

DUQUESNE UNIVERSITY

FORKLIFT SAFETY PROGRAM

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Prepared by: Environmental Health and Safety Department

Purpose

On August 27, 1971 OSHA LAW 29CFR1910.178 "Powered Industrial Trucks" came into effect. This law states that "only trained and authorized personnel shall be permitted to operate a powered industrial truck." This law was put into effect because one-tenth of all serious on-the-job accidents were caused by forklift trucks, accounting for over 2,000 serious on-the-job injuries annually.

The purpose of this Forklift Safety Program is to ensure each potential operator is properly trained in the safe procedures of operating a forklift truck. In order to comply with the most recent OSHA Regulation regarding Powered Industrial Trucks, training will consist of formal instruction (lecture, discussion, video tapes, written materials), practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace.

Driver Qualifications

Although driving a forklift truck may appear to be an easy task, it is actually more difficult to drive than an ordinary automobile. Therefore, not every person is capable of operating a forklift truck. Consequently, certain guidelines must be met in order to guarantee operator safety and the safety of co-workers and pedestrians. It is recommended that a forklift operator have a valid driver's license for the state, in which he/she works and have a good driving record.

A forklift truck operator must be physically capable of operating the forklift for long periods of time. The operator must be able to judge distances and heights accurately, and have good hand-eye coordination. The operator must be capable of looking over his/her shoulder when traveling in reverse. More importantly, the operator must be mentally alert at all times. If the operator is required to perform some physical handling of materials, he/she must be physically capable of handling such materials without putting undue stress on the back.

Operator Training

Before an operator is authorized to operate a forklift, he/she must attend and pass the forklift training sessions. Upon completion of the training sessions, each operator will be certified to operate that specific forklift used during the training sessions. The certification will contain the operator's name, date of the training and evaluation and the name of the person(s) performing the training or evaluation.

Refresher Training

Forklift operators will be required to undergo refresher training if any of the following conditions should arise:

- The operator was observed operating the forklift truck in an unsafe manner.

- The operator was involved in an accident or a near-miss incident.
- If the operator has received a poor evaluation.
- If, and before, the operator is required to operate a different lift truck other than the one he/she was trained on.
- Whenever there are changes in the workplace that would affect the safe operation of the forklift truck and operator.

Each certified forklift operator, who has not operated the lift truck for a period of 3 months or more, should be evaluated by another certified forklift operator and/or their immediate supervisor prior to operating the forklift. This evaluation is to ensure that the certified operator is still familiar with the safe operating procedures of the lift truck.

Evaluations

Each forklift truck operator will be evaluated to determine the operator's ability to handle the lift truck in a safe manner. This evaluation will be performed by the operator's immediate supervisor and/or the EH&S Department and will be conducted at least once every 3 years. This evaluation will be placed in the operator's file for the duration of his/her employment.

PRE-CHECK LIST

Frequency of Inspections:

Forklift trucks are to be inspected prior to being put into service. This inspection is to be performed at least daily. When forklift trucks are used on a round-the-clock basis, the inspection is to be at the start of each shift. If the operator finds a defect with the lift, the operator must report the problem(s) immediately to their supervisor.

Visual Pre-Check:

To perform a visual pre-check of the forklift truck, the operator will first need to walk around the forklift checking for any obstructions and inspect the general condition and cleanliness before operating the forklift (see pg. 12). The operator will look for the following conditions:

- ◆ Nameplate and Markings
 - Load Limits
- ◆ Fire Extinguisher
 - Present and charged
- ◆ Engine
 - No loose or frayed wiring
 - Oil level
 - Transmission fluid
 - Radiator fluid
- ◆ Evidence of any damage - missing/loose:
 - Bolts
 - Nuts
 - Guards
 - Chains
 - Hydraulic hose reel
- ◆ Wheels/tires
 - No excessive wear, splitting, or missing materials

- Good rim condition
- Tight wheel nuts
- No separation of rubber and rim
- Proper tire pressure
- ◆ Forks
 - Positioning latches in working condition
 - No cracks or other damage
 - Are right for the job
 - Locking pins work correctly
- ◆ Chains
 - Are clean and lubricated
 - No visible wear or loose, bent sections
 - Equal tension
- ◆ Fluid Leaks
 - Damp Spots
 - Fluid on the ground
- ◆ Energy System - Battery/Gas
 - Battery secure and in good condition
 - All connections secure
 - Proper fluid level
 - Fuel tanks have no cracks, broken welds, or other damage
 - All valves and couplings in good condition
 - Mounting hardware is secure
- ◆ Hoses
 - Securely fastened
- ◆ Cylinders and Hydraulic Lines
 - Hydraulic fluid at proper levels
 - No damage to or fluid leaking from the lift or tilt cylinders
 - Mounting hardware is secured
 - Hydraulic lines in good condition
 - Hoses in good condition

