1. Purpose / Background
The improper operation of powered industrial trucks can result in serious personal injury as well as extensive property damage. It has been estimated that over 34,000 injuries associated with fork trucks occur annually, about 100 per day, leading to amputations, fractures and fatalities.

The OSHA Powered Industrial Trucks (PIT) Standard, 29 CFR 1910.178, establishes uniform requirements to ensure that hazards associated with the use of powered industrial trucks are evaluated, and that this hazard information and training is communicated to all affected employees. Powered Industrial Vehicles continue to be classified as an “emphasis program” for OSHA, meaning that frequent inspections and enforcement can be anticipated.

Only trained and authorized personnel will be permitted to operate Powered Industrial Trucks on/in MIT facilities and premises. This procedure applies to both frequent as well as occasional operators.

In order to be issued an MIT PIT operator certification, the employee shall successfully complete an approved training program that includes classroom instruction, demonstration of operator/handling skills and an authorization by the employee’s supervisor. Certification applies to the use of fork trucks, tractors, platform lift trucks, motorized hand trucks, motorized pallet jacks and other specialized industrial trucks powered by electric motors or internal combustion engines: OSHA Standards 1910.178(a.)

Newly purchased PIT’s shall meet current ANSI specifications. All PIT’s shall receive routine periodic maintenance. Efforts shall be made to upgrade older model trucks to meet current standards including the addition of audible back-up alarms and operator seat belts.

2. Scope
This standard operating procedure describes the requirements for the certification of powered industrial truck operators at MIT, and for the safe use of powered industrial trucks on/in MIT facilities and premises. The intent is to protect the health and safety of all employees (especially those assigned to operate powered industrial trucks) and to comply with the requirements of OSHA 29 CFR 1910.178 (Powered Industrial Trucks).

The requirements outlined in this SOP apply to the operation of fork lift trucks, tractors, platform lift trucks, motorized hand trucks, motorized pallet jacks and other specialized industrial trucks powered by electric motors or internal combustion engines. This SOP does not apply to automobiles or vehicles intended for over-the-road hauling, mail-delivery carts, burden carriers or manually operated pallet jacks.

3. Prerequisites
A current valid state issued drivers license and MIT issued Powered Industrial Truck certification is required for MIT employees to operate any powered industrial truck on/in MIT premises. The certification must be evaluated every three years.
4. Procedures

The Powered Industrial Truck Program consists of the following:

4.1 Powered Industrial Truck Specifications:

Approved trucks shall bear a label or some other identifying mark indicating approval by a nationally recognized testing laboratory. And be suitable for the expected service regarding capacity rating, type of vehicle and electrical rating. Generally, the vehicle shall be equipped with:

4.1.1. Nameplate and markings (e.g. capacity information and limitations).
4.1.2. Warning devices including lights, blinkers, horns and motion alarms.
4.1.3. Overhead guards for those having stacking capability.
4.1.4. Fire extinguisher(s), keyed ignitions, rear view mirrors and deadman brakes.

4.2 Operator Training:

The operator-training program will consist of the following elements:

4.2.1. Only employees who have successfully completed training in accordance with this procedure will be permitted to operate a Powered Industrial Truck.

4.2.2. Training will consist of a combination of formal instruction (lecture, discussion, videotape program, written material, etc.) practical training (demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace.

4.2.3. Operator training and evaluation will be conducted by persons who have the knowledge, training, and experience to train powered industrial truck operators and evaluate their competence.

4.2.4. The formal (classroom) training will include a review/discussion of the following topics:

4.2.4.1. The factors that affect the stability of the truck.
4.2.4.2. The safe operation of powered industrial trucks.
4.2.4.3. The similarities and differences between powered industrial trucks and automobiles.
4.2.4.4. The proper techniques of battery charging and refueling.
4.2.4.5. The inspection of powered industrial trucks.
4.2.4.6. Vehicle capacity.
4.2.4.7. Load manipulation, stacking and unstacking.
4.2.4.8. Pedestrian traffic in areas where the vehicle will be operated.
4.2.4.9. Narrow aisles and other restricted places where the vehicle will be operated.
4.2.4.10. Other unique and potentially hazardous environmental conditions in the workplace that could affect the safe operation of the vehicle.

