



TEXAS WOMAN'S UNIVERSITY™

Powered Industrial Truck Safety Program

Created: 10/18/2021

Revised: 10/3/2022

Office of Environmental Health & Safety

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Table of Contents

I.	Purpose	1
II.	Scope	1
III.	Responsibilities	1
IV.	Classifications	3
V.	Operator Requirements	4
VI.	Vehicle Requirements	4
VII.	Standard Operating Procedures (SOPs)	5
VIII.	Unique Hazards	9
IX.	Inspections and Maintenance	9
X.	Training	11
XI.	Recordkeeping	13
XII.	Appendix 1 – Definitions	15
XIII.	Appendix 2 – General Information- Stability	17
XV.	Appendix 3 – Daily Pallet Jack (Truck) Inspection Form	19
XVI.	Appendix 4- Daily Forklift (Truck) Inspection Form	20
XVII.	Appendix 5 – Powered Industrial Truck Practical Training Form	21
XVIII.	Appendix 6 – Powered Industrial Truck Operator Performance Evaluation Form	23

I. Purpose

Powered industrial trucks (PITs), which include forklift, motorized pallet jacks/hand trucks, etc., are important tools in many workplaces. They perform a variety of material handling tasks and can facilitate moving, raising, lowering, or removing heavy or bulky materials or a number of smaller objects on pallets or in boxes, crates, or other containers. This makes it easier for the employee to move materials. See [Appendix 1](#) for Definitions.

During the movement of materials, there are numerous opportunities for injuries and property damage to occur. Driving a forklift is fundamentally different than driving other trucks. They usually have rear wheel steering; drive more easily loaded than empty; are driven in reverse as often as forward; are often steered with one hand; and have a center of gravity towards the rear, shifting to the front as forks are raised. PITs have a greater chance of tipping over when turned suddenly. They are designed with a very short rear wheel swing, which, when driven at high speeds may cause the center of gravity to shift dramatically. Speed coupled with sudden turns may cause the truck to tip, as might speeding over rough areas. See [Appendix 2](#) for general information on powered industrial truck stability.

This program has been created to minimize the risk of injury to employees or bystanders and to avoid damage to university property. These requirements are established under OSHA Powered Industrial Trucks, 29 CFR 1910.178 and 1910.178 General Standards for General Industry. Texas Woman's University also endeavors to remain compliant with design, construction, stability, inspection, testing, maintenance, and operation requirements of ASME/ANSI B.56.1-1969, Safety Standard for Low Lift and High Lift Trucks.

II. Scope

This program, in accordance with [University Regulation and Procedure Number 04.430](#), applies to the operation of all powered industrial trucks, including motorized pallet jacks and other specialized industrial trucks operated on Texas Woman's University property by staff, faculty, students, or contractors.

III. Responsibilities

A. Risk Management

- i. Assist departments with implementing a regulatory compliant powered industrial truck program.

- ii. Provide powered industrial truck training.
- iii. Provide consultation and guidance when necessary.
- iv. Periodically review and revise this program and reflect changes in regulatory requirements as necessary.
- v. Periodically evaluate the work site usage of powered industrial trucks and pallet jacks.
- vi. Investigate related injuries and damage.

B. Departments and Supervisors

- i. Designate and identify personnel authorized to operate powered industrial trucks (do not allow unauthorized use of the equipment).
- ii. Ensure authorized operators, and supervisors who directly supervise operators, have received proper training and certification (every 3 years for powered industrial trucks) prior to operating equipment. This includes hands-on training, as needed. Review and ensure understanding of this program and its applicability to your department.
- iii. Ensure all safety and manufacturer regulations and instructions are followed.
- iv. Ensure powered industrial trucks are maintained in proper working order and repaired when necessary.
- v. Ensure employees comply with all provisions of this program.
- vi. Ensure employees are provided with and use appropriate personal protective equipment (PPE); i.e. steel toed shoes or steel toe shoe caps.
- vii. Take prompt action including disciplinary action as appropriate when unsafe conditions or acts are observed.
- viii. Investigate (along with Risk Management) related injuries and damage.
- ix. Contact Risk Management to evaluate any safety concerns, or as specified in this program.

C. Operators

- i. Complete lecture training, hands on training, and in person evaluation of competence training prior to operating a powered industrial truck.
- ii. Perform and document powered industrial truck pre-use inspections.

- iii. Report all vehicle maintenance issues to his/her supervisor and remove the equipment from service if necessary.
- iv. Operate and maintain equipment in a safe manner at all times.
- v. Adhere to owner's manual and all provisions in this program.
- vi. Consult with supervisor and/or Risk Management regarding any unusual hazards.

