



Forklift Safety Guide

Table of Contents

Subject	Page
Introduction	2
Who is Covered?	3
General Requirements.....	4
Traveling & Operating	4
Loading.....	5
Maintenance	5
Environmental Considerations	6
Physical Properties and Modifications.....	7
Seatbelts	7
Operator Training Requirements.....	8
Sample Documents (Appendix A – I)	9
Resources	38

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This publication provides practical loss control and safety information to assist you in making your workplace safer. It is not legal advice. SAIF Corporation has made every effort to bring significant Oregon Occupational Safety and Health Administration (OR-OSHA) regulations to your attention. Nonetheless, compliance with OR-OSHA remains your responsibility. You should read and understand all relevant OR-OSHA regulations that apply to your job site(s). You may want to consult with your own attorney regarding aspects of OR-OSHA that may affect you.

Note: The information in this publication is time sensitive. Do not rely upon this document if its publication date is more than three years old. Please check the Employer Guide "Safety" section of our web site at www.saif.com/employer for a more recent, printable copy. You'll also find a variety of other valuable safety information designed to help your business prevent injuries and control costs.

Introduction

The Oregon Occupational Health and Safety Division (OR-OSHA) requires employers to try to understand and implement complex regulations in order to provide a safe workplace. For many employers, the array of regulations seems endless and perhaps a bit overwhelming. Putting together a Forklift Safety Program to comply with OR-OSHA regulations is a process. It takes time and effort to prepare, review and implement such a program, but is well worth it.

The purpose of this publication is to give both small and large companies the information and guidance needed to successfully develop and implement a forklift program. You will find examples and samples that you can adapt and use in your own programs.

This publication has been created with the intent of simplifying a seemingly arduous and complicated task to a step-by-step process. The format is divided into five main sections including an introduction, who is covered, general requirements, operator training requirements, and sample documents.

It is SAIF's experience that pre-packaged programs do not suit the needs of an individual business and are not the most effective in providing a safe and healthy workplace. You, the employer, must take the responsibility for tailoring the written requirements to your company's situation. We have included samples to provide guidance and assistance; however we encourage you to take the time to tailor them to meet your own goals and needs. Many professionals are available to review and assess the appropriateness of your program. After the program has been developed, it is important to continually monitor the program for effectiveness and to change the program as needed.

As stated previously, an effective powered industrial truck program requires time and effort to develop and implement. It is designed to protect employees and ensure efficient and safe operation. As with all things of value, we all must commit ourselves to this endeavor each day.

Who Is Covered?

A powered industrial truck is defined as a mobile, power-driven vehicle used to carry, push, pull, lift, stack or tier material. The vehicles are known by common names such as fork trucks, tractors, platform lift trucks, motorized hand trucks, cantilever trucks, rider trucks, straddle trucks, high lift order picker trucks, side loader lift trucks, motorized pallet jacks, and other specialized names. Maritime trucks may include container top handlers, container reach stackers, sidehandlers, combination vacuum lifts and yard tractors. Vehicles not covered by one of the "Powered Industrial Trucks" standards are compressed air or nonflammable compressed gas-operated industrial trucks and vehicles intended primarily for earth moving or over-the-road hauling.

General industry is covered under Division 2, Subdivision N 29 CFR 1910.178 Powered Industrial Trucks. Agriculture requirements are covered under 437-004-[1610 to 1825](#) N Forklifts and Other Powered Industrial Trucks.

Generally speaking, the standards are designed to provide safety requirements for the maintenance and use of fork trucks, forklifts, platform lift trucks, motorized hand trucks and other specialized industrial trucks. With well over one million lift trucks in operation in addition to the pallet jacks and other hoisting equipment used today, emphasis must be placed on worker safety. When it comes to powered industrial trucks, worker safety must entail both operators and pedestrians.

This program guide is designed to assist you in developing training for your lift truck operators and other affected employees.

General Requirements

Traveling & Operating

When operating a forklift, all traffic regulations should be followed, including authorized speeds. It is advisable that all locations establish speed limits in their facilities. If an operator is following another lift truck, it is expected that a safe stopping distance will be maintained and the truck is under control. Passing should not occur with trucks traveling in the same direction, at an intersection, blind spot or other dangerous location. As with all vehicles, forklifts must yield the right of way to emergency vehicles.

Horns must be sounded at cross aisles and other locations where vision is obstructed. If the load obstructs the view, travel with the load trailing. Drive loaded trucks with the load upgrade (typically a 10% grade or steeper) if the incline is steep enough to spill the load. It is critical for the driver to look in the direction of travel and keep a clear view of the travel path. On all grades the load should be tilted back and the forks raised only high enough to clear the road surface.

Drive only as fast as conditions permit. Slow down on wet or slippery surfaces. Do not drive over loose objects. Horseplay should not be permitted. Make sure employees are traveling at a safe speed when turning lift trucks.

If you have elevators that are used by your lift trucks the elevators must be approached slowly and entered only with the load end forward. Once on the elevator the controls should be neutralized, the power shut off and the brakes set.

To ensure safety when operating a forklift, OR-OSHA requires that employees:

1. Do not drive a powered industrial truck up to anyone standing in front of a fixed object.
2. Do not stand or pass under the elevated part of a truck.
3. Only the operator may ride on a truck unless it has a second seat or area intended for another rider.
4. Do not put any part of the body between or reach through the uprights of the mast or outside the running lines of the truck.
5. Fully lower the forks or platform on an unattended truck. The controls must be neutralized; the power shut off and brakes set if unattended.
 - a. Unattended is when the operator is 25 feet or more away from the vehicle or the vehicle is not in the operators view.
 - b. When the operator gets off the truck but is within 25 feet and can still see the truck, the forks or platform must be fully lowered, the controls in neutral and the brakes set, unless loading or unloading items to or from the forks or platform.
 - c. Keep a safe distance from the edge of ramps or platforms while on an elevated dock, platform, or freight car.

6. Whenever a truck has vertical only, or vertical and horizontal controls that elevate with the lifting carriage or forks for lifting personnel, do the following:
 - a. Use a safety platform (with standard guardrails or equivalent means, the hydraulic system must not drop faster than 135 feet per minute in the event of a failure of any part of the system and the operator must attend the lift equipment while workers are in the platform, the operator shall be in the normal operating position while raising or lowering the platform, the vehicle can not travel from point to point with the platform elevated higher than 4 feet from the floor unless necessary and then inching may be permitted at very slow speeds, and if workers on the platform can contact the lift chains or other dangerous pinch points on the mast or carriage, the platform must have a screen or guard that prevents contact) secured to the lifting carriage and/or forks.
 - b. Have a way for people on the platform to shut off power to the truck. Provide protection from falling objects as necessary by the operating conditions.

Loading

Do not handle loads that are heavier than the rated capacity of the truck.

Only stable or safely arranged loads should be handled. Extra caution must be exercised when handling off center loads that cannot be centered. Trucks that have attachments will be operated as a partially loaded truck even when no load is being handled. The forks or platform must be under the load as far as possible and the mast tilted backward to stabilize the load.

Do not tilt forward with forks or platform elevated except to pick up a load. Do not tilt an elevated load forward except when it is in a deposit position over a rack, chute or stack. When stacking or tiering, use only enough backward tilt to stabilize the load.