4.2.5. An evaluation of each powered industrial truck operator's performance will be conducted at least once every three years. See Appendix G for PIT Operator Performance Evaluation Recertification Form. Refresher training will take place when:

4.2.5.1. The operator has been observed to operate the vehicle in an unsafe manner;
4.2.5.2. The operator has been involved in an accident or near-miss incident;
4.2.5.3. The operator has received an evaluation that reveals that the operator is not operating the truck safely;
4.2.5.4. The operator is assigned to drive a different type of truck;
4.2.5.5. Or, a condition in the workplace changes in a manner that could affect safe operation of the truck.
4.2.6 If an operator has previously received training in a topic specified in paragraph 29 CFR 1910.178, and the training is appropriate to the truck and working conditions encountered, additional training in that topic is not required if the operator has been evaluated and found competent to operate the truck safely.

4.2.7 Training is offered through the EHS training needs assessment database under the title: Powered Industrial Trucks/Prep for MA Class C1 License Exam. Training records will be maintained through the EHS training needs assessment database. Certification will be documented and records maintained in the employee’s DLC main office. The certification will contain each employee's name, Kerberos (e-mail) name, MIT employee ID number, course name and course code, the date of training and the name of the instructor.

5. Roles & Responsibilities

5.1 Procurement Office– shall ensure that:

5.1.1 Only new trucks that are purchased, leased or rented must meet ANSI standard ANSI B-56.1 Approved trucks shall bear a label or some other identifying mark indicating approval by a nationally recognized testing laboratory. And be suitable for the expected service regarding capacity rating, type of vehicle and electrical rating. (It is recommended that older trucks in use should try to be upgraded to meet current standards).

5.1.2 Proper property damage and liability insurance is obtained.

5.2 DLC’s Operating Powered Industrial Trucks – shall ensure that:

5.2.1 The Powered Industrial Truck standard operating procedure is effectively implemented in their areas and that 3 year operator evaluations are conducted and submitted to the EHS Office.

5.2.2 A Person is assigned as the Certification Officer who is the designated person responsible for the Powered Industrial Truck Program and who shall possess or obtain the appropriate Massachusetts State hoisting license for equipment to be used in the DLC.

5.2.3 Individuals assigned to operate a powered industrial truck have been trained, possess a current valid state issued driver’s license and have been issued a current MIT Powered Industrial Truck Operators Certification. Note: All operators are not required to have a Massachusetts state-hoisting license so long as the Certification Officer is so licensed.

5.2.4 Ensure that powered industrial truck operators conduct daily safety inspections checks on the vehicle prior to use.

5.2.5 Supervisors provide observations and feedback to operators to reinforce safe equipment operation.

5.2.6 Required documentation, including training records, operator certifications and pre-operational checklists are maintained on file.

5.2.7 Only trucks meeting ANSI B-56.1 standards are operated.

5.2.8 Liquid Propane Gas (LPG) vehicles shall not be operated indoors without the approval of the MIT EHS Office.

5.2.9 Provisions are made for the routine periodic maintenance of the powered industrial trucks according to the manufacturer’s instructions.

5.2.10 Rental / Leasing Agencies that provide powered industrial trucks to MIT provide assistance for the training and certification of personnel assigned to drive these powered industrial trucks, and also provide the manufacturer's recommended maintenance program on these vehicles, including frequency of inspections.

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5.3 **Powered Industrial Truck Operator**– An individual authorized to drive a powered industrial truck shall:

5.3.1 Conduct a daily safety inspection check on the vehicle prior to use. (See Appendix C for optional inspection checklist)

5.3.2 Operate powered industrial trucks in a safe manner at all times.

5.3.3 Follow requirements of this safety procedure, applicable federal and state laws, as well as manufacturer’s instructions.

5.3.4 Be familiar with the operation and function of all controls and instruments prior to operating a powered industrial truck.

5.3.5 Report equipment defects and/or maintenance needs to the supervisor immediately.

5.3.6 Promptly report all accidents and injuries as well as property damage to one’s supervisor and/or the MIT EHS Office.

5.4 **MIT EHS Office – The MIT EHS Office shall:**

5.4.1 Work in conjunction with the Department of Facilities and other DLCs, to provide an MIT Powered Truck Certification Program for individuals driving powered industrial trucks.

5.4.2 Assist with the 3-year operator evaluations and provide, as needed, assistance in the investigation of accidents, injuries and near misses.

5.4.3 Maintain copies of training through the EHS-MS training records database. Certification records for DLC operators will be maintained by each individual DLC.