Operational Pre-Check:

Once the visual inspection is complete and the forklift has passed, the operator must then proceed through an operation check. The operator must make sure to test all moving parts before using the forklift for material handling. If the operator finds a defect with the forklift truck, the operator must report the finding to his/her supervisor immediately. The operator will look at the following conditions:

- ◆ Horn and Lights
 - Horn working properly
 - Head and tail lights working properly
- ◆ Backup Alarms/Flashers
 - Working properly
- ◆ Mast and Tilt Cylinders
 - Carriage moves smoothly and completely
 - Holds in place
- ◆ Parking Brake
 - Prevents movement with slight acceleration
- ◆ Accelerator, Transmission, and Service Brakes
 - Accelerates smoothly

- Brakes slow lift without jerking or locking
- Brakes are not too soft
- Lift moves forward and backward properly
- Smooth shifting - no jerky/jumpy movement
- ◆ Steering
 - Steering wheel turns while stopped and while moving
 - Turns lift smoothly
 - No strange noise
 - No hesitation
- ◆ Safety Belt
 - Locks and unlocks properly
 - No cracks, frays, cuts

MAINTENANCE PROCEDURES

Repairs:

- Any forklift truck not in a safe operating condition must be removed from service. All repairs must be made by authorized personnel, utilizing lockout/tagout procedures.
- Repairs to the fuel and ignition systems of the forklift truck which involve fire hazards shall be conducted only in designated locations for such repairs.
- All parts of a forklift truck requiring replacement shall be replaced only with parts equivalent to those used in the original design.
- Forklift trucks shall not be altered so that the relative positions of the various parts are different from what they were when originally received from the manufacturer. Additional counterweighting shall not be performed unless approved by the manufacturer.
- Trucks in need of repairs to the electrical system must have the battery disconnected prior to the repair work.
- If the temperature of any part of the forklift truck is found to be in excess of normal operating temperature, the lift shall be removed from service until the overheating has been eliminated.
- Forklift trucks are to be kept in a clean condition, free of lint and excess oil/grease.

Battery Changing/Charging:

- Battery charging installations shall be located in areas designated for that purpose. This area will include posted instructions, adequate fire protection, ample and readily available water supply, emergency eyewash station, and access to personal protective equipment.
- Reinstalled batteries shall be properly positioned and secured in the truck.
- When charging batteries, acid shall be poured into water, never water into acid.
- Forklift trucks are to be properly positioned and the parking brake applied prior the changing/charging the batteries.
- Smoking, open flames, sparks, and electric arcs are prohibited in the charging area.

Refueling:

- Fuel tanks shall not be refilled while the engine is running.
- Refuel only in designated areas, following posted safety instructions.
- Smoking, excessive heat, sparks, and open flames are prohibited where the truck is being refueled.
- If a leak is detected, do not start the lift truck. Pull the forklift truck out-of-doors and notify the immediate supervisor. If spillage occurs, use absorbent material to soak up the spill.
- Before removing an LPG fuel tank, close the tank's shutoff valve and let the engine run until it stalls.

- When storing LPG fueled lift trucks, follow the same procedure by closing the tank's shutoff valve and let the engine stall. If possible, park the lift truck near a sprinkler head for better protection against fires.
- LPG fuel tanks are to be stored so as to minimize exposure to excessive heat, physical damage, or tampering. LPG fuel tanks are not to be located near exits, stairwells, or other areas normally intended for the safe exit of people.

OPERATIONAL DRIVING PROCEDURES

Load Weight:

- Know the maximum weight the forklift truck can safely carry.
- Exceeding the load limit may adversely affect steering or stability causing the lift truck to tip over.
- Anytime a load weight or size exceeds the limits of the lift truck, do not attempt to handle the load. Contact the immediate supervisor and agree on a solution.

Steering:

- The front wheels on a counterbalanced lift truck carry the weight of the load.
- The steering wheel of a forklift truck causes the back wheels to turn instead of the front wheels like a car. Thus, the handling characteristics are quite different.
- A forklift truck has a very short turning radius, loaded or unloaded, and can easily be overturned.
- Never turn a lift truck steering wheel sharply, even at the lowest rate of speed.
- Attempting to lift a too heavy load can cause the rear wheels to lift off the ground, or at the very least, can cause the driver to lose steering control while traveling or maneuvering.