The length of the forks should be a consideration when picking up or setting down loads. Make sure the forks do not strike items in front of your load

Maintenance

If a powered industrial truck needs maintenance it should be taken out of service (tagged out) until authorized personnel complete the repairs. All trucks should be examined at least daily for conditions that may adversely affect the operation of the truck. The examination should be documented in a written format (see Appendix F). If the trucks are used for more than one shift, each shift must examine the truck prior to operating it. Report all defects immediately so they can be corrected.

Do not add fuel while the engine is running. This includes the changing of propane tanks. Clean up spilled fuel or allow it to completely dry before restarting the engine. Do not use the vehicle without the fuel filler cap in place.

Repairs should not be made in any class I, II, or III locations. Repairs to the fuel and ignition systems, which may involve fire hazards, shall be conducted only in locations designated for such repairs. Trucks in need of repairs to the electrical system must have the battery disconnected prior to the repairs. Do not use a flame to check the electrolyte level in batteries or the level in fuel tanks.

Replacement parts used in repairs must be at least as safe as the original parts. Do not change the relative position of parts from what they were when the vehicle was made. Do not remove parts. You may convert powered industrial trucks from gasoline to liquefied petroleum gas fuel if the converted truck complies with the specifications for LP or LPG trucks. Use only approved conversion equipment. Do not add counter weighting to fork trucks without approval by the manufacturer.

Remove from service any vehicle that gives off hazardous sparks or flames. Water mufflers shall be filled daily or as frequently as necessary to prevent the water from going below 75% of capacity. Vehicles with mufflers having screens or other parts that may become clogged should not be operated until they are free of debris. Overheated batteries or radiators are signs of a hazardous condition and the vehicle should be removed from service.

Keep powered industrial trucks clean, free of lint, excess oil, and grease. Clean the trucks with noncombustible cleaners. Do not use low flash point (below 100 degree F) solvents. Follow the directions on the cleaner's label.

Environmental Considerations

If there is a choice between electric or gas trucks, electric is recommended to minimize and/or eliminate potential emissions. It is always preferable to use electric trucks when possible. If fossil fueled lifts are used in "tight" or inadequately ventilated areas, overexposure to carbon monoxide may occur. Measures must be taken to control the concentration of carbon monoxide gas to keep employees from being overexposed.

The atmosphere or location where the lifts are to be used shall have been classified as either hazardous or non-hazardous prior to the use of the industrial trucks/lifts and the type of lift required shall be provided.

Power operated industrial trucks shall not be used in atmospheres containing a hazardous concentration of acetylene, butadiene, ethylene oxide, hydrogen (or gases or vapors equivalent in hazard to hydrogen), propylene oxide, acetaldehyde, cyclopropane, diethyl ether, ethylene, isoprene or unsymmetrical dimethyl hydrazine.

Power Industrial Trucks must be of an approved type to operate in atmospheres in which combustible dust will normally be in suspension in the

air or be thrown into the air by the operation of the powered industrial truck. Refer to OR-OSHA table N-1 for the type of powered industrial truck that may be use.

Physical Properties and Modifications

All nameplates and markings on the powered industrial truck must be in place and legible. (Change the capacity, operation and maintenance instruction plates, tags or decals to reflect any changes to the vehicle)

The manufacturer must approve in writing, all modifications and additions, which affect the safe operation and capacity. It is recommended that these documents be kept on file.

When using front-end attachments (other than the manufacturers') the truck must be marked accordingly and show the approximate weight of the truck and attachment combination at maximum elevation with the load laterally centered.

If an operator is exposed to hoisted objects that might fall, the truck needs an overhead guard to protect the employee from potential harm. If small objects, small un-banded units, small-bagged material or other objects that might fall are being handled, you need an overhead guard (FOPS--Falling Object Protective Structure) with openings no larger than 6 inches in width or height. It is critical that the guard does not obstruct visibility. The guard foot-pound test should be clearly marked on the inside of the canopy. It is imperative that the guard be constructed of round pipe or square tubing and be strong enough to support impact load tests. The clearance for the guard must be at least 39 inches on sit down trucks and 74 inches on stand up trucks.

A load backrest is critical when handling small objects or unbanded units. Openings in the backrest must be no wider than 6 inches and again cannot obstruct operator visibility.

Shear points on forklift loaders and similar type vehicles need to be guarded as necessary to prevent injury.

Seatbelts

Seatbelts provide important protection for employees operating forklifts. The national consensus standard ASME B56.1-1993, Safety Standard for Low Lift and High Lift Trucks, requires manufacturers to provide, and operators to wear operator restraint systems. OSHA does not currently have a specific standard requiring the use of an operator restraint system. However, the use of operator restraint systems is enforced through Section 5(a)(1) of the Occupational Safety and Health Act, which requires that each employer furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or likely to cause death or serious physical harm to his employees. In addition, the revision to the powered industrial truck operator training standard requires employers to train

all operators in operating instructions, warnings, or precautions, listed in the operator's manual, such as the use of operator restraint systems.

Please be advised that OSHA has not made any exclusion regarding the use of operator restraint systems.

Operator Training Requirements

Training

The employer is required to ensure that each operator is competent to operate the trucks as demonstrated by the successful completion of the training and evaluation. In order to ensure competency, the training should include formal instruction (lecture, discussion, interactive computer learning, videotape and/or written material). It should also include practical training with demonstrations by the trainer and practical exercises performed by the trainee. In addition, it is important to include an evaluation of the operator's performance in the workplace. The person conducting the training must have the knowledge, training, and experience to train powered industrial truck operators and evaluate their performance. This trainer may be someone inside the organization, if qualified, or can be conducted by an outside training entity.

The training, at a minimum, must include an examination of the rules of the forklift standard, the information provided by the manufacturer (operator manual), the difference between the operation of an automobile and a powered industrial truck, and any special information needed by the operating environment. In addition it has to include a behind the wheel driving portion supervised by a person who is competent in the operation of the equipment the employee is being trained on and who knows the area and circumstances involved in your work environment. These evaluations should be tailored to the material being handled and the environment it is being handled in.

OR-OSHA requires operators to have refresher-training every three years, or when their driving record indicates it, whichever is more frequent. Reasons for retraining include; the operator has been observed to operate the vehicle in an unsafe manner, the operator has been involved in an accident or near miss, an evaluation indicated unsafe operations, the operator is assigned to drive a different type of truck or a condition in the workplace changes in a manner that could affect safe operation.

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

Employers may not consider a new worker trained and qualified based on experience from a previous employer unless the previous experience was on the same type of equipment under substantially the same operating circumstances and the worker had a safe operating record acceptable to the new employer. If the training is acceptable you need to do the behind the wheel evaluation to ensure their competence. In most cases you will be better suited by completing your entire training program for all new employees.

The employer needs to certify that each operator has been trained and evaluated. The certification must include the name of the operator, the date of the training, the date of the evaluation, and the identity of the person(s) performing the training or evaluation.