6. **MIT Powered Industrial Truck Certification:**

To obtain a MIT Powered Industrial Truck Certification the following conditions must be satisfied:

6.0.1 The DLC must approve the application for certification. (See Appendix A).

6.0.2 The Certification Officer is the designated person responsible for the powered industrial truck program and who possesses the appropriate Massachusetts state-hoisting license for equipment to be used in the DLC.

6.0.3 The operator must be 18 years of age or older and have a valid and current state issued motor vehicle driver’s license.

6.0.4 The operator must attend and successfully pass a powered truck operators training course including the understanding of specific safety requirements as well as demonstrating the competent driving skills. Upon completion of the necessary steps, the Operator will be issued an Operators Certification. (See Appendix B).

6.0.5 Operators who possess the appropriate Massachusetts state-hoisting license are not required to have the MIT operators certification so long as the DLC certifies that these operators have been trained and evaluated, including the name of the operator, date of training, date of evaluation and identity of person performing the training and evaluation.

6.0.6 Operators must be re-certified every 3 years unless on the job performance indicates re-training at more frequent intervals is indicated. See Appendix G.

6.1 **Use Locations for Powered Industrial Trucks:**

Trucks shall only be operated in the area designated for its intended use. Use outside of the intended area requires the specific approval of the DLC supervisor and the MIT EHS Office.

6.1.1 Powered industrial trucks shall not be used where flammable liquids are stored or handled unless EX rated and safety arrangements are reviewed by the MIT EHS Office.
6.1.2 Propane or gasoline powered trucks shall not be used inside any building unless safety arrangements have been reviewed by the MIT EHS Office.

6.1.3 All pedestrian aisles should be marked and barriers and/or warning lights or mirrors should be installed at pedestrian / truck interface locations.

6.1.4 Main travel aisles and doorways shall provide adequate width and height for safe travel of the powered industrial trucks used in each area.

6.2 Operator Practices:
Powered industrial truck operators shall:

6.2.1 See section 5.3.1
6.2.2 Use seat belts where provided.
6.2.3 Yield to pedestrians at all times.
6.2.4 Keep forks lowered while traveling.
6.2.5 Trail loads when forward vision is obscured.
6.2.6 Never exceed the trucks rated capacity. Lifting a Load of unknown weight shall not be attempted until a proper weight determination has been performed.
6.2.7 Not leave an unattended truck running.
6.2.8 Remove the ignition key if more than 25 feet from the truck.
6.2.9 Park on level surface (or chock wheels) with forks lowered, brake secured and key removed.
6.2.10 Ensure wheel chocks and trailer jacks (if tractor is gone) are used when entering trailers with powered trucks.
6.2.11 Not use trucks for personnel lifting unless the truck is equipped with a platform specifically designed for elevating personnel.
6.2.12 Not attach slings, cables or chains to the forks to lift materials or objects

See Appendix D ~Powered Industrial Truck Rules for Safety which contains a list of safety rules pertaining to the operation of powered industrial trucks and also Appendix E~ Equipment Inspection and Maintenance and Appendix F ~Stability.

7. Powered Industrial Truck Types:

7.1 Liquid Propane Gas (LPG) powered trucks shall:

7.1.1 Be refueled outdoors after the running engine has consumed all gas.
7.1.2 Have propane gas cylinders stored in an outdoor, protected and secured caged area.
7.1.3 Ensure gas connections are leak free prior to operating the vehicle.
7.1.4 Ensure that license/permit for the storage of flammable liquids and gases has been issued for the facility and the permissible limit has not exceeded. (See SOP – Compressed Gasses)

7.2 Requirements for battery-powered trucks:

7.2.1 Be staged in a suitable area equipped with exhaust ventilation during battery re-charging (outdoor locations are exempted from this requirement.)
7.2.2 Have eye wash station and water flush capability at the recharging station.
7.2.3 Have a fire extinguisher and no smoking sign at the recharging station.
7.2.4 Have barrier protection at the battery charging station.

