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| Morenci Safe Production Standard | Standard 3.7.1 | |
| | OHSAS 18001:2007 | 4.4.6 |
| | Revision # | 02 |
| Forklift Operation | Revision Date | 06/24/2013 |
| | Effective Date | 11/1/2012 |
| | Document Owner | Training Department |
| | Approvals: | |
| <i>Senior VP Morenci Operations: 7/27/2012</i> | <i>Safety Steering Committee: 7/27/2012</i> | |

1.0 PURPOSE:

Forklifts are important tools for our workforce that if properly operated, maintained, and inspected, can be a valuable asset towards safe production operations. The elements of this standard are intended to outline training, inspection, operation and maintenance practices that are consistent with legal requirements and industry best practices.

2.0 SCOPE:

All employees, contractors, and vendors on Morenci Operations property who operate class 1 – 7 forklifts will comply with all elements of this standard. Divisions and Contractors may implement their own procedures that meet or exceed this document’s requirements if additional hazards are generated or supplementary controls are used as a result of tasks performed within their areas.

This standard does not supersede or replace operating or maintenance requirements specified by the manufacturer. Manufacturer manuals contain important information that must be read, understood and followed for each unique piece of equipment that is operated.

Existing task trained employees shall have completed formal classroom training from within 1 year of inception date of the standard.

3.0 TERMS, DEFINITIONS AND ABBREVIATIONS

- 3.1 Forklift:** a mobile, power driven vehicle used to carry, push, pull, lift, stack, or tier material that can be powered by electric or combustion engines (excluded are vehicles used for earth moving and over-the-road hauling)
- 3.2 Fulcrum Point:** the point on the truck which balances the weight of the truck and the weight of the load being carried. For most applications, the fulcrum is the front tires, which is the point where the load is balanced by the counterweight of the vehicle.
- 3.3 Load Moment:** the combination (product) of the load weight and distance from the fulcrum point (weight x distance from the fulcrum point).

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- 3.4 Mast:** is comprised of metal plates that lift, lower, and tilt materials. The mast has interlocking rails that give it support during its movement of heavy materials. It is made operable with the use of hydraulic cylinders or a series of chains that are linked to the truck's motor. The mast can be located in the front or the rear of the truck.
- 3.5 Carriage:** is the component to which the forks or other attachments mount. It is mounted into and moves up and down the mast rails by means of chains or by direct attachment to the hydraulic cylinder. Like the mast, the carriage may have either rollers or bushings to guide it in the interlocking mast rails.
- 3.6 Load Back Rest:** is a rack-like extension that is either bolted or welded to the carriage in order to prevent the load from shifting backward when the carriage is lifted to full height.
- 3.7 Attachments:** may consist of forks or tines that are the L-shaped members that engage the load. A variety of other types of material handling attachments are available. Some attachments include side shifters, slip-sheet attachments, carton clamps, multipurpose clamps, rotators, fork positioners, carpet poles, pole handlers, container handlers and roll clamps.
- 3.8 Qualified Trainer:** an individual authorized by FMMO to conduct forklift training and who has the knowledge, training and experience to train and evaluate forklift operators. The trainee can only operate the forklift when directly supervised by such a person and when this would not endanger anyone.

4.0 RESPONSIBILITIES

- 4.1 Supervisors:** will ensure that their employees understand and follow this standard, including evaluating task training received. Supervisor's duties include evaluation of the work to be performed, determination of the means of controls that will be used, and adherence to this standard. Supervision shall evaluate work activities that use forklifts on a routine basis to ensure the requirements of the standard are being followed.
- 4.2 Contractors:** will follow this standard or implement a process that is consistent with the requirements within. Contractors are responsible for ensuring the equipment they operate meets legal requirements and that their employees have been task trained to operate forklifts.
- 4.3 Employees:** will follow this standard and notify their supervisor of any situations that do not comply with this standard. Forklift operators are responsible for:
 - 1. Inspecting forklifts
 - 2. Reporting any defects found during pre-use inspections to their supervisor;
 - 3. Not operating a forklift that is in need of repairs;
 - 4. Not operating a forklift on which they have not been trained;
 - 5. Operating forklifts safely to prevent injury or damage; and
 - 6. Reporting any incidents or unsafe acts to their supervisor
- 4.4 Management:** will provide resources for supervisors and employees to comply with this standard. Resources may include information, training, time, money and equipment.
- 4.5 Health and Safety Department:** will provide information related to forklift hazards and controls; conduct in the field evaluations in conjunction with management to identify deficiencies. Investigate

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all accidents/incidents and recommend corrective actions to ensure safety of employees operating this equipment.