Appendix A:	
Sample Forklift Safety Program.....	10
Appendix B:	
Sample Operator Training Outline.....	20
Appendix C:	
Sample Classroom Training Outline	23
Appendix D:	
Sample Performance Test.....	24
Appendix E:	
Example Forklift Review Test	25
Appendix F:	
Sample Forklift Review Test.....	28
Appendix G:	
Sample Daily Inspection Checklist	32
Appendix H:	
Stability Triangle.....	34
Appendix I:	
Classes of Industrial Trucks	36

Appendix A

Sample Forklift Safety Program

Purpose

Material handling is a significant safety concern. During the movement of products and materials there are numerous opportunities for personal injury and property damage if proper procedures and caution are not used. This policy was developed to ensure the safety of all employees. The program applies to all powered industrial trucks, hoists & lifting gear. The information in this program shall be used to train prospective industrial truck operators and provide the basis for refresher and annual retraining. OSHA reference for Powered Industrial Trucks is 1910.178.

Pre-Qualifications for Powered Industrial Truck (PIT) Operators

All candidates for PIT operators must meet the following basic requirements prior to starting initial or annual training:

- Must have no adverse vision problems that cannot be corrected by glasses or contacts
- No adverse hearing loss that cannot be corrected with hearing aids
- No physical impairments that would impair safe operation of the PIT
- No neurological disorders that affect balance or consciousness
- Not taking any medication that affects perception, vision, or physical abilities

Training

Training for Powered Industrial Truck (PIT) Operators shall be conducted by an experienced operator, selected by management. All operational training shall be conducted under close supervision. All training and evaluation must be completed before an operator is permitted to use a Powered Industrial Truck (forklift, etc) without continual & close supervision. Training consists of:

Trainees may operate a powered industrial truck only:

- Under the direct supervision of persons, selected by management, who have the knowledge, training, and experience to train operators and evaluate their competence; and
- Where such operation does not endanger the trainee or other employees.

Training Content

Training consists of a combination of formal instruction, practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace.

Initial Training: Powered industrial truck operators shall receive initial training in the following topics:

Truck-related training topics:

- Operating instructions, warnings, and precautions for the types of truck the operator will be authorized to operate
- Differences between the truck and the automobile
- Truck controls and instrumentation: where they are located, what they do, and how they work
- Engine or motor operation
- Steering and maneuvering
- Visibility (including restrictions due to loading)
- Fork and attachment adaptation, operation, and use limitations
- Vehicle capacity
- Vehicle stability
- Any vehicle inspection and maintenance that the operator will be required to perform
- Refueling and/or charging and recharging of batteries
- Operating limitations
- Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of vehicle that the employee is being trained to operate

Workplace-related topics:

- Surface conditions where the vehicle will be operated
- Composition of loads to be carried and load stability
- Load manipulation, stacking, and un-stacking
- Pedestrian traffic in areas where the vehicle will be operated
- Narrow aisles and other restricted places where the vehicle will be operated
- Hazardous (classified) locations where the vehicle will be operated
- Ramps and other sloped surfaces that could affect the vehicle's stability
- Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust
- Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation

Refresher training and evaluation. Refresher training, including an evaluation of the effectiveness of that training, shall be conducted to ensure that the operator has the knowledge and skills needed to operate the powered industrial truck safely. Refresher training in relevant topics shall be provided to the operator when:

1. The operator has been observed to operate the vehicle in an unsafe manner
2. The operator has been involved in an accident or near-miss incident
3. The operator has received an evaluation that reveals that the operator is not operating the truck safely
4. The operator is assigned to drive a different type of truck
5. A condition in the workplace changes in a manner that could affect safe operation of the truck
6. Once every 3 years an evaluation will be conducted of each powered industrial truck operator's performance

Safe Operating Procedures (SOP) & Rules

- Only authorized and trained personnel will operate PITs.
- All PITs will be equipped with an overhead guard, fire extinguisher, rotating beacon, back-up alarm and seat belts. Seat belts will be worn at all times by the Operator.
- The operator will perform daily pre- and post-trip inspections.
- Any safety defects (such as hydraulic fluid leaks; defective brakes, steering, lights, or horn; and/or missing fire extinguisher, lights, seat belt, or back-up alarm) will be reported for immediate repair or have the PIT taken "Out of Service".
- Operators will follow the proper recharging or refueling safety procedures.
- Loads will be tilted back and carried no more than 6 inches from the ground. Loads that restrict the operator's vision will be transported backwards.
- PITs will travel no faster than 5 mph or faster than a normal walk.
- Hard hats will be worn by PIT Operators in high lift areas.
- Operator will sound horn and use extreme caution when meeting pedestrians, making turns and cornering.
- Passengers may not ride on any portion of a PIT. Only the operator will ride PITs. "NO PASSENGERS" decals will be affixed on all PITs.
- If PITs are used as a man lift, an appropriate man lift platform (cage with standard rails and toe-boards) will be used.
- Aisle will be maintained free from obstructions, marked and wide enough (six foot minimum) for vehicle operation.
- Lift capacity will be marked on all PITs. Operator will assure load does not exceed rated weight limits.
- When un-attended, PITs will be turned off, forks lowered to the ground and parking brake applied.
- All PITs (with exception of pallet jacks) will be equipped with a multi-purpose dry chemical fire extinguisher. (Minimum rating; 2A:10B:C)
- Operators are instructed to report all accidents, regardless of fault and severity, to Management. Management will conduct an accident analysis.
- When loading rail cars and trailers, dock plates will be used. Operators will assure dock plates are in good condition and will store on edge when not in use.

- Rail cars and trailers will be parked squarely to the loading area and have wheels chocked in place. Operators will follow established Docking/Un-Docking Procedures.

Changing and Charging Storage Batteries.

- Battery charging installations shall be located in areas designated for that purpose.
- Facilities shall be provided for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of fumes from gassing batteries.
- A conveyor, overhead hoist, or equivalent material handling equipment shall be provided for handling batteries.
- Reinstalled batteries shall be properly positioned and secured in the truck.
- A carboy tilter or siphon shall be provided for handling electrolyte.
- When charging batteries, acid shall be poured into water; water shall not be poured into acid.
- Trucks shall be properly positioned and brake applied before attempting to change or charge batteries.
- Care shall be taken to assure that vent caps are functioning. The battery (or compartment) cover(s) shall be open to dissipate heat.
- Smoking is prohibited in the charging area.
- Precautions shall be taken to prevent open flames, sparks, or electric arcs in battery charging areas.
- Tools and other metallic objects shall be kept away from the top of uncovered batteries.

Trucks and Railroad cars

- The flooring of trucks, trailers, and railroad cars shall be checked for breaks and weakness before they are driven onto.
- The brakes of highway trucks shall be set and wheel chocks placed under the rear wheels to prevent the trucks from rolling while they are boarded with powered industrial trucks.
- Wheel stops or other recognized positive protection shall be provided to prevent railroad cars from moving during loading or unloading operations.

- Fixed jacks may be necessary to support a semi trailer and prevent upending during the loading or unloading when the trailer is not coupled to a tractor.
- Positive protection shall be provided to prevent railroad cars from being moved while dockboards or bridge plates are in position.