8. Training Materials:
MIT Training Materials – Available from MIT EHS Office

An official hardcopy of this document exists in the EHS Office or on the EHS website. See Legal Disclaimer at: http://ehs.mit.edu/site/content/legal-disclaimer
Vendor – Equipment-Specific Training Materials

9. References / Related Safety Guides:
   9.1 OSHA – Occupational Safety and Health Administration, 29 CFR 1910.178, “Powered Industrial Trucks”
   9.2 ANSI – American National Standards Institute B-56.1 – Safety standard for Powered Industrial Truck
   9.4 NFPA 505, “Fire Safety Standard for Powered Industrial Trucks - Type Designations, Areas of Use, Maintenance and Operation”
   9.5 MGL Chapter 146, Section 53, Licenses for Operating Hoisting Machinery Not Run by Steam
   9.6 520 CMR 6.00: Hoisting Machinery
   9.7 Massachusetts Department of Public Safety, Interpretive Policy Statement, Hoisting Machinery Regulations, November 20, 2000
   9.8 Web Resources:
      http://www.cdc.gov/niosh/docs/2001-109/

10. Definitions:
   10.1 Powered Industrial Truck – A powered industrial truck is a mobile vehicle powered by an electric motor or internal combustion engine that is used to load, push, pull, lift or stack material. This would include vehicles that are commonly referred to as forklifts, rider trucks, powered hand trucks and motorized pallet trucks. It is not intended to refer to an over the road vehicles or burden carriers as those are regulated by CFR 1926.601.
      10.1.1 MIT Powered Industrial Truck Certification – A certification issued by MIT authorizing an MIT employee to operate a powered industrial truck.
      10.1.2 A comprehensive list of definitions associated with the design, type, and use of powered industrial trucks can be found in Appendix E.
   10.2 The following terms are associated with the design, type and use of powered industrial trucks:
      10.2.1 Backrest: Supports the load when tipped back and adds stability.
      10.2.2 Carriage: The part of the mast where the forks and backrest are mounted.
      10.2.3 Counterbalance Forklifts: Designed for both indoor and outdoor use, counterbalance truck wheels as their center of gravity and can be powered by battery, propane, gasoline or diesel fuel.
      10.2.4 Full-tapered Forks: Forks that gradually increase in thickness from the tip of the fork all the way back to the fork’s heel (rear). Full-tapered forks are used to lift lighter loads.
      10.2.5 Half-tapered forks: Forks that gradually increase in thickness from the tip of the fork (front) to about midway back where the blade reaches its maximum thickness. Half-tapered forks are used to lift heavier loads.
      10.2.6 Identification Plate: Contains information about the truck’s design and capacity including information about the truck’s engine, load capacity, serial number, weight and the truck’s type
10.2.7 Lift Cylinders: Hydraulically operated single acting cylinders used to lift the carriage.

10.2.8 Load Center: The distance from the heels of the forks to the load’s center of gravity.

10.2.9 Mast: The mechanism on the truck that raises and lowers the load. The mast is made up of a set of tracks that house bearings and chains.

10.2.10 Material Handling: Any activity that involves picking up and moving materials, parts and/or finished products.

10.2.11 Powered Industrial Truck: An industrial vehicle used to carry, push, pull, lift or stack material that is powered by an electric motor or an internal combustion engine. Included are vehicles that are commonly referred to as forklift trucks, rider trucks, motorized or powered hand trucks, pallet trucks and tugs. Not included are compressed air or nonflammable compressed gas-operated industrial trucks, farm vehicles or vehicles intended primarily for earth moving or over-the-road hauling.

10.2.12 Powered Pallet Jack: A type of powered industrial truck designed to move palletized materials. These trucks may be called walkies, or walkie riders.

10.2.13 Order Picker: A type of truck designed to allow the operator to ride up and down the load so that individual items can be pulled form a rack or storage self.

10.2.14 Overhead Guard: A guard over the operator’s head that protects the operator from falling debris. Note: the overhead guard is not designed to withstand the full impact of falling objects.

10.2.15 Rated Capacity: The maximum weight that the truck is designed to lift as determined by the manufacture. To lift the maximum rated capacity, the load must be as close as possible to the drive wheels. The rated capacity of a truck can be found on the Identification Plate on the vehicle and/or in the manufacture’s operator manual.

10.2.16 Side Stability: Refers to the truck’s ability to resist tipping sideways under various loaded and unloaded conditions.

10.2.17 Tilt Cylinders: Hydraulically operated double acting cylinders used to tilt the backrest and forks. Tilt cylinders work in both forward and backward directions.

10.2.18 Type designation: Refers to the truck’s power source (diesel, gas, electric or liquefied propane gas) and if the truck is equipped with any additional safeguards to the exhaust, fuel and/or electrical systems. The designation will also indicate any locations where the truck may not be used such as in atmospheres containing flammable vapors or dusts.

10.3 The following definitions help to explain the principle of stability

A detailed explanation of stability is found in Appendix F

10.3.1 Center of Gravity is a point on an object at which all of the object's weight can be considered to be concentrated.