Load Center:

- The recommended load center shows where the center of the load should be on the forks. The load is measured from the face of the forks.
- Even if the load is less than the posted load limit, the truck may still become overloaded if the load is too far away from the front wheels.
- Always insert the forks all the way under the load up to the backrest. Failure to do this may cause the lift truck to tip or cause a loss of steering. This may also cause the load and pallet to bounce around enough for items to fall off.
- Never place extra weight at the rear of the lift truck to counterbalance the load. This will cause :
 - Strain to the axles, tires, and motor.
 - Increase the chance of accident/injury.
 - Increase the chance of equipment breakdown and material damage.

Load Handling:

- Only handle loads within the rated capacity as shown on the nameplate. This rating represents the MAXIMUM load that can be lifted.
- Handle only stable loads. A load can have unstable items that can easily shift and fall.
- Position each fork the same distance from the center of the carriage. Set the forks as far apart as possible for maximum support of the load. Center the weight of the load between the forks. Make sure the pins that keep the forks in position are engaged so that the forks cannot move.
- Check the condition of the driving surface. Make sure the floor will support the weight of the lift truck and the load.

Tilting the Load:

Since the entire mast assembly can be tilted either away from the truck or toward the truck, it is important to note that tilting the load forward moves the load center away from the drive wheels and may cause:

- Overload.
- The truck to tip over forward.
- The loss of steering control while the truck is traveling or maneuvering.

Always tilt a load forward with caution and only when the load is directly over the unloading area, keeping the load as low as possible.

Tilting the load back as far as possible does 2 things:

- Prevents any of the load from falling off.
- Moves the center of the load as far back as possible, making the lift truck more stable.

Maneuvering the Lift Truck:

- While operating a lift truck, whether loaded or unloaded, the mast should be tilted back and the forks approximately 4-6 inches off the ground.
- When the load is raised, the lift truck becomes less stable.
- Do not raise or lower the forks unless the lift truck is stopped with the brakes applied. Always lift the load straight up or tilted back slightly.
- Never lift a load that extends above the backrest unless no part of the load can slide toward the operator.
- Before raising a load, always check for adequate overhead clearance.

Never travel with the load elevated:

- Driving over an obstruction may cause the truck to tip over.
- Driving over a rough floor can knock the load off balance.
- The load blocks your forward vision.
- The equipment is likely to hit overhead obstructions.

MAINTAINING CONTROL

Center of Gravity:

- Every object has a center of gravity. This is the single point of which the object is balanced in all directions.
- When the lift truck picks up an object, the truck and load have a new center of gravity. The stability of the lift truck is determined by the location of its center of gravity, or if the truck is loaded, the combined center of gravity.
- Because the lift truck has moving parts, the center of gravity moves. The center of gravity moves forward and back as the mast is tilted forward and back. The center of gravity moves up and down as the mast moves up and down.
- The size, weight, shape, and position of the load will affect the center of gravity, and therefore stability, of the loaded lift truck. The height of the load, the amount of forward/backward tilt of the load, tire pressure, as well as speed, braking, turning, and operating on uneven surfaces or ramps will also affect the stability of a moving lift truck.
- These factors must be considered when traveling with an unloaded truck as well because an unloaded lift truck will tip over to the side easier than a loaded truck with its load in the lowered position.

Stability Triangle:

- Even though the lift truck does not have springs, it is able to keep all four wheels on the ground on uneven or inclined surfaces, due to the three-point suspension.
- The lift truck is supported at each of the front wheels and at the center of the rear axle. Connecting these 3 points creates the "stability triangle".
- As long as the center of gravity of the combined weight of the truck and load is within the stability triangle, the lift truck will not tip over. However, changes in speed and directions act to shift the load center of weight outside the stability triangle. This may cause the lift truck to become unstable, which could lead to a tip over.

Stopping:

- Always stop the lift truck smoothly and gradually. Sudden movements shift the load center weight, which may cause the lift to overturn.
- Never shift the lift truck into reverse as a means of breaking the truck. Doing so will cause damage to the drive gears and motor.

Turning Corners:

- When turning a corner, the center of weight shifts to the outside. Taking a corner at high speeds or turning the wheel sharply can overturn the lift truck.
- Always remember to slow down at corners and watch the load as well as the swing at the rear of the truck.
- If, while turning, the operator realizes an error, the best action to take is the following:
 - Stop.
 - Back-up.
 - Approach the turn to one side.
 - Drive slowly.