Operations

- If at any time a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the truck shall be taken out of service until it has been restored to safe operating condition.
- Trucks shall not be driven up to anyone standing in front of a bench or other fixed object.
- No person shall be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.
- Unauthorized personnel shall not be permitted to ride on powered industrial trucks.
- Arms or Legs shall not be placed between the uprights of the mast or outside the running lines of the truck.
- When a powered industrial truck is left unattended, load engaging means shall be fully lowered, controls shall be neutralized, power shall be shut off, and brakes set. Wheels shall be blocked if the truck is parked on an incline.
- A safe distance shall be maintained from the edge of ramps or platforms while on any elevated dock, or platform or freight car. Trucks shall not be used for opening or closing freight doors.
- There shall be sufficient headroom under overhead installations, lights, pipes, sprinkler system, etc.
- An overhead guard shall be used as protection against falling objects. It should be noted that an overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, etc., representative of the job application, but not to withstand the impact of a falling capacity load.
- A load backrest extension shall be used whenever necessary to minimize the possibility of the load or part of it from falling rearward.
- Trucks shall not be parked so as to block fire aisles, access to stairways, or fire equipment.

Traveling

- All traffic regulations shall be observed, including authorized speed limits. A safe distance shall be maintained, approximately three truck lengths from the truck ahead, and the truck shall be kept under control at all times.
- The right of way shall be yielded to ambulances, fire trucks, or other vehicles in emergency situations.
- Other trucks traveling in the same direction at intersections, blind spots, or other dangerous locations shall not be passed.
- The driver shall be required to slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view, the driver shall be required to travel with the load trailing.
- Railroad tracks shall be crossed diagonally wherever possible. Parking closer than 8 feet from the center of railroad tracks is prohibited.
- The driver shall be required to look in the direction of, and keep a clear view of the path of travel.
- Grades shall be ascended or descended slowly. When ascending or descending grades in excess of 10 percent, loaded trucks shall be driven with the load upgrade. On all grades the load and load engaging means shall be tilted back if applicable, and raised only as far as necessary to clear the road surface.
- Under all travel conditions the truck shall be operated at a speed that will permit it to be brought to a stop in a safe manner.
- Stunt driving and horseplay shall not be permitted.
- The driver shall be required to slow down for wet and slippery floors.
- Dockboard or bridgeplates, shall be properly secured before they are driven over. Dockboard or bridgeplates shall be driven over carefully and slowly and their rated capacity never exceeded.
- Running over loose objects on the roadway surface shall be avoided.
- While negotiating turns, speed shall be reduced to a safe level by means of turning the hand steering wheel in a smooth, sweeping motion. Except when maneuvering at a very low speed, the hand steering wheel shall be turned at a moderate, even rate.

Loading

- Only stable or safely arranged loads shall be handled. Caution shall be exercised when handling off-center loads, which cannot be centered.
- Only loads within the rated capacity of the truck shall be handled.
- The long or high (including multiple-tiered) loads, which may affect capacity shall be adjusted.
- Trucks equipped with attachments shall be operated as partially loaded trucks when not handling a load.
- A load engaging means shall be placed under the load as far as possible; the mast shall be carefully tilted backward to stabilize the load.
- Extreme care shall be used when tilting the load forward or backward, particularly when high tiering. Tilting forward with load engaging means elevated shall be prohibited except to pick up a load. An elevated load shall not be tilted forward except when the load is in a deposit position over a rack or stack. When stacking or tiering, only enough backward tilt to stabilize the load shall be used.

Fueling Safety

- Fuel tanks shall not be filled while the engine is running. Spillage shall be avoided.
- Spillage of oil or fuel shall be carefully washed away or completely evaporated and the fuel tank cap replaced before restarting engine.
- No truck shall be operated with a leak in the fuel system until the leak has been corrected.
- Open flames shall not be used for checking electrolyte level in storage batteries or gasoline level in fuel tanks.
- Storage and handling of liquefied fues shall be in accordance with NFPA Code No. 30-1969
- Storage and handling of liquid petroleum gas shall be in accordance with NFPA No. 58-1969 which is part of 1910.6.

Maintenance of Powered Industrial Trucks

- Any power-operated industrial truck not in safe operating condition shall be removed from service. All repairs shall be made by authorized personnel.

- Those repairs to the fuel and ignition systems of industrial trucks which involve fire hazards shall be conducted only in locations designated for such repairs.
- Trucks in need of repairs to the electrical system shall have the battery disconnected prior to such repairs.
- All parts of any such industrial truck requiring replacement shall be replaced only by parts equivalent as to safety with those used in the original design.
- Industrial 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, nor shall they be altered either by the addition of extra parts not provided by the manufacturer or by the elimination of any parts. Additional counter-weighting of fork trucks shall not be done unless approved by the truck manufacturer.
- Industrial trucks shall be examined before being placed in service, and shall not be placed in service if the examination shows any condition adversely affecting the safety of the vehicle. Such examination shall be made at least daily. Where industrial trucks are used on a round-the-clock basis, they shall be examined prior to use each shift. Defects when found shall be immediately reported and corrected.
- When the temperature of any part of any truck is found to be in excess of its normal operating temperature, thus creating a hazardous condition, the vehicle shall be removed from service and not returned to service until the cause for such overheating has been eliminated.
- Industrial trucks shall be kept in a clean condition, free of lint, excess oil, and grease. Noncombustible agents should be used for cleaning trucks. Low flash point (below 100 deg. F.) solvents shall not be used. High flash point (at or above 100 deg. F.) solvents may be used.

Safe Operation Procedure for Charging LPG Tank

1. No Smoking.
2. Move LPG PIT outside for refueling.
3. Turn off PIT.
4. LPG tanks will be removed in the following order:
 - shut off service valve
 - disconnect tank from hose
 - unbuckle and remove tank from bracket

5. LPG tanks will be replaced in to following order:
 - place tank in bracket and re-buckle
 - reconnect hose to tank and tighten firmly
 - open valve slowly and assure proper seal

NOTE: Federal Law Prohibits dispensing an improper fuel type into any vehicle or into a non-approved fuel container.

In Case of LPG Leaks or Tank Rupture

1. DO NOT start or move the PIT.
2. If fuel hose is leaking, Close valve immediately and place PIT "Out of Service" until repaired.
3. If tank ruptures, warn others, immediately leave the area (at least 50 feet) and notify Management. Do not re-enter the area until cleared by Management.

Appendix B

Sample Powered Industrial Truck (PIT) Operator Training Program Outline*

Introduction

- Overview of the program
- Goal of the program: to provide a training program based on the trainee's prior knowledge, the types of vehicles used in the workplace, and the hazards of the workplace.
- Course will utilize at least three of the following options; video written material, computer learning group discussion, lecture and hands-on practice. Hands on practice must be one of the options. Each operator must obtain the knowledge and skills needed to do their job correctly and safely.

Types, Features and Physics

- Familiarize each operator with the basic types and functions of powered industrial trucks.
- Develop an understanding of the information shown on a data plate.
- Understand the critical truck measurements that affect safety.
- Understand the forces that cause tipovers, and the truck design considerations and safety ratings that help prevent them including the "stability triangle."

Inspecting the vehicle

- Understand the purpose and importance of pre-operational checkouts.
- Provide a basic understanding of areas covered during a pre-operational checkout.
- Familiarize each operator with a checklist for pre-operational checkouts, and what to do if a problem is discovered.

Driving the Truck

- Understand the elements of safe movement of a powered industrial truck.
- Understand the differences between an automobile and a powered industrial truck.
- Recognize the safety hazards associated with operating a powered industrial truck.
- Lighting – where lighting is less than 2 lumens per square foot, auxiliary directional lighting shall be provided on the truck.

Load Handling

- Understand the elements of load lifting safety.
- Understand the safe operating procedures for raising and lowering loads in aisles.