10.3.2 Counterweight is the weight that is a part of the truck's basic structure that is used to offset the load's weight and to maximize the vehicle's resistance to tipping over.

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

10.3.5 Grade is a surface's slope that is usually measured as the number of feet of rise or fall over a hundred foot horizontal distance (measured as a percentage).

10.3.6 Lateral stability is a truck's resistance to tipping over sideways.

10.3.7 Line of action is an imaginary line through an object's center of gravity.

10.3.8 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.

10.3.9 Longitudinal stability is the truck's resistance to overturning forward or rearward.

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10.3.10 **Moment** is the product of the object's weight times the distance from a fixed point. In the case of a powered industrial truck, the distance is measured from the point that the truck will tip over to the object's line of action. The distance is always measured perpendicular to the line of action.

10.3.11 **Tack** is the distance between wheels on the vehicle's same axle.

10.3.12 **Wheelbase** is the distance between the centerline of the vehicle's front and rear wheels.

### 11. Appendices:
- Appendix A: Application for Certification
- Appendix B: Operators Certification
- Appendix C: Daily / Pre-Operational Inspection Checklist
- Appendix D: Powered Industrial Trucks Rules for Safety
- Appendix E: Equipment Inspection & Maintenance
- Appendix F: Stability
- Appendix G: Operator Performance Evaluation Recertification Form

### 12. Record Management
Records will kept of training, pre-operational checklists (optional), operator certifications, inventory of equipment, list of operators and inspection and maintenance logs.
### Massachusetts Institute of Technology

### POWERED INDUSTRIAL TRUCK

Application for Certification

The following steps shall be followed in order to obtain, and revalidate every 3 years, an approved MIT Powered Industrial Truck Operators Certification.

**Applicant's Name:** ________________________  **DLC:** ______________  **Phone:** _________  **Date:** __________

**A. DLC Approval:** The applicant has the approval of the DLC to obtain an MIT Powered Industrial Truck Operator's Certification in order to support its operations.

<table>
<thead>
<tr>
<th>Group / Area:</th>
<th>Date:</th>
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<tbody>
<tr>
<td>Group Leader/Office Representative Name:</td>
<td>Date:</td>
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<tr>
<td>Signature:</td>
<td>Phone:</td>
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</table>

**B. Certification Approval:** The applicant has a current valid state issued drivers license and has successfully demonstrated specific knowledge of the safety requirements and competent driving skills. A MIT Powered Industrial Truck Drivers Certification has been approved and issued.

<table>
<thead>
<tr>
<th>Certification Officer Name:</th>
<th>Date:</th>
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<tbody>
<tr>
<td>Signature:</td>
<td>Date:</td>
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<tr>
<td>DLC EHS Coordinator Name:</td>
<td>Date:</td>
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<td>Signature:</td>
<td>Date:</td>
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</tbody>
</table>

[ Yingzhe Ke | Original – DLC Files - Copies | PIT Operator | EHS Office File ]
Appendix B:

<table>
<thead>
<tr>
<th>Massachusetts Institute of Technology</th>
<th>POWERED INDUSTRIAL TRUCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operators Certification</td>
<td></td>
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</table>

The following individual has successfully completed the steps necessary to obtain a MIT Powered Industrial Truck Operators Certification. The certification is valid for three years unless otherwise invalidated.

**Operators Name:** ___________________________  **Group:** __________

**Certificate Valid Until:** ___________________________

**Approved By:** The operator has successfully demonstrated specific knowledge of the safety requirements and competent driving skills. A MIT Powered Industrial Truck Drivers Certificate has been approved and issued.

**Certification Officer Name:** ___________________________  **Signature:** ___________________________  **Date:** __________

**DLC EHS Coordinator Name:** ___________________________  **Signature:** ___________________________  **Date:** __________
Appendix C:

Massachusetts Institute of Technology
POWERED INDUSTRIAL TRUCK
Daily / Pre-Operational Inspection Checklist

At the beginning of each shift and prior to being operated, powered industrial trucks shall be inspected to ensure safety of operation. Other locally generated checklists may be used in lieu of this form.