IV. Classifications

Powered industrial trucks are divided into 7 Classes and 11 Types:

A. Classes

- i. **Class 1-** Electric motor, sit-down rider, counter-balanced trucks, (solid or pneumatic tires).
- ii. **Class 2-** Electric motor, narrow aisle trucks.
- iii. **Class 3-** Electric motor Hand trucks or hand/rider trucks (solid tire).
- iv. **Class 4-** Internal combustion engine trucks (solid tires).
- v. **Class 5-** Internal combustion engine trucks (solid tires).
- vi. **Class 6-** Electric and internal combustion engine tractors (solid or pneumatic tires).
- vii. **Class 7-** Rough terrain trucks (pneumatic tires).

B. Types

- i. **Type D-** Diesel powered: few safeguards against fire hazards.
- ii. **Type DS-** Diesel powered: more safeguards than Class D, such as exhaust, fuel and electrical safety features.
- iii. **Type DY-** Diesel powered: more safeguards than Class DS, and has no electrical equipment, but includes a temperature limitation feature.
- iv. **Type E-** Electric powered: few safeguards against fire and electric shock hazards.
- v. **Type ES-** Electric powered: more safeguards than Class E, such as spark arresting features and suppression of surface temperatures.
- vi. **Type EE-** Electric powered: more safeguards than Class ES, by enclosing all electrical equipment to suppress sparks.

- vii. **Type EX-** Electric powered: more safeguards than Class EE, constructed for use around certain flammable vapors, dusts and fibers.
- viii. **Type G-** Gasoline powered: few safeguards against fire hazards.
- ix. **Type GS-** Gasoline powered: more safeguards than Class G, such as fuel, exhaust and electrical system safety features.
- x. **Type LP-** Propane gas powered: few safeguards against fire hazards.
- xi. **Type LPS-** Propane gas powered: more safeguards than Class LP, such as fuel, exhaust and electrical system safety features.

Pallet jacks owned by TWU are classified as follows:

- A. **Manual/Hand Pallet Jack** - Hydraulic powered lift, manual powered driving.
- C. **Electric Walk Behind** - Battery powered lift and driving.

V. Operator Requirements

- A. Operators shall review and follow the manufacturer's operating manual. A copy of the manual must be located on the equipment for PITs.
- B. Only certified operators shall operate a PIT, and trained operators shall operate a pallet jack.
- C. Operators shall wear PPE consisting of steel toe shoes or steel toe shoe caps during operation of powered industrial trucks.
- D. Operators shall follow safe work practices when operating a PIT.
 - i. If a powered industrial truck is to be used in an area containing potentially hazardous atmospheric conditions, it is the responsibility of the operator and supervisor to ensure the correct forklift designation is available for use. Any operation of a forklift in a potentially hazardous atmosphere should be approved by Risk Management.

VI. Vehicle Requirements

- A. All powered industrial trucks must be designed and constructed to meet minimum American National Standards Institute (ANSI) requirements established in the "American National Standard for Powered Industrial Trucks, Part II, ANSI B56.1-1969".

- B. All powered industrial trucks should be marked with a nameplate identifying its approval under ANSI B56.1-1969.
- C. Additional information on the nameplate should include the designation of the powered industrial truck.
- D. If a PIT is not equipped with a seatbelt the work unit must contact the manufacturer or forklift repair vendor to determine if a seatbelt can be retrofitted onto that PIT. If a PIT can be retrofitted with a seatbelt, it must be installed. If a seatbelt cannot be retrofitted, then the work unit must keep the documentation from the manufacturer.
- E. Powered industrial trucks will be kept in clean condition, free of excess dirt, oil, and grease.

VII. Standard Operating Procedures (SOPs)

FORKLIFTS

A. Operation SOP

- a. Perform pre-operational required inspection.
- b. Mount and dismount powered industrial truck facing the truck; use a three-point stance with two hands and one foot in contact with the floor or unit at all times.
- c. Become familiar with all controls, as they may vary from unit to unit.
- d. Understand every control for the powered industrial truck you are to operate before starting the motor/engine.
- e. Review operator's manual to answer specific questions you may have, or ask your supervisor directly.
- f. Fasten your seatbelt every time. It will help to hold you in the frame of the safety cage. Do not attempt to jump from an overturning powered industrial truck!!!
- g. Start powered industrial truck from the operator's position.
- h. Keep your hands, arms and legs inside the powered industrial truck at all times.
- i. Raise the forks approximately two-four inches off the floor for safe traveling.