- 4.6 Project Managers:** will ensure that contractors are informed of the standard and that contractors understand the requirements for compliance with the standard.
- 4.7 Training Department:** will provide or make available classroom training for all FMMO employees required to operate forklifts.

5.0 GENERAL SAFE PRODUCTION REQUIREMENTS

General Safe Work Practices

- 5.1** All forklifts shall be equipped with falling object protection structures (FOPS), a back-up alarm and seat belt. A fire extinguisher is not required unless ingress and egress from large class 7 forklifts could be hindered in the event of a fire.
- 5.2** Seat belts shall be worn at all times by the operator when the forklift is traveling or manipulating a load. Seatbelts should be maintained in a functional condition and replaced based upon manufacturer recommendation.
- 5.3** No individual shall be allowed to stand or pass under the elevated portion of any forklift, whether loaded or empty, unless the elevated portion is effectively blocked from hazardous movement.
- 5.4** Forklift modifications that affect capacity and safe operation must not be performed without the manufacturer's prior written approval.
- 5.5** Maintain sufficient clearance to keep the mast under lowest obstacle within the area being operated (i.e. under overhead installations, lighting, sprinkler piping, manifolds, doorways, etc.) Where restricted clearance creates a hazard to operators the area shall be conspicuously marked to indicate the restricted clearance.
- 5.6** Do not jump from an overturning, sit-down type forklift. Stay with the truck, hold onto steering wheel firmly and lean in the opposite direction of the overturn.
- 5.7** No passengers are permitted to ride on forklift trucks unless an additional seat and restraint device is provided.
- 5.8** Every forklift shall have a durable, corrosion-resistant nameplate, legibly inscribed with the following information:
 - 1. Forklift model and serial number
 - 2. Forklift weight
 - 3. Designation of compliance with the mandatory requirements of ASME B56.1, Safety Standard for Low and High Lift Trucks, applicable to the manufacturer
 - 4. Rated capacity.

In addition to these requirements, additional information is required (and allowed) on the nameplates of high-lift trucks, electric trucks, and trucks intended for use in hazardous locations.

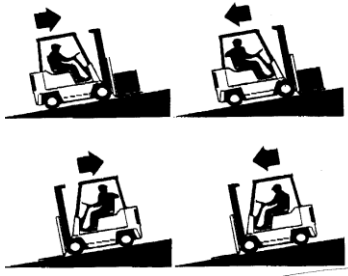
5.9 Traveling and Parking Practices

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- On all grades, the load and load engaging means shall be tilted back, if applicable, and raised only as far as needed to clear the road surface. The forks shall not be raised or lowered while the forklift is traveling at more than 5mph.
- Under all travel conditions, the truck shall be operated at a speed that will permit it to be brought safely to a stop.
- Operators shall slow down and sound the horn prior to crossing pedestrian crosswalks, entering buildings and at other locations where vision is obstructed.
- Forklifts shall not be driven up to anyone standing in front of a bench, piece of equipment or other fixed object where a pinch point exists. If routine travel occurs in close proximity to pedestrian traffic physical barriers should be installed and the hierarchy of controls used to reduce the likelihood of contact.
- Never drive forklifts into elevators unless authorized and the combined weight of the forklift and load does not exceed the rated capacity of the elevator.
- Do not block aisles and access to stairways, fire equipment, and electrical panels upon parking a forklift.
- When forklifts are left unattended the forks must be lowered completely to the ground, the controls placed in neutral, the parking brake set and the wheels chocked when positioned on a grade. If the truck is equipped with LPG fuel supply, close the fuel valve at the tank.



- When traveling on grades the forks shall be tilted back far enough to maintain stability of the load. In grades exceeding tilt capacity the forklift shall be traveled with the load facing the uphill slope to prevent hazardous movement of the load. When distances in excess of 1,000ft must be traveled along a significant grade, a flatbed truck or similar handling device shall be used to transport the load. Forklifts shall not be operated on grades in excess of that specified by the manufacturer.