<table>
<thead>
<tr>
<th>Date ____</th>
<th>Insp By: ____</th>
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<tbody>
<tr>
<td>Overhead guard</td>
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<tr>
<td>Horn</td>
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<tr>
<td>Lights</td>
<td></td>
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<tr>
<td>Parking Brake</td>
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<tr>
<td>Service Brake</td>
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<tr>
<td>Steering</td>
<td></td>
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<tr>
<td>Hydraulic / Fluid Leaks</td>
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<tr>
<td>Mast &amp; forks</td>
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<tr>
<td>Backup Alarm</td>
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<tr>
<td>Tire Damage</td>
<td></td>
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<tr>
<td>Seat Belts</td>
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<tr>
<td>Fuel Leaks (propane)</td>
<td></td>
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<tr>
<td>Fire Extinguisher</td>
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<tr>
<td>Other Local Requirements</td>
<td></td>
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</tbody>
</table>
Appendix D:

POWERED INDUSTRIAL TRUCK RULES FOR SAFETY

The following is a list of safety rules pertaining to the operation of a powered industrial truck.

**Truck Operations:**

- A safe distance will be maintained from the edge of ramps or platforms while on any elevated dock, platform or freight car.

- When leaving the truck unattended, the forks will be fully lowered the controls placed in neutral, the power shut off, the brakes set to and the key or connector plug removed. The wheels will be blocked if the truck is parked on an incline. **Note:** A powered industrial truck is considered unattended when the operator is 25 feet or more away from the vehicle which remains in his/her view or whenever the operator leaves the vehicle and the truck is not in view.

- Trucks will not be used to open or close freight doors.

- The brakes of trucks and trailers will be set and wheel chocks or stops will be in place to prevent movement during loading or unloading operations. Fixed jacks may be necessary to support a semi-trailer during loading or unloading when the trailer is not coupled to a tractor. The flooring of trucks and trailers will be checked by the operator for breaks and weakness before driving these vehicles into these surfaces.

- An overhead guard will be used as protection against falling objects. **Note:** The overhead guard is intended to offer protection from the impact of small packages, boxes or bagged materials only.

- A load backrest extension will be used whenever necessary to minimize the possibility of the load or part of the load from falling rearward.

- Fire doors, access to stairways, fire extinguishers and emergency exits will always be kept clear.

- Only approved industrial trucks will be used in hazardous conditions.

- Powered industrial trucks will not be driven up to anyone standing in front of a bench or other fixed object.

- No person will be allowed to stand or pass under the elevated portion of any truck, whether loaded or empty.

- Passengers are not permitted to ride on powered industrial trucks unless authorized and the truck is equipped with a safe place for the passenger to ride.

- The operator will never place his/her arms or legs between the uprights of the mast or outside the running lines of the truck.

- The operator will never push one load with another load.

- Spinner knobs must not be attached to the steering handwheels of trucks not originally equipped with such knobs.
Never lift people on the forks of a powered industrial truck unless the truck has a properly designed safety platform securely attached to the lifting carriage and/or forks. If the truck is equipped with vertical controls only, or vertical and horizontal controls elevatable with the lifting carriage or forks, means will be provided whereby personnel on the platform can shut off power to the truck. Protection from falling objects, as indicated necessary by the operating conditions would also be provided.

**Traveling:**

- Traffic regulations will be observed, including observing all STOP SIGNS.
- A safe distance of approximately three truck lengths from the truck ahead will be maintained whenever possible.
- The “Right of Way” will be yielded to ambulances or other vehicles in emergency situations.
- The operator will slow down and sound the horn at intersections and other locations where vision is obstructed.
- If the load being carried obstructs forward view, the operator will travel in reverse with the load trailing.
- Grades will be ascended or descended slowly. When ascending or descending grades in excess of 10 percent, loaded trucks will be driven with the load upgrade. Unloaded trucks will be operated on all grades with the load engaging means downgrade. On all grades, the load and load engaging means will be tilted back and raised only as far as necessary to clear the road surface.
- The operator will slow down for wet and slippery floors.
- Dockboards or bridgeplates will be properly secured before they are driven over and their rated capacity will never be exceeded. Dockboards or bridgeplates will always be driven over carefully and slowly.
- Elevators will be approached slowly and then entered squarely after the elevator car is properly leveled. Once on the elevator, the transmission will be in neutral, the engine shut off and the brakes set to prevent movement.
- Motorized hand trucks must always enter elevators with the load end forward.
- When making turns, the operator will reduce the truck’s speed to a safe level by means of turning the hand steering wheel in a smooth, sweeping motion.
- Other trucks traveling in the same direction or at intersections, blind spots or other dangerous locations will not be passed.
- Horseplay and stunt driving, including spinning of the tires, is not permitted.
- Running over loose objects in aisles will be avoided.
- Under all travel conditions, the truck will be operated at a speed that will permit the truck to be brought to a stop in a safe manner.
- The operator will always look in the direction of travel and keep a clear view of the path of travel.
Loading/Stacking:
- Only stable and safely arranged loads will be handled. Use extreme caution when handling off-centered loads that cannot be centered on the forks.
- Only loads within the rated capacity of the truck will be handled.
- The forks will be placed under the load as far as possible and the mast carefully titled backward to stabilize the load.
- Extreme care will be used when tilting the load forward or backward especially when high tiering. An elevated load will not be tilted forward except when the load is in a deposit position over a rack or stack of material.
- When stacking or tiering loads, the operator will tilt the load backward only enough to stabilize the load.
- The operator will remove unsafe containers and pallets from service.
- Trucks equipped with attachments will be operated as a partially loaded truck when not handling a load.
- The operator will adjust long and high loads, including multiple-tiered loads that may affect the capacity of the truck.
- The operator will insure there is always a safe distance between the mast and overhead lights, pipes and sprinkler systems.