THE OPERATOR

Safe Operating Procedures:

- Only those operators trained in safe and proper procedures can operate a forklift/hand-powered truck. The operator will be allowed to operate the lift truck in safe areas and for those jobs, which it is designed to handle.
- Never start or operate the lift truck, including any of its functions or attachments, from any other place other than the operator's position.
- Always wear the safety belt.
- Never attempt to move or adjust any part of the load while standing on the lift truck.
- Always raise and lower the load smoothly.
- Always keep hands, arms, legs, and feet inside while operating the lift truck.
- Avoid operating the lift truck in congested areas or in heavy pedestrian traffic.
- Prior to raising/lowering the load to be stacked, be certain all co-workers and pedestrians are a safe distance from the lift truck.
- Only operate the lift truck as fast as conditions permit and always be alert for changing conditions.
- Always be aware of the tail swing area when making a turn.
- Always yield the right-of-way to pedestrians.
- Never drive the lift truck up to anyone standing in front of a fixed object, such as a wall or bench.
- Be aware of other employees while servicing work areas.
- Under no circumstance is anyone permitted to ride the lift truck while the operator is performing tasks.
- At no time are pallets to be used as working platforms when elevated by lift trucks.
- At no time are employees/pedestrians permitted to walk under an elevated part of a lift truck whether loaded or unloaded.

- At no time is the operator permitted to swing a load over top employees/pedestrians.
- Immediately report any collisions, damages, or near misses to the supervisor.
- In emergency situations such as rollover, DO NOT JUMP OFF! Stay in the lift truck holding firmly to the steering wheel, brace your feet and lean forward and away from the point of impact.
- While in operation, keep the lift truck to the right-hand side at all times.
- Observe aisle line markings.
- Never lift a load that extends above the load backrest unless no part of the load can slide back toward the operator.
- Do not allow loads to obstruct the operator's view.
- Know the load capacity of the lift truck and never exceed the load limit.
- Always carry the load as low as possible, approximately 4-6 inches above the ground and tilted backwards. The forks should be low enough to the ground to clear uneven surfaces. The higher the load is when traveling, the more unstable the vehicle will be.
- Do not elevate a load until ready to stack it.
- Be sure all loads are securely/properly stacked prior to operation to prevent the load from falling.
- Drive smoothly and avoid jerky movements.
- Always set the brake when the truck is parked. If on a ramp, block the wheels and never park with the carriage elevated.
- Always maintain a safe distance from the edge of ramps or platforms.
- Never leave the lift truck while the engine is running.
- Do not joyride or partake in horseplay.
- Only authorized personnel are permitted to operate lift trucks.
- **REMEMBER - THE OPERATOR IS NOT ONLY RESPONSIBLE FOR HIS/HER OWN SAFETY, BUT THE SAFETY OF CO-WORKERS AND PEDESTRIANS AS WELL.**

LIFT TRUCK OPERATION

Handling of Palletized Loads:

Before handling a load and pallet, check to ensure both are in a safe condition. Some of the items that need to be checked include:

- Weight - Is the load weight safe for the lift truck?
- Stacking - Is the load properly stacked?
- Security of the Load - When the load is moved, will any part of the load fall or roll off?
- Contents - Do the materials require special handling or extra safety precautions?
- Obstructions - Is the load clear of projections or obstructions?
- Pallet - Is the pallet in good condition?

Handling Lift Trucks on Slopes:

The forklift is designed for travel on mostly smooth or flat surfaces. However, it is sometimes necessary to travel on a slope or ramp. Traveling on a ramp or slope depends on whether the lift truck is loaded or unloaded.

- Without a Load - Keep the forks pointed downhill.
- With a Load - Keep the forks pointed uphill.

Loading or Unloading of Public Carriers:

Before driving a powered lift truck into a truck or trailer, the operator must always take three important steps:

- Chock both sides of the rear wheels of the vehicle, using approved chocks. If the tractor is not coupled, trailer jacks must be positioned at the front of the trailer.
- Secure the dockplate so that it rests firmly on the dock and the truck bed and will not tip. The guide angles or pins must be properly placed so that the dockplate will not shift. The dockplate must be strong enough to hold the combined weight of the lift truck and the load.
- Inspect the interior condition of the vehicle for safe floors and adequate working conditions. Remove all trash, loose objects, and other obstructions. Make sure there are no holes or weak flooring and maintain adequate lighting.

Parking the Lift Truck:

Many accidents and injuries have occurred with lift trucks that have not been properly parked when left unattended. "Unattended" means anytime an operator is 25 feet or more from or, when out of sight of, the lift truck.

Every time the operator leaves the lift truck unattended, the following parking procedures must be followed:

- Park in approved locations.
- Set the brakes.
- Lower the forks or load to the floor.
- Neutralize the controls.
- Turn off the motor switch.

