 - Remember that the metal mast and forks will conduct electricity, so keep them at least 10 feet from any electrical wires or equipment.
- **A forklift can be very convenient for raising coworkers up high when they need to perform maintenance or other tasks off the ground, but only if you do it safely.**
 - Never lift someone who's standing on the bare forks, or on a pallet.
- **To lift people safely with a forklift you need to use an aerial platform or "cage".**
 - Make sure the platform is firmly against the vertical part of the forks or the backrest, then secure it with a safety chain.
 - Never move a forklift with the platform elevated or with someone on it.
- **Always stay with the truck when the platform is raised.**
 - Don't let anyone walk under the platform.
 - Never let anyone climb the mast.
- **A busy workplace presents a lot of challenges for a forklift operator.**
 - With so much going on, and so many people on the move, you have to stay alert and be sure to follow safe work practices.
- **Your vision will naturally be limited at intersections, doorways and elevators.**
 - These locations typically have a lot of vehicle and foot traffic.

- **Watch carefully for pedestrians and other vehicles.**
 - Sound the horn to let people know that you're approaching.
 - Come to a complete stop before changing direction.
 - Look both ways before moving off again.

- **Don't assume that pedestrians will see you.**
 - Always check for them before you move your forklift.
 - Watch out for them when you're in motion.
 - Make eye contact with them to verify that they're aware of you.
 - When in doubt, give pedestrians the right of way.

- **Since they may not understand a forklift's potential hazards, it's up to you to remind pedestrians to keep their distance, even when the lift is stopped.**
 - Never drive your forklift up to a pedestrian who is standing in front of a bench, wall or other fixed object.

- **Don't let anyone walk under raised forks, whether they're loaded or not.**

- **Don't let coworkers ride on your forklift, and never let anyone ride on the load.**

- **When you're driving, stay at least three lengths behind other forklifts that are travelling in the same direction.**
 - Do not pass them at intersections or in similar locations.

- **If you have to operate a forklift on grades, slopes or ramps pay special attention, because this can be tricky.**
 - The rules are different depending on whether the lift you're driving is loaded or unloaded.

- **For instance, if you drive a loaded forklift forward down an incline, the load is likely to slide off the forks.**
 - That's why you should always keep the forks of a loaded forklift pointed up any grade.
 - This means driving in reverse on the way down a ramp, and going forward on the way up.

- **When you're going up a slope have a coworker "spot" for you if the load you're carrying blocks your view.**
- **With an unloaded forklift, you should keep the forks pointed down the grade.**
 - Drive forward going down the incline, and backward going up.
 - This helps the vehicle's drive wheels maintain their traction, and prevents skids.
- **Always proceed slowly and travel straight up and down an incline.**
 - Don't turn or try to travel across one.
 - The truck will become dangerously unstable, and it's very likely to tip over sideways.
- **Trucks, trailers and rail cars often carry materials that forklifts are called upon to handle, but they also have some safety issues you need to pay attention to.**
 - To prevent them from moving unexpectedly, check that these vehicles have their brakes applied and their wheels chocked before you drive onto them.
 - Take a good look at their floors, too (if they can't support the weight of your forklift and its load, you could fall right through them!).
- **Whether you're loading or unloading, always use a "dock plate" to bridge the gap between trucks or rail cars and a loading dock.**
 - Make sure the plate's in good condition, and secured firmly in place.
 - Verify that it's rated to handle the weight of your forklift plus the weight of the load it will be carrying.
 - Drive across the dockplate slowly and carefully.
- **Like any machine, a forklift needs to be in good shape to operate safely.**
 - You can help by giving it a thorough inspection every time you use it.
- **Begin your inspection with a visual "walkaround".**
 - Look for obvious damage, missing parts, or fuel or oil leaks.