Maintenance of the Truck:
- Powered industrial trucks will be inspected before being placed in service. This inspection will be made at least daily. Trucks used on a multi-shift basis will be inspected after each shift.
- If at any time during the driver's shift a truck is found to be in unsafe, the operator will immediately notify his/her supervisor and remove the truck from service until it has been restored to safe operating condition.
- Spillage of excess oil or fuel will be carefully cleaned up and disposed of in accordance with state and federal regulations. Appropriate authorities will be notified if required by law.
- The operator will always wear the proper personal protective equipment when fueling the truck or performing any other maintenance on the truck.
- No truck will be operated with a leak in the fuel system until the leak has been corrected.
- Open flames will not be used to check the electrolyte level in batteries or the gasoline level in the fuel tank.
- Smoking is not allowed while changing LPG tanks, refueling gas-powered trucks or changing or charging batteries for electric powered vehicles.
A. General:
- Valid and current state driver’s license is always required
- Driving speeds must be dictated by conditions including passageways and pedestrians
- Seat belts are always required to be used when available in the truck
- Vehicle shall not be driven while impaired due to any reason
- Smoking is not permitted in any MIT vehicle or during re-fueling
- Safety checks prior to use include: lights, brakes, wipers, tires, seat belts, windshield, and directional signals
- Parking only allowed in approved areas
- Pedestrians always have the right of way – use defensive driving strategy
- Report all accidents, injuries and property damage. Use EHS emergency number (617-452-3477) to obtain assistance if required.

B. Re-Charging Battery
- Ensure ventilation is adequate - flammable gas is given off
- Ensure eye wash and / or safety shower available and accessible and operational
- Be sure protection available for battery terminals if removed for recharging in a rack
- Use eye and face protection during electrolyte level checks and / or re-filling
- Use care during positioning for re-charging to avoid damage to the charging station and surrounding area
- Fire extinguisher and no smoking signs at the re-charging station
- Periodic inspection and care for the recharging attachment device
- Other Local Requirements

C. Re-Fueling Propane
- Use of protective eyewear and gloves
- Allow engine to run until fuel trapped in the fuel line is exhausted
- Replace tank out of doors only
- Slowly unscrew the coupling from the tank only when valve at tank shut - look for leaks at tank
- Unstrap metal bands securing tank to truck - check for damage
- Place empty tank in designated secure storage area
- Place new tank, secure metal bands, re-connect fuel line to tank - check for leaks at couplings
- Other Local Requirements

D. Other Local Requirements–
Appendix E:

Equipment Inspection And Maintenance

A. The operator will conduct an examination of the truck before the vehicle is placed into service. This inspection must be made at least daily. When trucks are used on a multi-shift basis, each truck will be inspected after each shift. (See Operation Inspection Checklist)

B. The operator will immediately notify his/her supervisor if the truck is found to be in need of repair and/or unsafe.

C. If repairs are needed on a powered industrial truck that prevent its safe operation, the truck will be taken out of service until the repairs have been made.

D. Repairs must be made by authorized personnel only.

E. When the temperature of any part of any truck is found to be in excess its normal operating temperature, the vehicle must be removed from service and not returned to service until the cause for the overheating has been eliminated.

F. Any vehicle that emits hazardous sparks, flames or smoke from the exhaust system will be removed from service and not returned from service until the cause for the hazardous emissions has been corrected.

G. Powered industrial trucks are to be kept in a clean condition and free of excess lint, oil, and grease. Only noncombustible agents should be used for cleaning trucks. Cleaning trucks with low flash point solvents (below 100 degrees Fahrenheit) is not permitted.