5.10 Traveling Restrictions on Grades: Forklifts shall not be operated on grades in excess of manufacturer specifications. Safe machine operation depends on various factors including the machine model, configuration, maintenance, operating practices, terrain conditions, tire pressure and load stability. The following guidelines should be used to control the risk of tip-overs while operating specific classes of forklifts on grades:

- Class 1-3 Forklifts:** Shall not operate on grades in excess of 5%
- Class 4-5 Forklifts:** Shall not operate on grades in excess of 15%
- Class 7 Forklifts:** Shall not operate on grades in excess of 25%

Forklift operation sideways on inclined surfaces shall be avoided. If tasks will require perpendicular slope travel a risk assessment shall be performed to evaluate the likelihood of a tip over and the operation restricted to:

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- 1) Carrying loads which weigh less than 75% of the forklifts peak capacity
- 2) Operating on grades which are less than 75% of the forklifts specified limits
- 3) The machine is operated by an employee that has completed a formal forklift training program and has experience conducting similar tasks.

Where grades exist within areas of routine forklift operation at or near peak operating limits the area shall be conspicuously marked to indicate the nominal grade.

- 5.11** Railroad tracks shall be crossed diagonally wherever possible. Parking closer than 10 feet from the center of railroad tracks is prohibited.
- 5.12** Forklifts are not permitted to drive on public roadways unless they are registered with the state of Arizona. In general forklifts are not allowed to transport loads along public roadways unless registered and authorized by management. All loads should be delivered by a truck and unloaded once onsite at the required destination whenever feasible.
- 5.13 Ramps and Inclines:** Special care shall be taken when operating on ramps and other inclines. The load shall be well stacked and stable so that maneuvering on the incline does not cause it to spill or tip over. Drive forward going up the incline, and drive backward going down it to keep the load resting firmly against the carriage or backrest. Weather related conditions shall be observed and tasks modified when additional hazards are introduced as slippery surfaces. Loads should not be manipulated vertically or horizontally while operating on a ramp or incline due to the increased likelihood of instability and overturn.

When ramps or inclines exist that could overturn or endanger personnel on the forklift adequate berms or guardrails shall be installed.

- 5.14 Lifting and Loading Practices** The center of gravity, and therefore the stability, of a loaded forklift is affected by a number of factors including size, weight, shape, and position of the load. Also, the height to which the load is elevated, the amount of forward or backward tilt, tire pressure, and the dynamic forces created when the truck is moving. These dynamic forces are caused by things like acceleration, braking, operating on uneven surfaces or on an incline, the fulcrum point and turning.
- Do not lift unstable loads. If the material is not banded or correctly placed and the load is not secured from lateral movement, do not attempt to lift it.
 - When transporting wide loads, which protrude outward from the mast more than 3ft on either side, on heavily traveled roadways; the load shall be marked with flagging and a spotter used to prevent contact with other equipment.
 - Never attempt to lift a load that exceeds the rated capacity of the forklift.
 - Always space forks to fit the load and to maintain a good center of gravity. Always keep yourself and others clear of the hoisting mechanism. Keep forks as wide as possible when picking up a load to ensure a good center of gravity.
 - Tilt the elevated load forward only when directly over unloading area. If a load or lifting mechanism is elevated to pick or deposit a load, keep tilt in either direction to a minimum.

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- Lower loads slowly and stop them gradually, avoiding severe strains on the hydraulic systems to ensure that the truck will last longer.
- When stacking, leave a clearance of at least three feet from a fire sprinkler head.
- Vehicles being loaded and unloaded by a forklift shall have the controls placed in park, the parking brake set and be chocked to prevent inadvertent movement.

6.0 SPECIALIZED FORKLIFT APPLICATIONS

Forklifts are often used in a wide array of special applications to facilitate handling of varying loads. When forklifts are used in a manner other than normal load manipulation the likelihood of overturning, overloading and injury increase. The sections below provide the minimum requirements that must be met at FMMO for common specialized forklift applications.

