



FESHM 5023: POWERED INDUSTRIAL TRUCKS (PIT's)

Revision History

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1.0 INTRODUCTION

Forklifts, tow-motors and other powered material handling equipment are used throughout Fermilab to perform a variety of functions. Equipment of this type is often grouped together under the title “powered industrial trucks.” The use of powered industrial trucks creates a potential for serious injury and property loss. This chapter contains procedures to ensure that the operation, inspection, and maintenance of powered industrial trucks are conducted in a safe manner and that operators are qualified to operate the truck safely.

2.0 APPLICABILITY

This chapter applies to any powered industrial trucks (commonly referred to as fork trucks) used at Fermilab. Examples include:

- Sit Down Rider, Counter-Balanced Truck (Solid and Pneumatic Tires)
- Narrow Aisle Trucks (Solid Tires)
- Hand Trucks or Hand/Rider Trucks (Solid Tires)
- Internal Combustion Engine Trucks (Solid or pneumatic tires)
- Electric and Internal Combustion Engines Tractors (Solid and pneumatic Tires)
- Rough Terrain Forklift Trucks (Pneumatic Tires)
- Magnet Movers
- Walk-Behinds with Elevating Mechanisms

Excluded from the scope of this chapter are construction, grounds keeping, and farm equipment such as wheel loaders, mobile cranes, bulldozers, crawler loaders, snow plows, hay bale loaders and tree removal equipment.

3.0 DEFINITIONS

Attachments – A device added to the PIT, either designed and built by the user, purchased from a commercial supplier, or provided by the manufacturer of the PIT, other than the conventional forks, and intended to carry the load. Examples include non-conventional forks, fork extensions, extension booms, non-conventional or special or unique load handlers, rotating devices, side shifters, load stabilizers and jib crane booms. A removable attachment is an attachment that can be mounted on the forks, or in place of the forks on the carriage, by means of such conventional fasteners as bolts, pins, etc., and does not require the disassembly of any other portion of the lifting system to install or remove.

Bulldozing - The action that results when an operator would have one pallet on the forks, then use the load to push other pallets ahead of the truck. Bulldozing may also involve having two pallets arranged vertically on the forks plus pushing up to six pallets (single or double stacked) out in front of the truck.



Electric pallet truck - An electrically-powered pallet truck.

Employee - For the purpose of this chapter includes Fermilab direct hired personnel, term and temporary employees and contract technicians.

Forklift truck - A self-loading truck equipped with load carriage and forks for transporting and tiering loads. There are eleven truck designations that are applicable: D, DS, DY, E, ES, EE, EX, G, GS, LP and LPS.

Free Rigging – The direct attachment to or placement of rigging equipment (slings, shackles, rings, etc) onto the tines of a P.I.T. for a below-the-tines lift. This type of lift does not use an approved lifting attachment.

Lead Evaluator – An individual whose purpose is to evaluate the Operator Evaluators among divisions/sections. This evaluation is aimed at ensuring evaluation maneuvers and protocols are standard and objective.

Magnet Movers - A vehicle or tractor-trailer combination, which is equipped for the purpose of lifting, moving and setting beam line magnets or other such large heavy objects in the beam line enclosures. The trailer may be pulled or pushed by the tractor. Lift tables on wheels are excluded from this definition unless they are towed by a tractor while carrying a load.

Non-employee - This category defines subcontractors and their employees, users, experimenters, graduate students, experimental collaborators, visiting or guest scientists and engineers, and DOE employees.

Operator Evaluator – Individual assigned by the division and section to evaluate the performance phase of an operator’s training.

Pallet truck - A self-loading, low lift truck equipped with wheeled forks of dimensions to go between the top and bottom boards of a double-faced pallet and having wheels capable of lowering into spaces between the bottom boards so as to raise the pallet off the floor for transporting.

Powered Industrial Trucks (PIT) - Equipment designed to move, lift, carry, stack, push, and pull a load. This includes forklifts, electric pallet movers, walk-behinds with elevating mechanisms, and magnet movers. PIT’s may be electrically-powered, gasoline-powered, LP- gas-powered, or diesel. See ASME B56.1 for information on all the types of truck configurations.

Qualified Operator - An individual deemed competent by management after successfully completing the Training and Qualification requirements of this chapter.

Qualified Person - A person who, by possession of a recognized degree in an applicable field or a certificate of professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.