- **If the forklift has an internal combustion engine, check the fuel, the oil levels in the crankcase and transmission, and the coolant.**
- **For an electric forklift you should inspect the electrolyte levels in the battery.**
 - "Electrolyte" (also known as "battery acid") is very corrosive, so be sure you put on personal protective equipment including rubber gloves, a rubber apron, and a face shield before checking or refilling it.
 - Examine the battery terminals for corrosion or loose connections as well.
- **Inspect the condition of the tires of any forklift that you're using.**
 - Look for damage and remove any foreign objects that may have gotten stuck in them.
- **Verify that the steering works, and moves freely.**
- **Check the brakes, including the parking brake.**
- **Examine the chain bearings, nuts and cotters on the mast, and lubricate them as needed.**
- **Make sure there's enough oil in the hydraulics reservoir.**
 - Look for evidence of any leaks.
- **Examine the forks for cracks or excessive wear, and check their alignment.**
- **Ensure that headlights, taillights, turn signals and warning flashers all function correctly.**
- **Test the horn, the back-up alarm and the warning beacon.**
- **Verify that there are seat belts, and that they work.**
- **If you find anything that isn't right, repair it or report it.**
 - Take the forklift out of service, if necessary.
 - Never start your shift using a faulty lift.

- **You carry out another important form of forklift maintenance when you refuel or recharge the vehicle.**
 - The procedures that you should follow will vary, depending on which type of forklift you're operating.
- **How you refuel a forklift depends on what it runs on:**
 - For compressed gases like propane, you'll need to install a new gas cylinder.
 - For gasoline or diesel fuels, you'll be refilling its tank.
 - For a truck that's electrically-powered, you'll be recharging its battery.
- **All of these refueling procedures share one critical safety issue... the risk of fire and explosion.**
 - Gasoline, diesel fuel and gases like propane are all flammable.
 - Recharging an electric forklift can also be a fire risk, because the charging process can cause its battery to generate hydrogen gas, which is also flammable.
- **That's why all refueling and recharging areas must be well-ventilated... so that any fumes can disperse safely.**
 - There should be no open flames, electrical sparks or other ignition sources nearby.
 - Smoking is never allowed in these areas.
 - Always switch off engines and motors before you begin refueling or recharging.
- **Now let's take a closer look at how to refuel a forklift that runs on compressed gas.**
 - There are some special issues with these lifts that you should know about.
- **Simply shutting off this type of forklift can leave flammable residues in its fuel lines.**
 - To prevent this, close the shutoff valve on the fuel tank while the engine is still running.
 - Let the forklift run until it uses up the gas in the lines and stalls.

- **Strangely enough, compressed gases, even flammable ones, can cause frostbite.**
 - So you need to wear protective gloves while working with them.
- **Handle the compressed gas tanks carefully.**
 - Do not use metal tools when disconnecting and reconnecting them.
 - Always watch for signs of gas leaks in the system.
 - When you put a new tank in place, make sure that it engages the locking pin on the forklift.
- **Refueling a forklift that runs on gasoline or diesel fuel is fairly straightforward.**
 - It's pretty much like filling up the gas tank in a car.
 - For added safety, touch the nozzle of the hose to the truck's fill pipe before you start transferring fuel.
 - If you spill any of the fuel, wipe it up, and wait for the residue to evaporate before you restart the engine.
- **Recharging the batteries in electric forklifts can generate flammable hydrogen gas.**
 - The fact that their batteries can generate sparks as well makes the process even more dangerous.
 - To prevent sparks, keep tools and other metal objects away from the battery (this includes jewelry and wristwatches).
- **The charging process can also cause the batteries to heat up, so leave the battery compartment lid open to help cool them off.**
 - This will also allow any hydrogen gas to dissipate safely.

*** * * SUMMARY * * ***

- **A forklift is a specialized piece of equipment, and it has special handling requirements.**
- **Know how to keep a forklift stable under different operating conditions.**

- **Inspect your forklift before every use.**
- **Know how to refuel or recharge it safely.**
- **Make sure you can see clearly when operating your forklift, even if it means driving in reverse.**
- **Use caution in high-traffic areas.**
 - Stay alert for pedestrians and other vehicles.
- **Operating a forklift in a busy workplace is a big responsibility, and it can be a challenge.**
- **Now that you know how the machine works, and how to deal with its limitations, you're ready to get the job done safely... every day!**