- j. Keep a clear, safe area around you at all times. Powered industrial trucks are very heavy and will not stop quickly, especially when loaded.

B. Load Lifting SOP

- a. Never exceed the rated capacity of your truck.
- b. Check for overhead obstructions.
- c. Space forks properly.
- d. Raise the forks to the proper height before driving into the pallet.
- e. Drive into the load as far as possible.
- f. Tilt the load back slightly and then lift it.
- g. Watch for overhead objects or obstructions to the sides.
- h. Sound horn, back up to get clearance.
- i. Lower the load to 2 - 4 inches from the floor before traveling.
- j. Be certain the forks clear the pallet before turning or changing height.

C. Traveling SOP

- a. Familiarize yourself with operations, stock locations and traffic patterns.
- b. Be aware of slippery floors, bumps and holes.
- c. Be aware of pedestrians, they always have the right-of-way.
- d. Look in the direction of travel.
- e. Start and stop gradually.
- f. Drive in reverse only when your forward vision is obstructed.
- g. Always drive at a safe speed.
- h. Slow down and sound horn when approaching blind corners and aisles.
- i. Sound horn before reversing.
- j. Maintain a safe following distance between powered industrial trucks (at least 3 lengths).
- k. Generally, operate unloaded trucks with the forks or attachment downgrade.
- l. Keep hands and legs inside the compartment when traveling.
- m. Never pass another vehicle at a blind spot or aisle.
- n. Never allow anyone to ride on your powered industrial truck.

- o. Never drive over debris or objects.

D. Placing a Load SOP

- a. Stop the powered industrial truck completely before raising the load.
- b. Move slowly with the load raised.
- c. Tilt the load forward only when over a stack or rack.
- d. Always stack the load square and straight.
- e. Stack rolls and round objects tightly together.

E. Dock Operation/Traveling With a Load SOP

- a. Inspect the flooring of the vehicle you are entering for cracks, holes, or suspected weaknesses.
- b. Make sure dock plates are properly positioned/secured before driving into transportation vehicles.
- c. Ensure that the brakes of the delivery truck have been set and the trailer wheels have been chocked.
- d. Travel slowly on the dock-boards or bridge-plates. High-speed travel and/or sudden acceleration can jar them loose.
- e. Do not lift or lower a load when traveling, keep load 2 - 4 inches high.
- f. Angle mast back slightly.

F. Fueling with Gasoline SOP

- a. No smoking or open flame.
- b. Shut off the engine.
- c. Use the proper fuel.
- d. Avoid overfilling the tank.
- e. Replace the fuel cap.
- f. Clean up any spills following proper safety procedures for fuel spills.
- g. Use your sense of smell to troubleshoot for leaks.

G. Fueling with Propane SOP

- a. No smoking or open flame.
- b. Shut off engine.
- c. Shut valve off to use propane in the line before changing tanks.
- d. Check all valves and seals before connecting the new tank.
- e. Handle tanks carefully. Propane can cause a “freeze burn” to skin.

- f. Use your sense of smell to troubleshoot for leaks.
- g. Store tanks in storage area, NOT where leaking gas might accumulate.

PALLET JACKS

A. General Operation SOP For All Pallet Jacks

- a. Perform pre-operational required inspection.
- b. Do not exceed the manufacturer's load rated capacity; read the lift capacity plate on the pallet jack if you are unsure.
- c. Do not ride on pallet jacks.
- d. Start and stop the pallet jack gradually to prevent the load from slipping.
- e. Pull manual pallet jacks; push them when going down an incline or passing close to walls or obstacles.
- f. If your view is obstructed, ask a spotter to assist in guiding the load.
- g. Stop the pallet jack if anyone gets in your way.
- h. Never place your feet under the pallet jack.

B. Manual Pallet Jacks

Hand pallet jacks/trucks have a simple raise/neutral/lower operating method. To raise the forks, push the actuating lever down and pump the handle up and down until the pallet has reached the desired height. A clearance of one inch between the floor and pallet is usually sufficient to move the load. To move a load, engage the actuating lever in a neutral or middle position. This position disengages the lifting mechanism, making the handle free from hydraulic resistance, and the forks remain in the raised position. Lower the forks by pulling the actuating lever past the neutral position. Because the lever is spring-loaded for lowering, when you release the lever it will automatically return to the neutral position.

C. Electric Pallet Jacks

Electric pallet jacks/trucks should first be unplugged and the charging cord stored away inside the machine. The controls will vary depending on the specific equipment for which you should receive hands-on training on before operating, but generally there is an obvious down and up button to raise and lower the load as well as controls for forward and reverse moving. Always plug it back in after use so it is charged for the next use.