- 6.1 Forklift Mounted Man Baskets (Lifting and lowering people):** Never allow anyone to be lifted while standing on the forks or on a pallet lifted by the forks. An approved work platform (single level only, with standing area resting on forks) can be attached to a forklift truck for overhead maintenance work, provided it is equipped with guardrails and toe boards, and is securely fastened to the forks and mast. In addition all FMMO forklift mounted work platforms applications must meet the following:
- a. All work platforms must meet ANSI construction design standards and have a weight capacity plate attached, in addition to nameplate on forklift. Pre-engineered work platforms meeting ANSI standards are recommended for new purchases.
 - b. The forklift must be equipped with velocity fuses or similar, i.e. valves in the hydraulic lines to prevent free fall in the event of a hose failure.
 - c. The mast, if adjustable is set vertical (not on an angle) to ensure the working surface inside the man basket remains as flat as possible.
 - d. Existing "in-house" work platforms designed and fabricated by on-site personnel must be certified by a Professional Engineer and a weight capacity plate attached, before use.
 - e. All work platforms must be inspected by a competent individual before each use. If work platforms are damaged or modifications are required the alterations must be approved in writing by the manufacturer or a professional engineer.
 - f. Operators must not leave the controls while the truck is being used to lift personnel.
 - g. Personnel on platforms must use fall arrest equipment attached to a certified anchor point within the platform.
 - h. The forklift must be on a level surface and the parking brake set while the mast is elevated.
 - i. The forklift is not permitted to move in between work areas with the mast raised and personnel in the platform. Minor adjustments vertically and horizontally are permitted to the extent necessary to align personnel with the elevated work.
 - j. The combined weight of the platform, load, and personnel is not to exceed one-half of the truck capacity as indicated on the nameplate of the forklift truck.
 - k. Ladders, scaffolds, etc. are prohibited from use inside the platform.

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- I. No overhead obstruction hazards can exist including work within 20ft of energized overhead power lines and other unprotected energized electrical conductors.

6.2 Rigging Applications: Free rigging is the direct attachment to or placement of rigging equipment (slings, shackles, rings, etc.) onto the tines of a powered industrial truck for a below-the-tines lift. This type of lift does not use an approved lifting attachment. Free rigging using a forklift shall only be used when other more suitable rigging applications are not available. The use of an engineered forklift rigging attachment (i.e. cherry picker, jib attachment) shall be used when available.

Although free rigging is a common practice, it could affect the capacity and safe operation of a powered industrial truck. Modifications and additions of rigging equipment which affect the capacity and safe operation shall not be performed. Only stable and safely arranged loads shall be handled. Caution shall be exercised when handling off-center loads which cannot be centered. In general the following precautions shall be adhered to during free rigging applications:

- a) The rigging apparatus shall be rated for the capacity of the load and installed in a manner which guards against contact with the sharp edges of forks.
- b) The forks shall be tilted back and the rigging attached at the base of the forks to prevent the load from sliding off the front of the forks. If using class 5 or smaller forklifts this practice may expose forklift components (i.e. hydraulic lines, carriage, etc...) to damage as a result of load swing. In this case the load shall be installed in the center of the forks and handled in limited short distance situations with no personnel located within 6ft of the pick.
- c) A tagline shall be used to guide the load if needed; personnel must remain outside of the suspended load and swing radius of the load at all times.
- d) The rigging apparatus, load weight, attachment point and height of the load must be evaluated against the forklifts load weight chart to ensure that the stability of the forklift will be maintained.

Front-end Attachments: If the truck is equipped with front-end attachments other than factory installed attachments, each attachment must be equipped with a load handling weight chart which indicates the approximate weight of the truck and attachment combination at maximum elevation with the load laterally centered.

6.3 Tandem Lifts: The use of two forklifts to handle a common load is only permitted when it is impractical to lift the load with a single lifting device. When two forklifts are used in tandem to handle a common load, each forklift shall be operated by a qualified and experienced operator and the lift shall be coordinated by a third person who is experienced and allocated the responsibility of supervising the lift.

- a. It is recommended that the forklifts involved in a tandem lift are identical.

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- b. The load permitted on each forklift must not exceed 85 percent of the rated capacity of the forklift.
- c. The lift must be performed on a flat surface not exceeding a grade of 2% from horizontal.

6.4 Loading Trucks and Trailers: Forklifts are often driven onto trucks, trailers, or railroad cars over a dock board (also known as a bridge plate) at loading docks. It is critical that the truck, trailer or car is secured to the dock and prevented from inadvertent movement. Prior to loading or unloading the following controls shall be used:

- a. The parking brakes of trucks shall be set and wheel chocks placed under the rear wheels to prevent the trucks from rolling while they are loaded with forklifts.
- b. Wheel stops or other recognized positive protection shall be provided to prevent railroad cars from moving during loading or unloading operations.
- c. Positive protection shall be provided to prevent railroad cars from being moved while dock boards or bridge plates are in position. The locomotive shall be effectively blocked from inadvertent movement through the use of a flag, sign or LOTOTO device.
- d. Fixed jacks may be necessary to support a semitrailer and prevent upending during the loading or unloading when the trailer is not coupled to a tractor.
- e. Portable and powered dock boards shall be strong enough to carry the load imposed on them and inspected for cracks, bends, or deformation prior to use.
- f. Portable dock boards/boarding ramps shall be secured in position, either by being anchored or designed to prevent slipping.
- g. Powered dock boards shall be designed and constructed by a recognized manufacturer or qualified professional engineer in accordance with Commercial Standard CS202-56 (1961) "Industrial Lifts and Hinged Loading Ramps" published by the U.S. Department of Commerce (See Reference List)