LPG for Lift Trucks

- Discuss LPG and its properties and appropriate personal protective equipment that must be worn.
- Understand the elements and procedures of safely refueling internal combustion vehicles.
- Describe tank components: service valve, surge valve, relief valve, etc.
- Discuss related safety issues.

Battery and Charging

- Understand the elements and procedures of safely changing and charging batteries and the appropriate personal protective equipment that must be worn.
- Discuss filling procedures and maintenance.
- Discuss related safety issues.

Safety Concerns

- Review/reinforce potential serious injury.
- Review/reinforce safety procedures in your facility.

Specific Truck and Workplace Training/Hands-On

- Review features of specific PITs to be operated.
- Review operating procedures of specific PITs to be operated.
- Review safety concerns of specific PITs to be operated.
- Review workplace conditions and safety concerns of areas where PITs will be operated.
- Learn/practice actual operation of specific PITs to be operated and specific workplace conditions where PITs will be operated.
- Demonstrate proficiency performing the powered industrial truck operator duties specific to the trainee's position and workplace conditions.

Certification of Completion of the Course

Note: This document was created by OR-OSHA and can be found in the publication "Training Materials for Oregon OSHA's Powered Industrial Truck Operator Standard".

Appendix C

Sample Classroom Training Outline

Powered Industrial Truck Classroom Training

Trainer: _____ Date: _____

Training topics covered

Truck-Related Topics:

1. Operating instructions, warning, and precautions for the type of truck being used
2. Difference between truck and automobile
3. Truck controls and instrumentation; where they are located, what they do, and how they work
4. Engine and motor operation
5. Steering and Maneuvering
6. Visibility
7. Fork and attachment adaptation, operation, and use limitations
8. Vehicle capacity
9. Vehicle stability
10. Vehicle inspection and maintenance
11. Refueling and/or charging batteries
12. Operating limitations

Workplace-related Topics:

1. Surface conditions where the truck is operated
2. Composition of loads to be carried and load stability
3. Load manipulation, stacking, and unstacking
4. Pedestrian traffic in areas where the vehicle will operate
5. Narrow aisles and other restricted places where the truck will be operated
6. Hazardous (classified) locations where the vehicle will be operated
7. Ramps and other sloped surfaces that could affect the vehicle stability
8. Closed environments and other areas that could cause a buildup of carbon monoxide or diesel exhaust
9. Other potential hazardous conditions that could affect safe operation

The requirements of 29 CFR 1910.178 "Powered Industrial Trucks"
I have received training in the topics mentioned above.

Employee name (printed): _____

Employee signature: _____ Date: _____

Appendix D

Sample Performance Test

Performance Test

Employee: _____ Date: _____ Time: _____

- _____ Shows familiarity with truck controls.
- _____ Gave proper signals when turning.
- _____ Slowed down at intersections.
- _____ Sounded horn at intersections.
- _____ Obeyed signs.
- _____ Kept a clear view of direction of travel.
- _____ Turned corners correctly - was aware of rear end swing.
- _____ Yielded to pedestrians.
- _____ Drove under control and within proper traffic aisles.
- _____ Approached load properly.
- _____ Lifted load properly.
- _____ Maneuvered properly.
- _____ Traveled with load at proper height.
- _____ Lowered load smoothly/slowly.
- _____ Stops smoothly/completely.
- _____ Load balanced properly.
- _____ Forks under load all the way.
- _____ Carried parts/stock in approved containers.
- _____ Checked bridge plates/ramps.
- _____ Did place loads within marked area.
- _____ Did stack loads evenly and neatly.
- _____ Did drive backward when required.
- _____ Did check load weights.
- _____ Did place forks on the floor when parked, controls neutralized, brake on set, power off.
- _____ Followed proper instructions for maintenance checked both at beginning and end.

Total Rating

Evaluator: _____

Note: The State of Michigan Department of Consumer and Industry Services, Safety Education and Training Division developed this test.

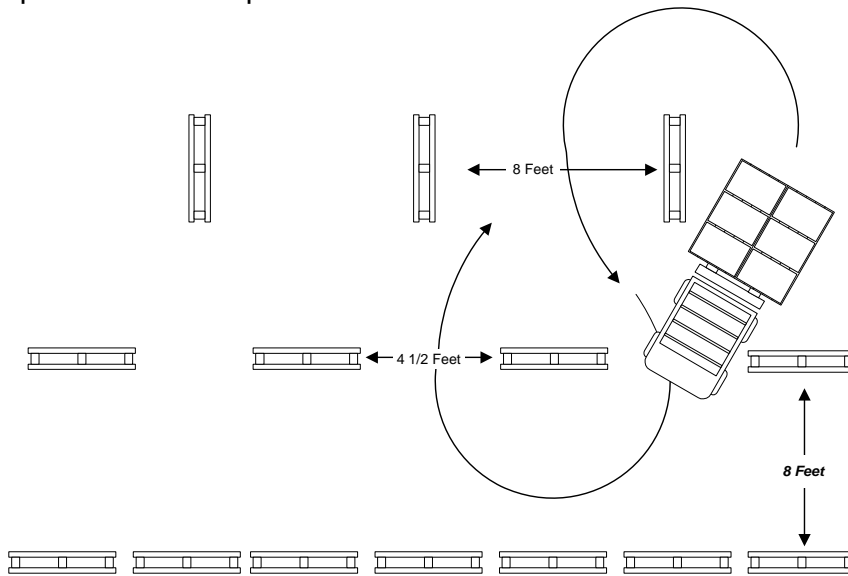
Appendix E

Example Forklift Exercises

Exercise 1 - Operating in Tight Quarters:

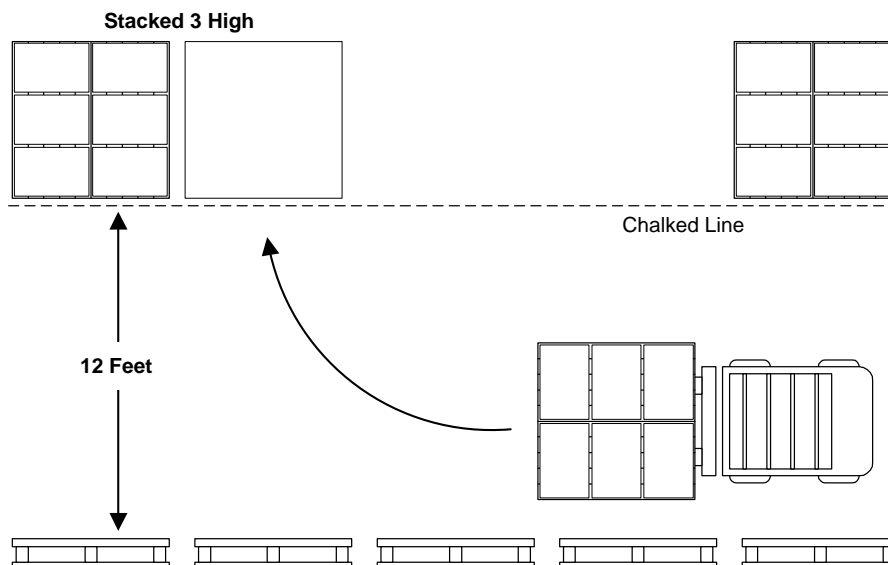
A loaded pallet is maneuvered through a series of pallets on-end as illustrated.