VIII. Unique Hazards

A. Carbon Monoxide

- i. Powered industrial trucks with internal combustion engines produce carbon monoxide (CO), an odorless, and deadly gas produced by the incomplete burning of any carbon containing material. Gasoline, natural gas, propane, coal, and wood are examples of carbon containing material. The most common source of CO is the internal combustion engine. Trucks, cars, powered industrial trucks, floor polishers, pressure washers, and other fossil-fueled powered machines generate carbon monoxide. When inhaled, CO restricts the ability of your blood system to carry oxygen to the body. Overexposure results in carbon monoxide poisoning. Mild poisoning may cause headaches, chest tightness, dizziness, drowsiness, inattention, fatigue, flushed face, and/or nausea. Continued exposure causes lack of coordination, confusion, weakness, and/or loss of consciousness. Smoking tobacco, using drugs and/or alcohol, pregnancy, and some heart conditions may aggravate CO poisoning. Physical activity will increase exposure, as oxygen uptake increases. Carbon monoxide has the potential to cause death within minutes, sometimes with no warning symptoms in cases of severe poisoning. The more CO there is in the air and the longer the exposure, the greater the danger. Standard operating procedures reduce CO levels, & prevent CO overexposure and illness.

B. Pedestrians

- i. Each powered industrial truck and pallet jack on campus was purchased for a specific purpose and will function in a specific area most of the time. Occasionally, they are driven in locations shared with pedestrians. The operator will keep a lookout for ALL pedestrians at ALL times and drive defensively.

IX. Inspections and Maintenance

A. Inspections

i. Pre-Shift Inspection

- a. Must Complete the pre-use inspection checklist for Pallet Jacks/Trucks (see [Appendix 3](#)) or Forklift-type PITs (see

[Appendix 4](#)) prior to operating any PIT (i.e., at the beginning of every work shift and whenever a new authorized operator takes control of the PIT).

- b. Adhere to the manufacturer's guidelines for additional pre-use inspection criteria, if applicable.
- c. Completed pre-use checklists must be submitted to the departmental supervisor.
- d. Any safety defects, impairments, damage, or malfunctions must be reported to supervisors, and the PIT must be immediately removed from service and tagged with a label "Out of Service: Do Not Use" until repaired.

ii. **Periodic Inspection**

- a. Periodic inspections occur in conjunction with maintenance and service schedules, expressed in days and hours of operation. Specialized service technicians provide repair beyond recommended service schedules.

A. Maintenance

i. **General Maintenance**

- a. Adhere to the manufacturer's recommendations to establish a PIT preventative maintenance program and take into account the environment of the workplace and severity of use.
- b. Only authorized and qualified personnel can perform repairs on PITs.
- c. PIT repairs must be conducted within a designated area for equipment or vehicle maintenance.

ii. **Fueling and Charging Batteries**

- a. Only trained and authorized personnel may fuel or charge batteries on PITs.
- b. Fueling and battery charging must take place in areas designated for those purposes.
- c. Wear protective clothing and PPE in accordance with the manufacturer's guidelines while fueling and charging batteries.

X. Training

A. Initial Training

i. Training Requirements

- a. Supervisors must ensure all operators are adequately trained prior to operating a powered industrial truck. Training shall consist of a combination of formal instruction (e.g., lecture, discussion, interactive computer learning, video tape, written material), practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and practical evaluation of the operator's performance in the workplace.
- b. Operator training shall be conducted by persons who have the knowledge, training, and experience to train powered industrial truck operators.
- c. Formal instruction is the pre-requisite for practical training.

ii. Formal instruction

- a. Includes lecture, discussion, online, video, and or written training and must consist of the following elements, when applicable:
- b. Specific operating instructions, warnings, limitations, and precautions specific to the type of equipment to be utilized by the operator;
- c. Differences between the powered industrial truck and a vehicle;
- d. Equipment controls and instrumentation including their location and proper operation;
- e. Operating the motor/engine;
- f. Steering and maneuverability;
- g. Visibility, including limitations when loading/unloading;
- h. Fork use and attachment adaptation, operation and limitations (when applicable);
- i. Vehicle capacity and stability limitations;
- j. Completing equipment pre-use inspections;
- k. Refueling and/or battery changing/charging; and
- l. Specific workplace operation of the powered industrial truck including the following:

- i. Handling loads specific to the operation;
 - ii. Operating in narrow aisles and/or around pedestrian traffic;
 - iii. Operating on sloped surfaces;
 - iv. Ventilation while using powered industrial trucks; and
 - v. Use restrictions based on hazardous locations.
 - iii. **Practical Training**
 - a. Includes demonstration performed by the trainer and practical exercises performed by the trainee in order to ensure competence by the operator when utilizing a powered industrial truck.
 - b. Practical evaluation should simulate typical work to be conducted with the powered industrial truck and may consist of the following:
 - i. Location and purpose of various levers, gages, etc.
 - ii. How to move the powered industrial truck in multiple directions, on an incline (if applicable), navigating tight spaces, etc.
 - iii. How to pick up, transport, and place loads
 - iv. How to properly refuel or recharge the truck
 - v. How to properly park and turn off the truck
 - c. See [Appendix 5](#) for the Powered Industrial Truck Practical Training Form.

A. Practical Evaluation

- i. An evaluation of each powered industrial truck operator's performance shall be conducted after initial training and at least once every three years thereafter.
- i. Practical evaluations shall be conducted by persons who have the knowledge, training, and experience to evaluate the competence of powered industrial truck operators.
- ii. Practical evaluation should be conducted utilizing the powered industrial truck(s) to be used by the operator.
- iii. Practical evaluation should simulate typical work to be conducted with the powered industrial truck and may consist of the following:
 - a. Performing pre-use inspections
 - b. Safe operation of the industrial truck

- c. Handling a load
- d. Maneuverability
- iv. See [Appendix 6](#) for the Powered Industrial Truck Operator Performance Evaluation Form

B. Refresher Training

- i. Refresher training may be necessary due to certain circumstances as follows:
 - a. The operator is observed operating the vehicle in an unsafe manner;
 - b. The operator is involved in an accident or near-miss incident;
 - c. The operator receives an evaluation revealing unsafe practices;
 - d. There is a change in workplace conditions affecting operation of an industrial truck;
 - e. There is a change in the type of industrial truck being utilized in the workplace.

C. Certification/Recertification

- i. Powered Industrial Truck operators shall be certified prior to operating a powered industrial truck.
- ii. This certification must be documented and include the following.
 - a. Operator name
 - b. Date of training
 - c. Date of evaluation
 - d. Evaluator name

XI. Recordkeeping

- A. Departments and units are responsible for maintain the following records:
 - a. Training certifications for all powered industrial truck operators including names and dates of training; and the equipment they are certified to operate.
 - b. Pre-use inspection checklists.
 - c. Maintenance records for each powered industrial truck.
 - d. Accident reports involving powered industrial trucks.

- B. Unless otherwise specified in this program, all records must be retained and made available for at least 5 years.

XII. Appendix 1 - Definitions

Authorized Person (Repair): Someone with training and experience on the brands/models being serviced. There are specific safety considerations that are unique to forklift trucks, thus the training must be specific to the brands/models being serviced.

Center of Gravity- is the point of an object at which all of the object's weight is concentrated. For symmetrical loads, the center of gravity is at the middle of the load.

Certified Operator: Certification of a PIT operator at UNCP is a three-step process consisting of classroom instruction, hands-on training and hands-on evaluation. Once the employee has successfully completed all three steps they are considered to be a certified operator.

Competent Trainer: An employee who has successfully completed a Train-the-Trainer or equivalent type of training program and is familiar with the type of PIT in their work unit. A contractor or equipment vendor who has experience training PIT safety and operation and is familiar with the equipment is also permitted to be a Competent Trainer.

Competent Evaluator (Hands-on): An employee in the department/work unit who is experienced and competent with the PIT. An employee must be familiar with the equipment and its safe operation. In order to be considered competent in regards to conducting the evaluation portion of the PIT training, an employee must have successfully completed the classroom portion of PIT training. This employee could be but is not limited to a certified operator, supervisor/manager or safety officer.

Counterweight- is the weight that is built into the truck's structure and is used to offset the load's weight and to maximize the vehicle's resistance to tipping over.

Fulcrum- is the truck's axis of rotation when it tips over.

Grade- is the slope of a surface, which is usually measured as the number of feet of rise or fall over a hundred-foot horizontal distance (the slope is expressed as percent).

Lateral Stability- is a truck's resistance to overturning sideways.

Line of Action- is an imaginary vertical line through an object's center of gravity.

Load Center- is the horizontal distance from the load's edge (or the fork's or other attachment's vertical face) to the line of action through the load's center of gravity.

Longitudinal Stability- is the truck's resistance to overturning forward or rearward.