Split-forking - The action that results when the operator moves two palletized loads by inserting one fork in each pallet.

Tractors - An industrial tractor, tugger or locomotive designed exclusively for towing a trailer or other load on wheels at speeds of 5 mph or less. Generically used brand names jeep, towmotor and donkey are often used to describe these vehicles. The tractor may be hitched to a load at either end, if two appropriate hitches are provided by the manufacturer or user. A locomotive may have rail cars hitched at both ends at once. Farm tractors in agricultural service, lawn mowing tractors, and licensed road-going tractors are excluded from this definition.

4.0 POLICY

The operation, inspection, maintenance, and testing of powered industrial trucks and associated equipment shall be in accordance with mandatory standards. For powered industrial trucks, these standards are:

- 29 CFR 1910, Subpart N, OSHA General Industry Standards, Materials Handling and Storage
- 29 CFR 1926.602 (c), (d) – Material Handling Equipment
- ASME B56.1 - Safety Standard for Low Lift and High Lift Trucks

Requirements applicable to all powered industrial trucks are highlighted in this Chapter. Other requirements may exist that are specific to a certain style, size, or use of a particular piece or type of equipment. The appropriate standards are to be consulted by those assigned responsibility for powered industrial truck operations to identify specific requirements, recommendations, and guidance for the safe operation and use of this equipment. Assistance with the implementation of these standards can be obtained from division/section ES&H personnel and the ES&H Section, if requested.

Another source of information is the DOE Hoisting and Rigging Manual available for review in the ES&H Section or in division/section ES&H offices. This manual is not part of the Work Smart Standards but it is available as a reference.

5.0 RESPONSIBILITIES

5.1 Division/Section Heads

- Implement the requirements associated with the use of powered industrial trucks.
- Ensure that powered industrial truck operators are trained and qualified to perform their assigned duties.
- Appointing Operator Evaluators.
- Ensure that inspections are performed.



- Arrange for the review of attachment Engineering Notes by qualified persons or committee.
- Keep an open file of all Engineering Notes for attachments used in their division/section.

5.2 Business Services Section

- Be responsible for the maintenance and maintenance records of all powered industrial trucks owned and operated by Fermilab.
- Distribute of inspection, testing and maintenance reports to the division/section head upon request.

5.3 ES&H Section

- Coordinate with training providers to obtain qualified trainers.
- Maintain the lesson plan and training materials.
- Maintain documentation of all classroom training, on-the-job training and evaluations.
- Review and keep a file of Lead Evaluator's annual report of Operator Evaluators.
- Appoint Lead Evaluator.

6.0 TRAINING AND QUALIFICATIONS

6.1 Employee

Operator training and qualification shall include those requirements identified in regulatory standards (29CFR1910.178). In addition, the prospective powered industrial truck operator must hold a valid driver's license from any of the fifty states.

6.2 Non-employee

Qualification of non-employees requesting to operate powered industrial trucks owned by Fermilab shall be made by a qualified Operator Evaluator of the division/section responsible for the equipment to be operated. In all cases, where previous training and experience is used as the basis for accepting qualification, such training and experience shall be certified in writing by the employer as meeting the requirements of 29CFR1910.178. When there are special hazards/features associated with a particular piece of equipment, e.g., unfamiliar controls or modifications to the original design, a qualified division/section Operator Evaluator will determine whether the operator(s) (including professional contract operators and contract riggers) shall receive documented job instructional training from Fermilab supervisory personnel. In addition, the prospective powered industrial truck operator must hold a valid driver's license from any of the fifty states.

In the case of subcontractor personnel follow the procedures under the section "Loaning of Powered Industrial Trucks."



6.3 Qualification Training

Qualification training shall include both a classroom and a performance phase. At a minimum, the training shall meet the learning objectives specified in Fermilab Training Course No. FN000014/Forklift Operator Training. Demonstration of the operator's abilities to perform all activities expected or anticipated for the job will be part of the qualification process during the performance phase.

The performance evaluation must be conducted in the environment similar to where the employee is expected to operate the PIT. Employees who operate powered industrial trucks in several locations throughout the Laboratory are required to be evaluated on one representative PIT that the employee is expected to operate.

Magnet Mover operators are to be evaluated in the tunnels and enclosures.