The path is then repeated in reverse.



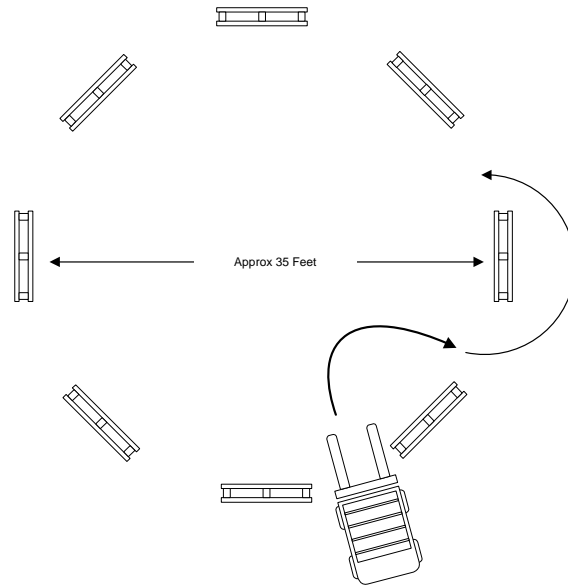
Exercise 2 - Stacking:

Trainees remove one pallet load at a time from a starting stack then travel down a 12 foot wide aisle. Two stacks are made, side-by-side, three high. Afterwards, the pallet loads are returned to the original storage area.



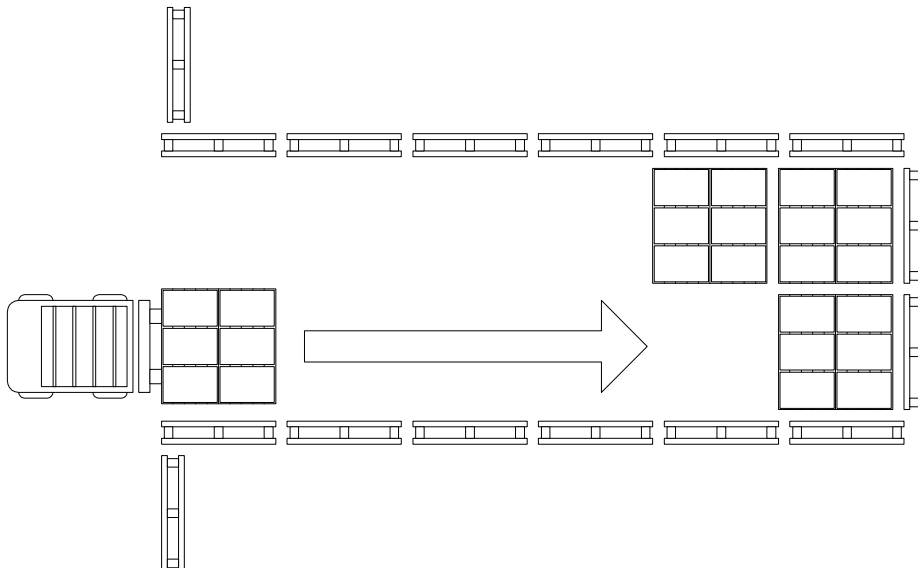
Exercise 3 - Pallet Circle:

Arrange pallets on-end in a circular pattern with a little more than enough room for a forklift to pass between. Each trainee travels around the circle, zigzagging between the pallets with forks lowered and empty. The first trip is forward, the second in reverse.



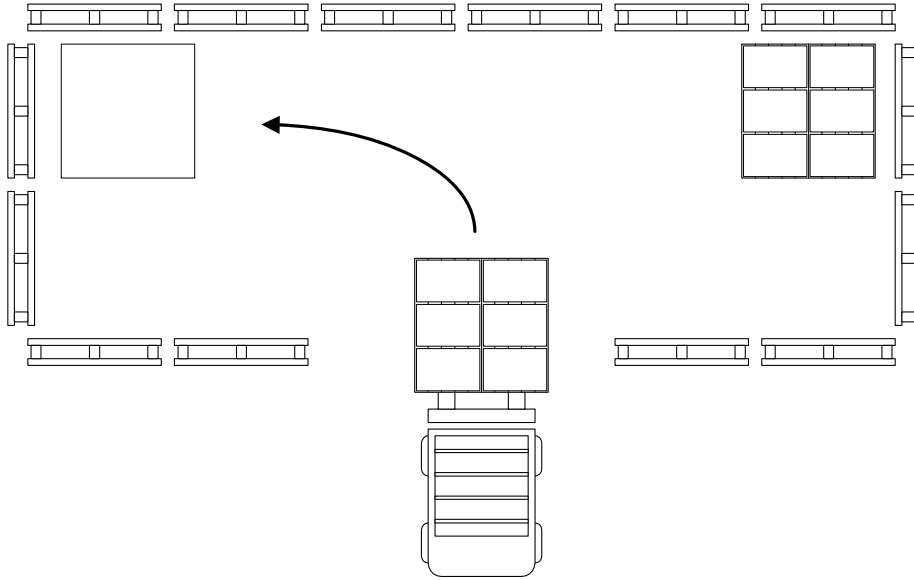
Exercise 4 - Trailer Loading:

Arrange pallets on-end to approximate the dimensions of a closed trailer. Each trainee places two pallet loads, side by side, in the simulated trailer until each has had a turn. They each then unload two pallet loads, returning them to a storage area.



Exercise 5 - Box Car Loading:

Arrange pallets on-end to approximate the dimensions of a boxcar. Each trainee places two pallet loads into the corners of the simulated boxcar as shown. They then reverse the order in removing the loads.



Appendix F

Sample Forklift Review Test

Name _____ Date: _____

Lift Truck Training Review Test

- | | True | False | |
|-----|--------------------------|--------------------------|--|
| 1. | <input type="checkbox"/> | <input type="checkbox"/> | A careful driver may hang their leg outside a machine when it is protected by a wide load. |
| 2. | <input type="checkbox"/> | <input type="checkbox"/> | As the load center of the load moves away from the mast, the weight handling capacity of the truck decreases. |
| 3. | <input type="checkbox"/> | <input type="checkbox"/> | Backward tilt moves the combined center of gravity closer to the rear wheels. |
| 4. | <input type="checkbox"/> | <input type="checkbox"/> | A lift truck should never be driven in reverse. |
| 5. | <input type="checkbox"/> | <input type="checkbox"/> | Other workers may stand nearby when you stack materials. |
| 6. | <input type="checkbox"/> | <input type="checkbox"/> | It is all right to leave the engine running if you are only going to be gone a couple of minutes. |
| 7. | <input type="checkbox"/> | <input type="checkbox"/> | Rear wheel steering provides good maneuverability, but also requires caution in that the operator must be constantly aware of tail swing. |
| 8. | <input type="checkbox"/> | <input type="checkbox"/> | It is not necessary to report slippery conditions in your driving area. |
| 9. | <input type="checkbox"/> | <input type="checkbox"/> | Stability is resistance to overturning. A lift truck operator must be continually aware of both forward and side stability particularly when driving on a slope. |
| 10. | <input type="checkbox"/> | <input type="checkbox"/> | Although there is a margin of safety built into the capacity rating of a new lift truck the rated capacity should never be ignored. |
| 11. | <input type="checkbox"/> | <input type="checkbox"/> | A good driver drives fast in order to get more work done in a day. |
| 12. | <input type="checkbox"/> | <input type="checkbox"/> | It is not necessary to observe the condition of building, railroad car, or truck flooring because the law says they must always be in good condition. |
| 13. | <input type="checkbox"/> | <input type="checkbox"/> | If your truck begins to make a peculiar noise it is a good idea to tell your supervisor about it at the end of the shift. |

14. The center of gravity on a lift truck always remains constant.
15. Checking for safe brake operation is one of the daily checks an operator makes.
16. Tire skid marks on the floor are signs of poor driving habits.
18. A lift truck is suspended at ____ points. Lines of side support form a _____ with the points.
19. List three fluid level checks a trained operator should make at the beginning of each shift.
20. Describe what will happen if during a material handling operation the vehicle's center of gravity extends beyond the lines of side support.
21. The load center of a lift truck is measured at a distance of ____ inches from the heel of the forks.