Additional Trailer Loading and Unloading Procedures:

- Inspect the floor of the trailer to be sure that it will support the forklift and load.
- Ensure that the height of the entry door is adequate to clear the height of the forklift, taking into consideration the height of the loading platform.
- Drive straight across the bridge plates when entering or exiting the truck trailer or railroad car.
- While being loaded no individuals are permitted inside the trailer or railcar unless they are effectively protected from the hazardous motion of the forklift.
- If loading and unloading occurs at night, dock lights and headlights shall be adequate to ensure proper illumination.
- The horn shall be sounded prior to entering or exiting a trailer when operations occur near heavily traveled walkways.
- In determining the capacity of the trailer floor to support a forklift, consider various factors, including floor thickness and cross-member spacing or unsupported floor area. In general, the larger the unsupported area, the lower the forklift capacity the trailer will have for the same floor thickness.

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- Never use the forklift to open railroad car doors unless equipped with a device designed for that purpose by an equipment manufacturer or professional engineer.

7.0 OTHER REQUIREMENTS

- 7.1 Modifications:** Modifications or additions which affect capacity or safe operation shall not be performed by FMMO without the manufacturers' prior written approval. Management must seek written approval from Forklift manufacturers when modifications and additions could affect the capacity and safe operation of a forklift. When approval has been granted, the capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly.

If no response or a negative response is received from the manufacturer, a qualified Registered Professional Engineer must perform a safety analysis and address any safety or structural issues contained in the manufacturer's negative response prior to granting approval. When approval has been granted, forklift data plates must be changed accordingly.

- 7.2 Refueling/ Charging Requirements:** Prior to the commencement of fueling operations all forklifts shall:

1. Be chalked on a level surface
2. Have the parking brakes set
3. Have the engine shut off
4. Be cooled down (especially near the fuel tank neck) to prevent the ignition of flammable fuel vapors on hot surfaces
5. Remain clean and clear of flammable/combustible materials so as to prevent their inadvertent ignition.
6. Be checked for leaks to ensure that other oils and fluids cannot be ignited
7. Have a fire extinguisher available within 75ft of the re-fueling operation
8. Free of any spilled fuel before restarting the engine (Gasoline & Diesel models)

Liquid Petroleum Gas (LPG) Forklifts

- Check for leaks before operating. Gloves, long sleeves and a face shield shall be worn when changing LPG tanks (escaping gas is painfully cold to the skin).
- Inspect the valves and fittings of the LPG tank for damage and ensure that the relief valve points are in the direction specified by the manufacturer.

Battery Operated Forklifts

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- When charging batteries, keep the battery vent caps in place to prevent electrolyte spray. (Check that the vent caps are not plugged.)
- Keep the battery compartment open to dissipate heat.
- Keep tools and other metal objects away from the top of the battery to prevent an arc or explosion due to short circuited terminals.
- When adding fluid to the battery, wear safety glasses and a face shield for protection against electrolyte splash or spray.
- Battery charging areas must have a way to flush and neutralize spilled electrolyte.
- Do not attempt to remove a battery from the forklift unless you have been trained and the charging station is equipped with a hoist designed for this purpose.
- An eyewash station must be able to be reached within 10 seconds and must be capable of providing adequate water pressure for at least 15 minutes.

7.3 Working around Pedestrians: Whenever feasible forklift traffic should be separated from pedestrian travel through the use of engineering controls to reduce the likelihood of contact. The following guideline should be used to prevent forklift to personnel contact:

- a) Separate forklift traffic and other workers where possible
- b) Limit aisles and travel ways to workers on foot only or forklifts only
- c) Restrict the use of forklifts near time clocks, break rooms, cafeterias, smoking areas and main exits whenever possible; particularly when the flow of workers on foot is at a peak (such as at the end of a shift or during breaks)
- d) Install physical barriers where practical to ensure that workstations are isolated from aisles traveled by forklifts
- e) Evaluate intersections and other blind corners to determine whether overhead dome mirrors could improve the visibility of forklift operators or workers on foot
- f) Make every effort to alert workers when a forklift is nearby. Use horns, audible backup alarms, and flashing lights to warn workers and other forklift operators in the area
- g) Flashing lights are especially important in areas where the ambient noise level is high

8.0 INSPECTION AND MAINTENANCE

8.1 Inspection Requirements: The forklift must be checked for defects by the operator before use. Even if you operate a forklift safely, a defect can cause or contribute to a serious incident.