Moment- is the product of the object's weight times the distance from a fixed point (usually the fulcrum). In the case of a powered industrial truck, the distance is measured from the point at which the truck will tip over to the object's line of action. The distance is always measured perpendicular to the line of action.

Powered Industrial Truck: Vehicles which are commonly called "forklifts" or "lift trucks" and are used primarily to move materials. This includes motorized pallet jacks/hand trucks. They can be used to move, raise, lower, or remove large objects or a number of smaller objects on pallets or in boxes, crates, or other containers. Powered industrial trucks can be ridden or controlled by a walking operator. Earth moving and over the road haulage trucks are not included in this definition.

Standard Operating Procedure (SOP)- SOPs are outlined in this program for topics of operation, inspection, placing a load, traveling with a load, fueling with battery, fueling with gasoline or diesel, and fueling with propane.

Track- is the distance between the centerline of the vehicle's front and rear wheels.

Wheelbase- is the distance between the centerline of the vehicle's front and rear wheels

XIII. Appendix 2 - General Information- Stability

Determining the stability of a powered industrial truck is simple once a few basic principles are understood. There are many factors that contribute to a vehicle's stability: the vehicle's wheelbase, track, and height; the load's weight distribution; and the vehicle's counterweight location (if the vehicle is so equipped).

The "stability triangle," demonstrates stability simply.

Basic Principles- The longitudinal stability of a counterbalanced powered industrial truck depends on the vehicle's moment and the load's moment. In other words, if the mathematic product of the load moment (the distance from the front wheels, the approximate point at which the vehicle would tip forward) to the load's center of gravity times the load's weight is less than the vehicle's moment, the system is balanced and will not tip forward. However, if the load's moment is greater than the vehicle's moment, the greater load-moment will force the truck to tip forward.

Longitudinal Stability- The axis of rotation when a truck tips forward is the front wheels' point of contact with the pavement. When a powered industrial truck tips forward, the truck will rotate about this line. When a truck is stable, the vehicle-moment must exceed the load-moment. As long as the vehicle-moment is equal to or exceeds the load-moment, the vehicle will not tip over. On the other hand, if the load moment slightly exceeds the vehicle-moment, the truck will begin to tip forward, thereby causing the rear to lose contact with the floor or ground and resulting in lose of steering control. If the load-moment greatly exceeds the vehicle-moment, the truck will tip forward.

To determine the maximum safe load-moment, the truck manufacturer normally rates the truck at a maximum load at a given distance from the front face of the forks. The specified distance from the front face of the forks to the line of action of the load is commonly called the load center. Because larger trucks normally handle loads that are physically larger, these vehicles have greater load centers. Trucks with a capacity of 30,000 pounds or less are normally rated at a given load weight at a 24-inch load center. Trucks with a capacity greater than 30,000 pounds are normally rated at a given load-rate at a 36- or 48-inch load center. To safely operate the vehicle, the operator should always check the data plate to determine the maximum allowable weight at the rated load center.

Although the true load-moment distance is measured from the front wheels, this distance is greater than the distance from the front face of the forks. Calculating the maximum allowable load-moment using the load center distance always provides a lower load-moment than the truck was designed to handle. When handling unusual loads, such as those that are larger than 48 inches long (the center

of gravity is greater than 24 inches), or that have an offset center of gravity, etc., a maximum allowable load-moment should be calculated and used to determine whether a load can be safely handled. For example, if an operator is operating a 3,000-pound capacity truck (with a 24-inch load center), the maximum allowable load-moment is 72,000 inch-pounds (3,000 x 24). If a load is 60 inches long (30-inch load-center), then the maximum that this load can weigh is 2,400 pounds (72,000 divided by 30).

Lateral Stability- The vehicle's lateral stability is determined by the line of action's position, (a vertical line that passes through the combined vehicle's and load's center of gravity), relative to the stability triangle. When the vehicle is not loaded, the truck's center of gravity location is the only factor to be considered in determining the truck's stability. As long as the line of action of the combined vehicle's and load's center of gravity falls within the stability triangle, the truck is stable and will not tip over. However, if the line of action falls outside the stability triangle, the truck is not stable and may tip over.

Factors that affect the vehicle's lateral stability include the load's placement on the truck, the height of the load above the surface on which the vehicle is operating and the vehicle's degree of lean.

Dynamic Stability-Up to this point, the stability of a powered industrial truck has been discussed without considering the dynamic forces that result when the vehicle and the load are put into motion. The weight's transfer and the resultant shift in the center of gravity due to the dynamic forces created when the machine is moving, braking, cornering, lifting, tilting, and lowering loads, etc. are important stability considerations.