A designated division/section Operator Evaluator shall observe such demonstrations and document the performance results on the "Fermilab – Forklift Operator Evaluation Form" (see associated form). Documents reflecting successful demonstration of operator abilities shall be maintained in the TRAIN database. Operator qualification is for a period of three (3) years unless withdrawn within that period by the operator's supervisor. Re-qualification training will include both a classroom phase and a performance phase.

6.4 Certification Records

Training records certifying operator qualification shall include the name of the trainee, date of training, and the signature of the trainer or evaluator.

6.5 Remedial Training

Remedial training will be provided to individuals who do not successfully pass the qualification course. The course instructor or Operator Evaluator will determine the level of remedial training required. Remedial training will be provided also to operators involved in an accident, a near-miss incident, or who are observed operating a forklift in an unsafe manner. The employee's supervisor in consultation with the division/section senior safety officer will determine the level of remedial training needed under these circumstances.

7.0 INSPECTIONS

7.1 Daily Pre-use Inspections

A safety inspection shall be completed for each powered industrial truck and any attachment prior to the start of each shift, or prior to the first use of the day for equipment not in continuous service. A qualified operator shall conduct the inspection, and preferably one that is familiar with the specific equipment. The inspector shall review the elements listed on the checklist provided for guidance at the end of this chapter. Daily pre-use inspections are not required to be documented.



Daily inspections are not required for equipment that is not in service. Prior to being placed back into service, the daily inspection shall be completed by a qualified operator.

7.2 Preventative Maintenance Inspection

A documented inspection shall occur at least every six months as part of the Preventative Maintenance and Repair program described in this chapter.

7.3 Attachment Periodic Inspection

A documented, annual inspection shall occur. Inspection frequency may be modified if so specified in the engineering note.

8.0 EVALUATOR PROGRAM

The ES&H Section will designate a Fermilab Lead Evaluator in writing. This Lead Evaluator will in turn conduct evaluations every three years of the designated division/section Operator Evaluators. The intent of this program is to standardize the manner and rigor in which evaluations are administered. The lead evaluator will submit a yearly report to the ES&H Section by October 1 listing all the division/section Operator Evaluators who have completed their checks during the prior fiscal year. This report will list the name, employee number, div/sec, the type of trucks the evaluator can conduct evaluations for and a facsimile of the signature of the person evaluated.

9.0 ATTACHMENTS

9.1 Scope

All PIT attachments owned by Fermilab or by collaborating institutions and used at Fermilab shall meet all requirements of this FESHM chapter.

PIT attachments provided and used by outside contractors in execution of their contract work are outside the scope of the following engineering note procedure but must adhere to the balance of this FESHM Chapter.

9.2 Engineering Note Procedure

1. Engineering Notes: An Engineering Note shall be prepared by a qualified person for all PIT attachments owned by Fermilab or by collaborating institutions and used at Fermilab whether purchased or fabricated at Fermilab or a collaborating institution. The minimum format for the Engineering Note is shown in the appendix of this chapter.



- a. Engineering Notes for all attachments shall include:
 - Attachment unique identifier.
 - Identification of PIT(s) or class of PIT(s) for which it is designed.
 - Allowable operating parameters: load rating, operation envelope, etc.
 - Operating instructions, if required for safe operation.
 - Inspection frequency and criteria.
 - b. Engineering Notes for attachments designed at Fermilab or other non-commercial institutions (such as Universities or other Laboratories) shall include design compliance calculations to verify that the attachment meets, as a minimum, the requirements of ASME B56.1 and 29 CFR 1910, as well as demonstrating a safety factor greater than or equal to 3 on yield strength for all load bearing components.
 - c. Engineering Notes for attachments purchased from a commercial source engaged in the manufacturing of PIT attachments shall include any manufacturer's documentation (Certificate of Test, copies of the Operator's Manual, Inspections and Maintenance Instructions, etc.)
 - d. Engineering Notes for all attachments that affect the capacity and safe operation of the PIT(s) for which they are designed shall include written approval from the PIT(s) manufacturer(s) or record of the PIT(s) manufacturer's negative or non-response to request for approval. A negative or non-response from the manufacturer does not necessarily disqualify the engineering note from approval.
 - e. Engineering Notes for all attachments must specifically address the stability of the PIT/attachment/load combination as required by ASME B56.1 unless written approval from the PIT(s) manufacturer(s) has been obtained (see (d) above).
 - f. Engineering Notes for all attachments must specifically address the strength of load bearing PIT components unless written approval from the PIT(s) manufacturer(s) has been obtained (see (d) above).
 - g. Modifications to PIT attachments (whether designed at Fermilab or other non-commercial institutions such as Universities or other Laboratories or purchased from a commercial source engaged in the manufacturing of lifting fixtures) shall be documented in the Engineering Notes.
 - h. Load tests shall be documented in the Engineering Note.
2. Review of Engineering Notes: All PIT attachment Engineering Notes shall be reviewed by a qualified person for compliance with the requirements of this chapter.
 3. Amendment of Engineering Notes: All subsequent changes in usage that could affect the safety of personnel or the capability of performance of the attachment shall require an amendment to the original Engineering Note. This amendment shall be reviewed in the same manner as the original note.