Before starting your vehicle, conduct a pre-operation (or pre-start) inspection that checks a variety of items, including but not limited to:

- Fluid levels -- oil, water, and hydraulic fluid
- Leaks, cracks or any other visible defect including hydraulic hoses and mast chains. NOTE: Operators should not place their hands inside the mast. Use a stick or other device to check chain tension

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- Tire condition and pressure including cuts and gouges
- Condition of the forks, including the top clip retaining pin and heel
- Load backrest extension
- Guarding for moving machine parts
- Safety decals and nameplates. Ensure all warning decals and plates are in place and legible. Check that information on the nameplate matches the model and serial numbers and attachments
- Operator manual on truck and legible
- Operator compartment. Check for grease and debris
- All safety devices are working properly including the seat belt
- Brakes and parking brake

Parking brakes shall be capable of holding the equipment with its typical load on the maximum grade it is designed to travel on. Parking brakes shall be tested at least once per shift with the typical load raised off the ground a minimum of 6" while the forklift is positioned on an incline.

8.2 Forklift Maintenance Safety: If a forklift is found unsafe then it must be removed from service until repaired by an authorized and qualified person. In addition, the forklift owner's manual will have routine checks and preventive maintenance tasks that must be completed by a skilled maintenance person to keep the forklift in a safe operating condition. A record of all maintenance and repairs performed on each FMMO owned forklift shall be retained by the entity responsible for conducting the repairs for a period of 2 years.

To prevent injury or illness when performing maintenance on a forklift:

1. Do not perform repairs in an area with a potentially flammable or combustible atmosphere (Class I, II, or III).
2. Make sure there is adequate ventilation to prevent accumulation of exhaust or gas fumes.
3. Do not use flammable solvent to clean a forklift. Use a non-combustible (flash point above 100° F) solvent.
4. Never get under a forklift supported only by a jack or under any part supported only by hydraulic pressure; secondary blocking shall be installed to control the stored energy.
5. To prevent the forklift from accidentally being started: LOTOTO the truck and disconnect the battery while making repairs. If the electrical system will be serviced, disconnect the battery before starting repairs.

9.0 TRAINING REQUIREMENTS

Personnel who have not been trained to operate forklifts may operate a truck for the purposes of training only, and only under the direct supervision of a trainer or individual competent in the assigned task. This training should be conducted in an area away from other forklifts, heavy vehicle traffic, and pedestrians. The training program outlined below shall be presented to all new operators. All new employees, assigned to operate a forklift after the standard has been approved, shall receive comprehensive training as outlined below. Existing

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forklift operators shall have completed formal classroom training from within 1 year of inception date of the standard.

The FMMO Forklift training program requires operators to complete classroom and practical training prior to receiving certification to operator a forklift. This training shall include, at minimum, the following:

- 9.1 All employees will receive classroom training; in the field instruction and pass a practical examination administered by the training department or competent division personnel. Employees will be certified to operate the specific type and model of forklifts included within the scope of the training program.
- 9.2 Refresher training is required every three years, whenever a new or different type of forklift is purchased, whenever the employee demonstrates a need for retraining or as determined necessary by the training department.

The training program shall inform the trainee that:

- a. The primary responsibility of the operator is to use the powered industrial truck safely following the instructions given in the training program.
- b. Unsafe or improper operation of a powered industrial truck can result in: death or serious injury to the operator or others; damage to the powered industrial truck or other property.

The training program shall emphasize safe and proper operation to avoid injury to the operator and others and prevent property damage, and shall cover the following areas:

1. Fundamentals of the powered industrial truck(s) the trainee will operate, including:
2. Similarities to and differences from automobiles;
3. Significance of nameplate data, including rated capacity, warnings, and instructions affixed to the truck;
4. Methods of steering and braking systems, with and without load;
5. Visibility, with and without load, forward and reverse;
6. Stability characteristics with and without load, with and without attachments;
7. Controls, location, function, method of operation, identification of symbols
8. Load handling capabilities; forks, attachments and free rigging practices
9. Operating environment and its effect on truck operation
10. Fueling and battery charging precautions
11. Proper pre-shift inspection and approved method for removing from service a truck which is in need of repair
12. Load handling techniques
13. Other hazards and controls specific to the area and tasks the employee will conduct

Training practice shall include the actual operation or simulated performance of all operating tasks such as load handling, maneuvering, traveling, stopping, starting, and other activities under the conditions which will be encountered in the use of the truck.