Safety Platforms:

At no time will the forklift be used to elevate or lower employees without the use of a safety platform. The lift truck operator must abide by the following safety precautions before and while using the safety platform:

1. The safety platform must be firmly secured to the lifting carriage and/or forks of the lift truck prior to employees enter the platform.
2. Any time employees are utilizing the safety platform, the emergency shut-off device must be connected so that power to the lift truck can be terminated from within the safety platform.
3. If necessary and dependent on the operating conditions and environment, protection from falling objects will be provided.
4. Safety platform will be inspected prior to each use. This inspection will ensure that the structural integrity of the platform is safe to use.
5. At all times, the platform's access door will be closed and secured while in motion and during use.
6. Only 2 employees at a time are permitted to utilize the safety platform.
7. If using the safety platform at a height of 6' or more, each employee is required to use a full body harness and lanyard to prevent falling from the platform. The lanyard must to tied-off to a secure location.

This Program will be reviewed at least annually and updated when deemed necessary.

INSPECTION CHECKLIST

Forklift trucks are to be inspected prior to being put into service. This inspection is to be performed at least daily. When forklift trucks are used on a round-the-clock basis, the inspection is to be at the start of each shift. If the operator finds a defect with the lift, the operator must report the problem(s) immediately to their supervisor. This inspection checklist is to be returned to your immediate supervisor at the end of each shift. Supervisors are to route the completed Inspection Checklist to the Safety Manager, Facilities Management for recordkeeping. A checkmark (✓) indicates the item is okay. An X indicates a problem that requires attention by immediate supervisor. N/A indicates not applicable.

Truck Serial #: _____

Date: _____

Operator: _____

Shift: _____

Hour Meter Reading: Start: _____

TIRES:

- No excessive wear, splitting, or missing material.
- Rim condition good.
- Lug nuts are tight.
- No separation of tire and rim.
- Proper tire pressure.

CYLINDERS AND HYDRAULIC LINES:

- Hydraulic fluid at proper levels.
- No damage to or fluid leaking from lift and tilt cylinders.
- Mounting hardware on cylinders is secure
- Hydraulic lines okay.
- Hoses okay.
- Secure connections at fittings.

CHAINS:

- Chains are clean and lubricated.
- Chains have no visible wear.
- Chains have equal tension.

HORNS AND LIGHTS:

- Horns work properly.
- Lights work properly.

FIRE EXTINGUISHER:

- Present.
- Charged.

ENGINE:

- Engine has no loose or frayed wiring.
- Air filter okay.
- Oil filter okay.
- Proper oil level.
- Proper transmission level.
- Radiator fluid okay.
- No visible leaks under forklift.

ENERGY SYSTEM:

- Battery mounts secure.
- Battery casing in good shape.
- All connections secure.
- Proper fluid level.
- Vent holes are clear.

SAFETY BELT:

- Locks and unlocks properly.
- No cracks, frays, cuts.

NAME PLATE AND MARKINGS

- Load Limits. Readable.

FUEL SYSTEM:

- Fuel tanks have no cracks, broken welds or other damage.
- All valves and coupling okay.
- Mounting hardware is secure.

FORKS:

- Forks are centered on carriage.
- Forks are equally spaced.
- Forks have no cracks or other damage.
- Forks are correct for the job.
- Locking pins work correctly.

CARRIAGE, MAST, AND BACKREST:

- No visible damage.
- Secure mountings.
- No broken welds.
- Roller tracks are lubricated.

GUARDS:

- No broken welds.
- Mounted securely.
- No visible damage.

GAUGES:

- All gauges work properly.
- All indicators work properly.
- Moving parts work smoothly and properly.

MAST AND TILT CYLINDERS:

- Lift carriage to its maximum height.
- Lower carriage to just above the floor.
- Carriage moves smoothly and completely.

PARKING BRAKES:

- Set parking brake and accelerate slightly.
- Parking brake prevents the forklift from moving.

ACCELERATOR, TRANSMISSION AND SERVICE BRAKES:

- Forklift accelerates smoothly.
- Brakes slow lift without jerking or locking.
- Brakes are not too soft.
- Forklift moves forward properly.
- Forklift moves backward properly.
- Backup signal sounds while moving in reverse.

STEERING:

- Steering wheel turns while stopped.
- Wheel turns while moving.
- Forklift turns smoothly and precisely.
- No strange noise.
- No hesitation.

DEFECTS/COMMENTS: _____

FORKLIFT IS SAFE TO OPERATE - OPERATOR'S SIGNATURE: _____