When determining whether a load can be safely handled, the operator should exercise extra caution when handling loads that cause the vehicle to approach its maximum design characteristics. For example, if an operator must handle a maximum load, the load should be carried at the lowest position possible, the truck should be accelerated slowly and evenly, and the forks should be tilted cautiously. However, no precise rules can be formulated to cover all of these eventualities.

(Appendix 2 was copied verbatim from 63 Federal Register 66270, Dec. 1, 1998).

For questions, contact Environmental Health & Safety at risk@twu.edu or (940) 898-4001, option 3.

XV. Appendix 3 - Daily Pallet Jack (Truck) Inspection Form

Inspector Name: _____ Date: _____ Truck Inspected: _____

Inspection Item	Pass	Fail	Comment
Guards/Covers - Are there broken welds, missing bolts, or damaged areas on the package backrest, battery covers, or other covers?			
Hand Guards - Are the hand guards present and undamaged?			
Forks - Are they cracked or bent, worn, or mismatched? Is there excessive oil or water on the forks?			
Wheels - What do the rubber wheels look like (both the drive and fork wheels)? Are there large pieces of rubber missing or separated from the rim?			
Battery Check - Are the cell caps and terminal covers in place? Are the cables missing insulation?			
Horn - Does the horn work if equipped?			
Load Handling Attachments - Is there hesitation when hoisting or lowering the forks? Is there excessive oil on the cylinders?			
Drive - Are the forward and reverse controls functioning properly?			
Leaks - Any signs of hydraulic fluid or battery acid leaks?			
Notes:			

XVI. Appendix 4- Daily Forklift (Truck) Inspection Form

Inspector Name: _____ Date: _____ Truck Inspected: _____

Inspection Item	Pass	Fail	Comment
Overhead Guard - Are there broken welds, missing bolts, or damaged areas?			
Hydraulic Cylinders - Is there leakage or damage on the lift, tilt, and attachment functions of the cylinders?			
Mast Assembly - Are there broken welds, cracked or bent areas, and worn or missing stops?			
Lift Chains and Rollers - Is there wear or damage or kinks, signs of rust, or any sign that lubrication is required? Is there squeaking?			
Forks - Are they cracked or bent, worn, or mismatched? Is there excessive oil or water on the forks?			
Tires/Wheels - What do the tires look like? Are there large cuts that go around the circumference of the tire? Are there large pieces of rubber missing or separated from the rim? Are there missing lugs? Is there bond separation that may cause slippage?			
Battery Check - Are the cell caps and terminal covers in place? Are the cables missing insulation?			
Hydraulic Fluid - Fluid level okay?			
Gauges - Are they all working properly?			
Steering - Is there excessive free play? Is the power steering pump working?			
Brakes - If pedal goes all the way to the floor when you apply the service brake, it is the first indicator that the brakes are bad. Brakes should work in reverse, also. Does the parking brake work? The truck should not be capable of movement with parking brake engaged.			
Lights - If equipped with lights, are they working properly?			
Horn - Does the horn work?			
Load Handling Attachments - Is there hesitation when hoisting or lowering the forks, when using the forward or backward tilt, or the lateral travel on the side shift? Is there excessive oil on the cylinders?			
Propane Tank - Is the tank guard bracket properly positioned and locked down?			
Propane Hose - Is it damaged? It should not be frayed, pinched, kinked, or bound in any way. Is the connector threaded on squarely and tightly?			
Propane Odor - If you detect the presence of propane gas odor, turn off the tank valve and report the problem.			
Leaks - Any signs of oil, coolant, fuel or transmission leaks?			
Windshield Wipers - Do they work properly if equipped?			
Seat Belts - Do they work? Seatbelt use is required.			
Notes:			

XVII. Appendix 5 - Powered Industrial Truck Practical Training Form

What Trainer Should Demonstrate

- Show trainees the various lift trucks used in your organization. Identify whether they are gasoline, diesel, LP or electrically powered.
- With each lift truck, show the location and function of all gauges, levers, pedals, switches and safety features.
- Demonstrate:
 - Pre-use inspection
 - Starting the lift truck(s)
 - Lifting the forks
 - Tilting the forks
 - Adjusting the width of the forks
 - Rear wheel steering
 - Driving a lift truck in a straight line, in both a forward and backward direction
 - Driving a lift truck in a circle, in both a forward and backward direction
 - Driving a lift truck in a cross, making clean turns, in both a forward and backward direction
 - Driving a lift truck in tight spots, making smooth turns, in both a forward and backward direction
 - Driving up and down an incline without a load
 - Picking up a load
 - Driving up and down an incline with a load
 - Picking up a load from a stack of boxes and moving each to a new area
 - Parking and shutting down a lift truck
 - Each step required to refuel or recharge the lift trucks used in your organization; emphasize precautions that must be followed for safe refueling and recharging
- If applicable, demonstrate:
 - Picking up a load and placing it in a simulated trailer and/or simulated box car
- Summary
 - Summarize the session and emphasize the importance of safety
 - Answer any questions trainees may have
 - Distribute any printed literature you may feel is necessary