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Forklift Inspection Card

10.0 REFERENCE DOCUMENTS

- 10.1 OSHA Guide to Forklift Safety; <http://www.osha.gov/SLTC/powerindustrialtrucks/index.html>
- 10.2 CDC Guide to Forklift Safety; [CDC - NIOSH Publications and Products - Preventing Injuries and Deaths of Workers Who Operate or Work Near Forklifts \(2001-109\)](#)
- 10.3 FMI Forklift/Powered Industrial Truck Training Manual (http://fmweb/sites/knwmgt/13/2/100/Task%20Training/Forklift/Forklift_Training_Manual.pdf)
- 10.4 ASME B56.1, Safety Standard for Low and High Lift Trucks
- 10.5 OSHA Letter of Interpretations. Forklift Modifications. April 11th 1997. Retrieved 3/5/2012 from [04/11/1997 - Powered industrial truck modifications and approval.](#)

11.0 RECORDS

| Name of the Document | Responsible for Control | Records Retention |
|--|---|-----------------------------------|
| Original Document of this Standard | Safety Department | Permanent |
| Manufacturer Instruction and Maintenance Manuals | Division / Area | Permanent |
| Training Certificates | Training Department | Duration of employment + 10 years |
| Forklift Inspection Records | Division / Area | 10 years |
| Forklift repair and maintenance records | Division management and Contractor Management | 10 years |

12.0 APPENDICES

- 12.1 HS-SPS-3.7.1-001 - Forklift Inspection Card
- 12.2 Forklift Principles
- 12.3 Classification and Selection

13.0 REVIEW AND CHANGE

All changes, modifications and/or revisions must be documented on the table below:

| Description of Changes to this Document |
|---|
| Included form # for Forklift Inspection Card – S. Elias 08/24/2012 |
| Minor grammatical corrections throughout document – B. Lamanna 10/24/2012 |
| Updated records table – S. Elias -06/24/2013 Rev. 02 |

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Date: _____

Shift: _____

Forklift Number: _____

| Operator Employee ID | | | | | | | | |
|----------------------|----|----|----|----|----|----|----|----|
| Inspection Items | OK | BO | OK | BO | OK | BO | OK | BO |
| Tires | | | | | | | | |
| Back-up Alarm* | | | | | | | | |
| Brakes* | | | | | | | | |
| Brake Lights* | | | | | | | | |
| Fire Extinguisher* | | | | | | | | |
| Head Lights | | | | | | | | |
| Horn* | | | | | | | | |
| Steering* | | | | | | | | |
| Lights* | | | | | | | | |
| Tail Lights | | | | | | | | |
| Grab Irons and Steps | | | | | | | | |
| Mirrors | | | | | | | | |
| Seatbelt* | | | | | | | | |
| Hydraulic Lines/Rams | | | | | | | | |
| Forks | | | | | | | | |
| Park Brake* | | | | | | | | |
| Strobe Light | | | | | | | | |
| Data Plate | | | | | | | | |
| Overhead Guard* | | | | | | | | |
| Controls | | | | | | | | |
| Raise/Lower | | | | | | | | |
| Tilt | | | | | | | | |
| Side Shift | | | | | | | | |
| Rotation | | | | | | | | |

** Equipment cannot be operated if this is marked B.O.*

Comments: _____

Appendix 12.1 (STD 3.7.1 Forklift Safety Standard)

HS-SPS-3.7.1-001 Rev. 00

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Appendix 12.2 Forklift Principles

Loading and Unloading:

Forklifts are used in numerous work settings, primarily to load and unload materials. Forklift overturns are the leading cause of fatalities involving forklifts and they represent about 25% of all forklift-related deaths. The case studies examined by the National Institute for Occupational Safety and Health (NIOSH) indicate that the forklift, the factory environment, and actions of the operator can all contribute to fatal incidents involving forklifts. In addition, these fatalities indicate that many employees and employers are not using or may be unaware of safety procedures and the proper use of forklifts to reduce the risk of injury and death.