4. Similar Attachments: Attachments that are manufactured or fabricated to meet previously engineered, fabricated and reviewed attachments need not have the full engineering analysis repeated. Documentation shall be provided by reference to an existing approved Engineering Note and the detailing of all differences. A load test shall still be required.

9.3 Attachment/Pit Identification

1. All attachments will be assigned a unique identifying ID by the responsible division/section to facilitate periodic inspections.
2. All attachments shall display the ID, maximum elevation with the load laterally centered, the attachment weight, and where applicable, the attachment load rating.
3. Removable attachments shall be labeled to list the PIT or class of PIT(s) for which the attachment has been designed.
4. For attachments that affect the capacity or safe operation of the PIT(s) for which they are designed, capacity, operation, and maintenance instruction plates, tags, or decals on the PIT(s) shall be modified accordingly.
5. Attachments shall be removed from service if the required markings are not legible.

9.4 Attachment Load Test

1. All PIT attachments shall be acceptance load tested prior to initial use. The load rating should not be more than 80% of the maximum load utilized during the test. The test shall be documented in the Engineering Note including signature of the qualified person overseeing the test.
2. Specialized commercially manufactured PIT attachments which have certificates of test or existing devices which have documented evidence of having successfully passed a load test do not need to be re-load tested. Supporting documentation shall be included in the Engineering Note. The only deviation to this occurs when the attachment has been altered, repaired, or modified. In this case a qualified person must be consulted; they may require further testing.

9.5 Attachment Inspections

All attachments used in the course of operating a powered industrial truck must be inspected periodically and used in accordance with ASME B56.1 and the manufacturer's requirements and recommendations. Inspection frequency shall be determined by the engineer and/or user-based on the service. Minimum inspection criteria shall incorporate the items as noted in this chapter and ASME B56.1. At a minimum, each attachment will be inspected visually before each use. Each



division/section shall document the periodic inspections using the forms provided at the end of this chapter as an example.

10.0 OPERATIONS

Powered Industrial trucks shall only be used in the environment, atmospheres and surfaces for which they are designated by the manufacturer for use. *Note: See 29 CFR 1910.178(c).*

10.1 Installation of Operator Restraint Systems (Seat Belts)

All powered industrial trucks with seats shall be fitted with seatbelts. Those PIT's for which retrofit kits are not available are exempt from this requirement. Division/Section Heads shall notify the ESH Section of any powered industrial truck that cannot be retrofitted.

10.2 Use of Seat Belts

Seat belt use is mandatory at all times when the operator is seated on the truck and the truck is equipped with seat belts. Notify the building manager if seatbelts were installed but are missing and tag the truck "Out of Service" until seat belts can be installed.

Exception: Magnet movers and towmotors when used in tunnels and enclosures.

10.3 Prohibited and Restricted Work Practices

- The practice of split-forking is prohibited.
- The practice of bulldozing is prohibited unless specifically authorized in writing by the line manager. Only stable or safely arranged loads shall be handled. Caution shall be exercised when handling off-center loads which cannot be centered.
- The use of a spinner knob on the steering wheel is not allowed except on stand-up rider trucks where steering is designed to be accomplished with one hand and a steering wheel is used or, if the powered industrial truck is equipped with an anti-kickback device on the steering mechanism. The operator must exercise caution when using a spinner knob to avoid over-controlling the vehicle that would cause the vehicle to tip over.
- Free rigging is prohibited unless specifically authorized in writing by the line manager and after a Job Hazard Analysis has been performed per FESHM 2060 Work Planning and Hazard Analysis.
- Operators shall not wear radio headsets, carry or listen to audio devices such as radios and media players, wear headsets or use cellular phones or portable radios except that equipment issued by the Department for safety or communication.