Appendix F

Sample Forklift Review Test- Answers

Lift Truck Training Review Test

- | | True | False | |
|-----|-------------------------------------|-------------------------------------|--|
| 1. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | A careful driver may hang their leg outside a machine when it is protected by a wide load. |
| 2. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | As the load center of the load moves away from the mast, the weight handling capacity of the truck decreases. |
| 3. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Backward tilt moves the combined center of gravity closer to the rear wheels. |
| 4. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | A lift truck should never be driven in reverse. |
| 5. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Other workers may stand nearby when you stack materials. |
| 6. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | It is all right to leave the engine running if you are only going to be gone a couple of minutes. |
| 7. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Rear wheel steering provides good maneuverability, but also requires caution in that the operator must be constantly aware of tail swing. |
| 8. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | It is not necessary to report slippery conditions in your driving area. |
| 9. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Stability is resistance to overturning. A lift truck operator must be continually aware of both forward and side stability particularly when driving on a slope. |
| 10. | <input checked="" type="checkbox"/> | <input type="checkbox"/> | Although there is a margin of safety built into the capacity rating of a new lift truck the rated capacity should never be ignored. |
| 11. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | A good driver drives fast in order to get more work done in a day. |
| 12. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | It is not necessary to observe the condition of building, railroad car, or truck flooring because the law says they must always be in good condition. |
| 13. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | If your truck begins to make a peculiar noise it is a good idea to tell your supervisor about it at the end of the shift. |

14. The center of gravity on a lift truck always remains constant.
15. Checking for safe brake operation is one of the daily checks an operator makes.
16. Tire skid marks on the floor are signs of poor driving habits.
18. A lift truck is suspended at 3 points. Lines of side support form a triangle with the points.
19. List three fluid level checks a trained operator should make at the beginning of each shift.
OIL, WATER FUEL, HYDRAULIC OIL
20. Describe what will happen if during a material handling operation the vehicle's center of gravity extends beyond the lines of side support.
VEHICLE COULD TIP OVER TO THAT SIDE
21. The load center of a lift truck is measured at a distance of 24 inches from the heel of the forks.

Appendix G

Sample Daily Inspection Checklist

Daily Inspection Checklist Electric Forklift Truck

KEY OFF Procedures			
The vehicle inspection	Pass	Fail	Comments:
Overhead guard			
Hydraulic cylinders			
Mast Assembly			
Lifting Chains and rollers			
Forks			
Tires			
Battery			
Hydraulic fluid level			
KEY ON Procedures			
Check the Gauges	Pass	Fail	Comments:
Hour meter			
Battery discharge indicator			
Test the Standard Equipment	Pass	Fail	Comments:
Steering			
Brakes			
Front, tail, and brake			
Horn			
Safety seat			
Load handling attachments			

Vehicle Identification: _____

Inspector: _____ Date: _____ Time: _____

Note: The information in this form was taken from the "Sample Daily Checklist for Powered Industrial Trucks" publication produced by the Occupational Safety and Health Administration.

Propane Forklift Truck

KEY OFF Procedures			
The vehicle inspection	Pass	Fail	Comments:
Overhead guard			
Hydraulic cylinders			
Mast Assembly			
Lifting Chains and rollers			
Forks			
Tires			
LPG tank and locator pin			
LPG tank hose			
Gas Gauge			
Check engine oil			
Examine the battery			
Check the hydraulic fluid level			
Check the engine coolant level			
KEY ON Procedures			
Check the Gauges	Pass	Fail	Comments:
Oil pressure indicator lamp			
Ammeter indicator lamp			
Hour meter			
Water temperature gauge			
Test the Standard Equipment	Pass	Fail	Comments:
Steering			
Brakes			
Front, tail, and brake lights			
Horn			
Safety seat			
Load handling attachments			

Vehicle Identification: _____

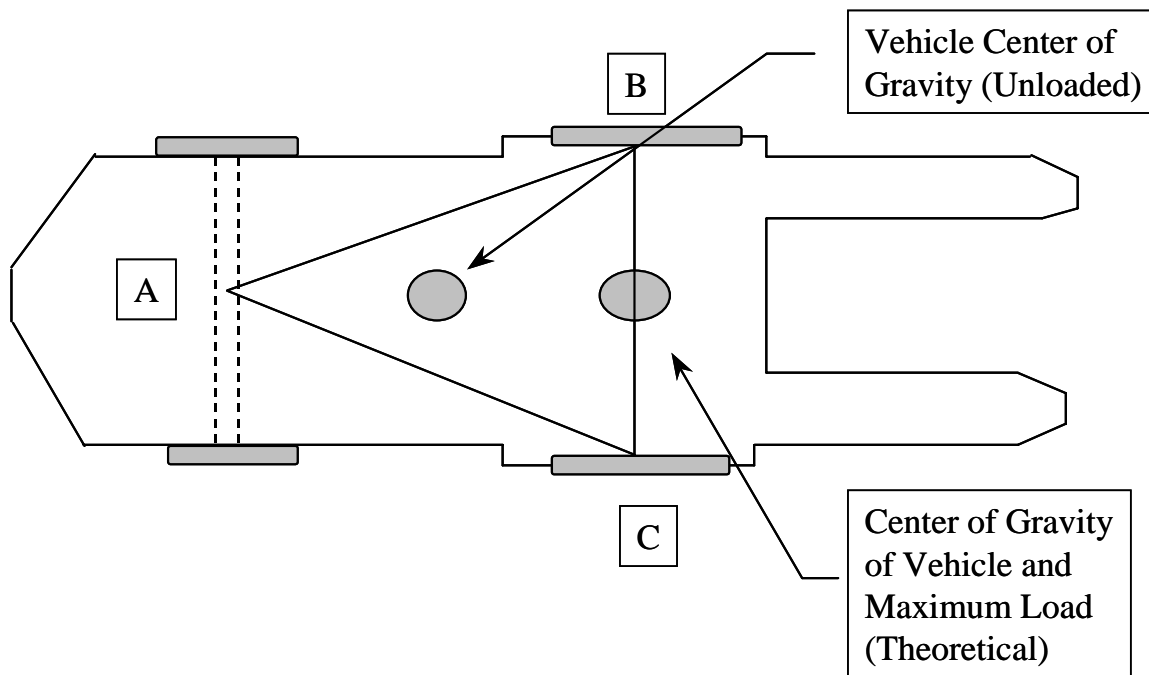
Inspector: _____ Date: _____ Time: _____

Note: The information in this form was taken from the "Sample Daily Checklist for Powered Industrial Trucks" publication produced by the Occupational Safety and Health Administration.