Basic Principles: A forklift works on the principle of a cantilever. A load on a beam (the forks) supported by a fulcrum (the front wheels) is counterbalanced by a weight on the other end of the beam (the forklift body and counterweight built into it). Whether a forklift will safely carry a load or will tip forward can be determined by comparing the “moment” of each. Moment equals the distance from the fulcrum to the center of gravity (the point where all the weight is concentrated) times the weight.

Forklifts have a capacity plate to tell the user what loads are safe to lift. If the plate says the capacity is 30,000 pounds or less then that capacity is rated for a load with a center of gravity 24” from the face of the forks. If the forklift capacity is greater than 30,000 pounds then the label will rate the load at a 36” or 48” center of gravity since larger forklifts usually lift physically larger loads.

As the load is raised, it becomes possible for the forklift to fall to the side as well as tip forward. The operator must consider the center of gravity of the forklift and load together. This combined center of gravity moves as the load is moved and as the forklift travels over surfaces that are rough or inclined.

Stability: Forklifts have a “stability triangle”. The sides of the triangle are formed by the center of each front wheel and the center of the rear wheel or at the center of the axle if there are two rear wheels. A vertical line extending from the center of gravity of the vehicle-load combination must be inside of the stability triangle to prevent the forklift from tipping forward, falling sideways or dropping its load.

The center of gravity of the forklift-load combination can move outside of the stability triangle, causing the forklift to tip if:

- The load is picked up on the tip of the forks,
- The load is tilted forward.
- The load is tilted too far back when raised,
- The load is wide, or
- Forklift movement causes the center of gravity to shift.

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Load Handling: The stated capacity of a forklift only applies to the load center indicated on the data plate. If the load is not centered at the specified position, the forklift's capacity will be reduced. Loads come in all shapes and sizes, not just symmetrical boxes. The load size, position, and weight distribution critically affect the forklift's capacity and the stability of the truck.

The following factors play a critical role when engaging a load and therefore must be carefully considered:

- Weight, Size, and Position
- Safe Load Capacity
- Maximum Load Moment
- Balance
- Stability

12.3 Classification and Selection

All forklifts have a hazard designation assigned to them that identifies whether they are suitable for use in certain kinds of hazardous atmospheres and work locations. The forklift designation is located on the load capacity data plate. The following tables explain the designations and the associated safeguards. These charts should be used in conjunction with in the field risk assessments and manufacturer guidelines to determine which type of forklift is safe to use in your work area.

Explosion/Combustion (for indoors and other enclosed locations)

| Type | Built-in Safeguards Against Fire Hazards |
|-----------------------|--|
| D (Diesel forklift) | Minimum |
| DS | D + additional for fuel, exhaust and electrical systems |
| DY | DS + all electrical equipment enclosed |
| E | Minimum |
| ES | E + prevents sparks and limits surface temperatures |
| EE | ES + all electric motors and equipment completely enclosed |
| EX | Can be used in flammable vapor or dust atmospheres |
| G (Gasoline forklift) | Minimum |
| GS | G + additional for fuel, exhaust and electrical systems |
| LP | G + minimum safeguards for liquid petroleum gas |
| LPS | LP + additional for fuel, exhaust and electrical systems |

Classes and Types: Forklifts are also classified into seven types based on their characteristics:

| Class | Type | Approved Uses |
|-------|------|---------------|
|-------|------|---------------|

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| | | |
|---------|---|--|
| Class 1 | Electric Motor, Rider, Counter-Balanced Trucks (solid and pneumatic tires) | Indoors on flat & solid surfaces |
| Class 2 | Electric Motor Narrow Aisle Trucks (solid tires) | Indoors on flat & solid surfaces |
| Class 3 | Electric Motor Hand Trucks or Hand/Rider Trucks (solid tires) | Indoors on flat & solid surfaces |
| Class 4 | Internal Combustion Engine Trucks (solid tires) | Indoors (ventilated) & Outdoors on maintained surfaces |
| Class 5 | Internal Combustion Engine Trucks (pneumatic tires) | Indoors (ventilated) & Outdoors on graded surfaces |
| Class 6 | Electric and Internal Combustion Engine Tractors (solid and pneumatic tires). There are no forklifts in this class. | Outdoors on surfaces allotted by the manufacturer |
| Class 7 | Rough Terrain Forklift Trucks (pneumatic tires) | Outdoors on surfaces allotted by the manufacturer |