10.4 Procurement or Significant Modification

Divisions/Sections wishing to purchase or modify existing PIT's shall prepare the technical specifications in consultation with BSS- Transportation Services to ensure the standardization of equipment and that provisions are in place to address maintenance requirements.

10.5 PIT Nameplate(s) and Marking

Every truck shall have a durable, corrosion-resistant nameplate, legibly inscribed with the following information: truck model, serial number, truck weight and designation of compliance with the mandatory requirements of ASME B56.1, *Safety Standard for Low and High Lift Trucks*, applicable to the manufacturer and rated capacity.

10.6 Repair

Repairs on all powered industrial trucks will be conducted by the Transportation Services Department of the Business Services Section, or, as their agent, a qualified vendor working under the direction of the Transportation Services Department.

10.7 Acceptance Testing

The Business Services Section shall arrange for documented inspection and testing of a new powered industrial truck before placing in service or after extensive repairs to a damaged one are made. The owner shall be provided with copies of acceptance testing documentation.

10.8 Control of Access to Powered Industrial Trucks

Means shall be provided to prevent forklifts, tow-motors, and other powered industrial trucks from use by unqualified personnel (e.g., restricting access, locking operating controls, removing ignition keys, posting each truck with a sign that states: "Trained Personnel Only" or other appropriate measures). This is the responsibility of the division/section who owns the equipment.

10.9 Damage to Powered Industrial Trucks

When a powered industrial truck is damaged in an accident, it will be tagged and locked "out of service" by the division/section responsible for the truck. Owners will investigate and document incidents resulting in damage to a powered industrial truck. Do not return to service until repaired and, if applicable, until acceptance testing has been completed (See Acceptance Testing paragraph above).

11.0 PREVENTATIVE MAINTENANCE AND REPAIR PROGRAM

The Business Services Section (BSS) will administer a maintenance and repair program for all powered industrial trucks owned by Fermilab divisions and sections. This program will provide for



semi-annual preventive inspections and maintenance for all equipment; and for any unforeseen maintenance and repair work necessary to keep the equipment in safe operating condition.

Frequency of preventive maintenance inspections, other than semi-annual, will be determined by the owner based on use.

These services shall be conducted by the Transportation Services Department of the Business Services Section or, as their agent, a qualified maintenance contractor determined by a "Request for Proposal (RFP) with Qualifications" to assure professional services. The program will be carried out in conjunction with the division/section head responsible for the equipment. The division/section head is responsible for ensuring that all powered industrial trucks within their areas of responsibility are included in the program and shall establish and inform BSS of times of availability. All costs for inspection, testing, and maintenance shall be the responsibility of the division/section that owns the equipment.

Note: Maintenance and repair of rental powered industrial trucks and associated equipment is the responsibility of the vendor as per contract documents unless the division/section administering the contract specifies otherwise.

12.0 LOANING OF POWERED INDUSTRIAL TRUCKS

Loaning of a powered industrial truck to sub-contractor personnel must follow the requirements found in [FESHM 7010](#). The owner of the PIT must fill out the [Sub-Contractor Acceptance And Use Of Fermilab Tools/Equipment](#) form #20 found in [FESHM 7010](#) and verify that the operator meets the training requirements established in this chapter or the training requirements published in the Code of Federal Regulations.

13.0 DRIVING POWERED INDUSTRIAL TRUCKS ON FERMILAB MAIN ROADS

At times it may be necessary to drive a powered industrial truck on Fermilab roads. These are slow moving vehicles that may introduce a collision hazard because of their slow speeds. The owner of the truck shall request an escort from the security services to follow the truck to its destination. The security vehicle needs to have all security emergency lights and strobes ON. Another vehicle may provide escort if Security is not able to provide the service. The escort vehicle must have the emergency flashers ON. A powered industrial truck equipped with a rotating yellow light or yellow strobe light and an operating horn does not need an escort as long as the rotating yellow light or yellow strobe and the horn are in working condition and the lights turned ON. A powered industrial truck without a yellow strobe or rotating beacon requires an escort when transiting.

Escort duties are only required when transiting:

- Wilson Road
- Pine Street



- Batavia Road
- Eola Road
- Road A
- Road B
- Road D