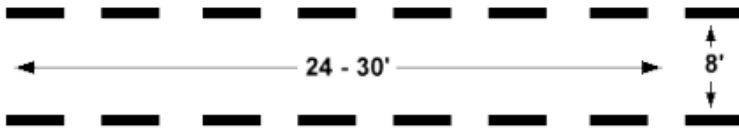
What Trainees Should Practice and Be Able to Do

- Have trainees identify and name the different types of lift trucks used in your organization
- Have trainees identify and explain the function of all gauges, levers, pedals, switches and safety features
- Have trainees practice
 - Pre-use inspection
 - Starting the lift truck(s)
 - Lifting the forks
 - Tilting the forks
 - Adjusting the width of the forks
 - Rear wheel steering
 - Driving a lift truck in a straight line, in both a forward and backward direction
 - Driving a lift truck in a circle, in both a forward and backward direction
 - Driving a lift truck in a cross, making clean turns, in both a forward and backward direction
 - Driving a lift truck in tight spots, making smooth turns, in both a forward and backward direction

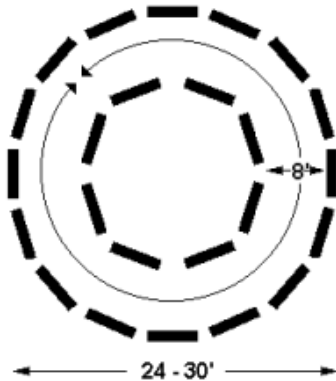
- Driving up and down an incline without a load
- Picking up a load
- Driving up and down an incline with a load
- Picking up a load from a stack of boxes and moving each to a new area
- Parking and shutting down a lift truck
- Each step required to refuel or recharge the lift trucks used in your organization; emphasize precautions that must be followed for safe refueling and recharging
- If applicable, have trainees demonstrate:
 - Picking up a load and placing it in a simulated trailer and/or simulated box car

Example Driving Exercises

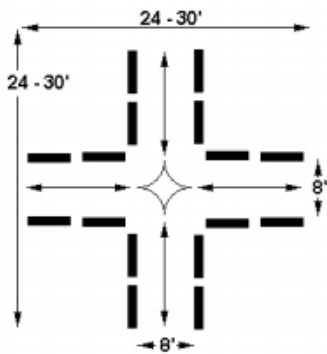
A. Straight - forward and back (exercise #1)



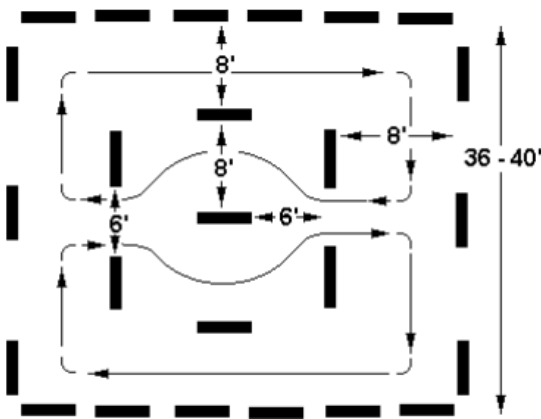
B. Circle - forward and back (exercise #2).



C. Cross - forward and back (exercise #3)



D. Tight Spots - forward and back (exercise #4)



XVIII. Appendix 6 - Powered Industrial Truck Operator Performance Evaluation Form

OPERATOR NAME: _____ DATE _____ TIME _____ a.m./p.m.

TRUCK EVALUATED: _____

	NA	Yes	No
Fully conducted appropriate daily inspection			
Shows familiarity with truck controls			
Gave proper signals when turning			
Slowed down at intersections			
Sounded horn at intersections			
Obedied 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 bridgeplates/ramps			
Did place loads within marked/designated 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			
Comments:			
Employee performance was acceptable?			
Employee requires additional training?			
Evaluator Name:			
Evaluator Signature:			