Appendix H

Stability Triangle

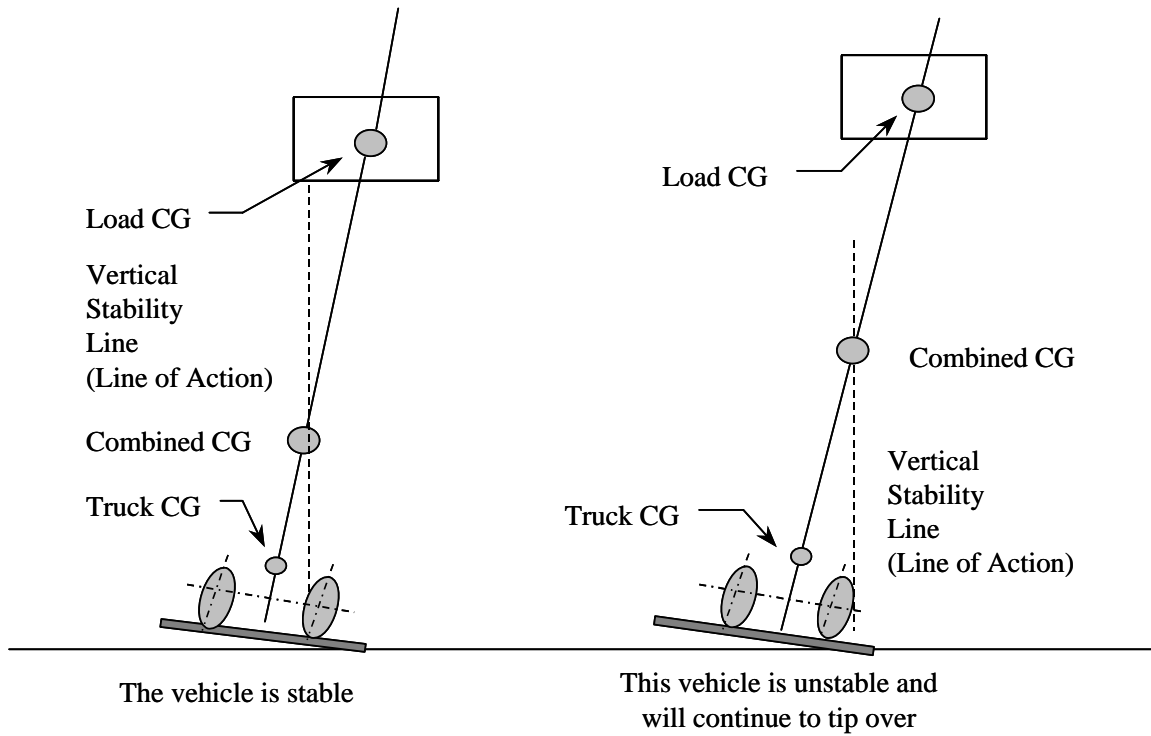
Stability Triangle - Figure 1



Notes:

- 1. When the vehicle is loaded, the combined center of gravity (CG) shifts toward line B-C. Theoretically the maximum load will result in the CG at the line B-C. In actual practice, the combined CG should never be at line B-C.*
- 2. The addition of additional counterweight will cause the truck CG to shift toward point A and result in a truck that is less stable laterally.*

Stability Triangle - Figure 2

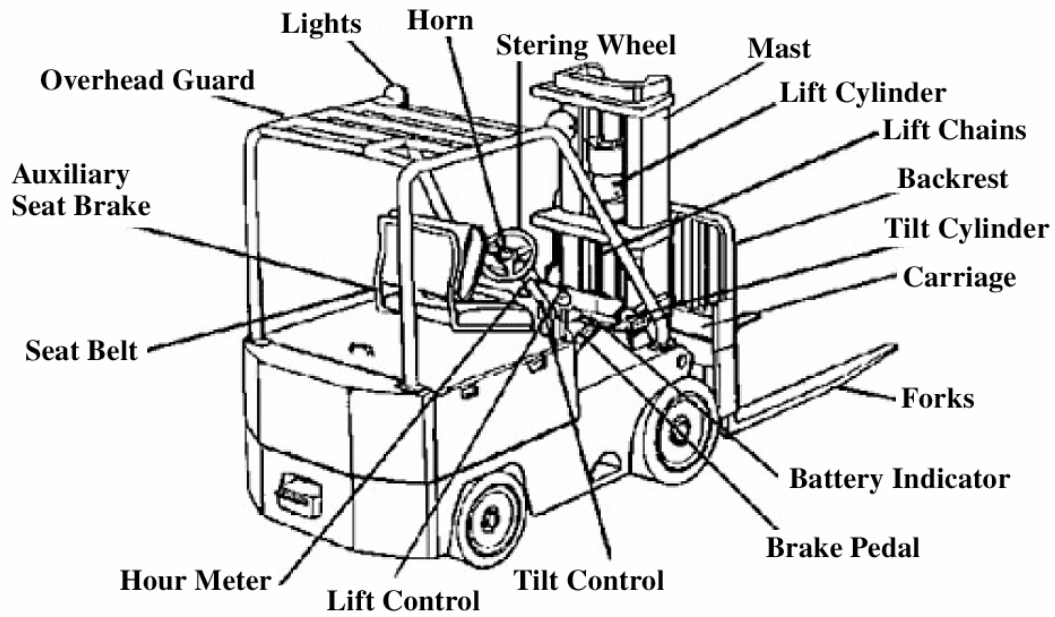


Components of a Forklift Truck*

Appendix I

Classes of Industrial Trucks

Components of a Forklift Truck*



* One of the most common types of powered industrial trucks

Classes of Commonly–Used Powered Industrial Trucks*

The Industrial Truck Association has placed powered industrial trucks into 7 classes.

- Class I — Electric motor rider trucks
- Class II — Electric motor narrow aisle trucks
- Class III — Electric motor hand trucks or hand/rider trucks
- Class IV — Internal combustion engine trucks (solid/cushion tires)
- Class V — Internal combustion engine trucks (pneumatic tires)
- Class VI — Electric and internal combustion engine tractors
- Class VII — Rough terrain forklift trucks

** Note that this classification refers to commonly used vehicles and does not include all powered industrial trucks covered by the OSHA standard.*

Resources

SAIF Corporation publishes a companion piece to this guide entitled “Forklifts”, SC-129. It provides a practical outline for implementing a forklift safety program. It is available in both English and Spanish.

A copy of OAR 432, Division 2, Subdivision N, “Powered Industrial Trucks”, may be obtained from the Oregon Occupational Safety and Health Division (OR-OSHA) by contacting them at:

Address: 350 Winter Street NE, Salem, OR 97301-3882
Telephone: 503.378.3272 or 800.922.2689
Web site: <http://www.orosha.org>

OR-OSHA also provides two additional publications on this topic:

- (1) “Industrial Truck Operator Training Guide”
- (2) “Tech Notes: Lift Truck Safety Inspection Guide”

Federal OSHA is also a good resource. Information on forklift truck safety can be found on their web site at:

<http://www.osha.gov/SLTC/powerindustrialtrucks/index.html>