H. Precautions regarding toxicity, ventilation, personal protective equipment and fire hazards are to be followed as stated on the warning label and/or the Material Safety Data Sheet (MSDS) for that particular cleaning agent.

I. Parts used in any industrial truck requiring replacement will be replaced only with parts equal in safety to those parts originally provided by the manufacturer.
Appendix F:

Stability

Stability determination for a powered industrial depends on a few basic principles. There are many factors that contribute to a vehicle's stability:

- Vehicle wheelbase;
- Track;
- Height;
- The load's weight distribution; and,
- The vehicle's counterweight location (if so equipped).

The "stability triangle," used in most stability discussions, demonstrates stability simply.

Basic Principles

Determining whether an object is stable is dependent on the object's moment at one end of a system being greater than, equal to, or smaller than the object's moment at the system's other end. This is the same principle on which a seesaw works. If the product of the load and distance from the fulcrum (moment) is equal to the moment at the device's other end, the device is balanced and will not move. However, if there is a greater moment at the device's one end, the device will try to move downward at the end with the greater moment.

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 point about which the vehicle would tip over) 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-moment is greater than the vehicle-moment, the greater load-moment will force the truck to tip forward.

The Stability Triangle

Almost all counterbalanced powered industrial trucks have a three-point suspension system; that is, the vehicle is supported at three points. The truck's steer axle is attached to the truck by a pivot pin in the axle's center. When the points are connected with imaginary lines, this three-point support forms a triangle called the stability triangle.
Industrial Truck

**Figure 1.**

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**Note:** When the vehicle’s line of action, or load center, falls within the stability triangle, the vehicle is stable and will not tip over. However, when the vehicle’s line of action or the vehicle/load combination falls outside the stability triangle, the vehicle is unstable and may tip over.

**Longitudinal Stability**

The axis of rotation when a truck tips forward is the front wheels' points 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 loss of steering control. If the load-moment greatly exceeds the vehicle moment, the truck will tip forward.

To determine the maximum safer 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 a load center. Trucks with a 30,000 pounds or less capacity are normally rated at a given load weight at a 24-inch load center. For trucks of greater than 30,000-pound capacity, the load center is normally rated at 36- or 48-inch load center distance. 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. Calculation of 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 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 3000-pound capacity truck (with a 24 inch load center), the maximum allowable load moment is 72,000 inch pounds (3,000 times 24). If a probable load is 60 inches long (30-inch load center), than 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 lines 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 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**

The dynamic forces that result when the vehicle and load are put into motion must also be considered. 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 weight load, the load should be carried at the lowest practical height, the truck should be accelerated slowly and evenly, and forks should be tilted forward cautiously. However, no precise rules can be formulated to cover all of these eventualities.
APPENDIX G

PIV Operator Performance Evaluation Recertification Form.

The purpose of this form is for supervisors to document a Powered Industrial Vehicle (PIV) operator performance evaluation. The Occupational Health and Safety Administration (29CFR 1910.178) and the MIT Powered Industrial Vehicle (PIV) standard operating procedure (SOP) require that PIV operator performance be evaluated every (3) years to determine if refresher training is necessary. Powered Industrial Vehicles include forklifts, hi-lifts and powered pallet jacks.

Name of operator:____________________  Department:____________________

Date:_______________________   PIV Type:___________________

The purpose of the evaluation is to determine;

1. If the operator has been observed operating the PIV in an unsafe manner
2. If the operator has been involved in an accident involving injury, property damage or a near miss.
3. If conditions in the workplace have changed in a manner that could affect the safe operation of the PIV (eg. a different type of forklift requiring new operator skills.)

If none of the above conditions apply, then refresher training for the operator is not required. If any one of the conditions listed above applies, then the operator is required to attend refresher training.

This form can be completed by the DLC EHS Coordinator and/or the Manager/Supervisor of the PIV operator. Please check the appropriate box below and forward this Operator Evaluation Form to the Bret Dyer in the EHS Office @N52-467.

☐ The evaluation revealed none of the above conditions.

☐ The evaluation revealed that at least one of the above conditions applies. The employee will be notified that he/she is required to attend a refresher training class.

Once the evaluation forms have been reviewed by the EHS Office, a PIV Operator Refresher Training class will be scheduled, if required.

Name of person completing this form:________________________________________

If there are questions, please call the EHS Office at 617-452-3477.