

Northwestern

Material Handling Equipment

Environmental Health and Safety

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I. Purpose

This program establishes the framework to protect individuals, property, and the environment from the hazards associated with material handling equipment operations through inspections, training, and maintenance.

II. Scope

This program applies to the operation of all material handling equipment used by, or on behalf of, Northwestern by staff, faculty, students, and contractors (i.e., operators). For the purposes of this program, material handling equipment includes, but is not limited to:

- A. Powered industrial trucks (e.g., forklifts, motorized pallet jacks, tractors, loaders, and other similar mobile, power-propelled equipment or vehicles used to carry, push, pull, lift, stack, or tier materials), and
- B. Overhead cranes, hoists, rigging equipment (e.g., slings, chains, shackles), and other similar equipment.

III. Responsibilities

A. Environmental Health and Safety (EHS)

- i. Adhere to the requirements of this program.
- ii. Review and revise this program, as necessary.
- iii. Coordinate and/or administer training (see **Section VII – Training**), when necessary.
- iv. Provide consultation and guidance, as necessary and upon request, to identify, evaluate, and control potential hazards associated with material handling equipment.

B. Schools and Units

- i. Adhere to the requirements of this program.
- ii. Ensure operators attend all required training as required in **Section VII – Training**.
- iii. Protect material handling equipment from unauthorized use (e.g., securing equipment keys).
- iv. Ensure operators are competent, trained, and authorized to operate equipment.
- v. Maintain documentation and records required in **Section VIII - Recordkeeping**.
- vi. Ensure equipment operation manuals are available to authorized operators.
- vii. Ensure the care, selection, inspection, operation, maintenance, testing, repair, and storage of material handling equipment are in accordance with this program and manufacturer's guidelines.
- viii. Immediately remove damaged or defective material handling equipment from service, including when equipment does not pass inspection.
- ix. Comply with all manufacturer safety-related bulletins (e.g., recalls) and communicate relevant information to equipment operators.
- x. Use reasonable diligence and make every effort to avoid contractor or other outside entity use of University-owned material handling equipment. Contact EHS for more information.
- xi. Monitor operators' need for additional or refresher training, based upon assigned duties, observed work practices, changes to the worksites, or changes to this program.

- xii. Contact EHS for guidance and technical assistance, as necessary, to ensure compliance with this program.

C. Operators

- i. Adhere to the requirements of this program.
- ii. Complete all required training (see **Section VII – Training**) prior to operating material handling equipment.
- iii. Prohibited from operating material handling equipment they are not trained on, familiar with, and authorized to operate, and when it is unsafe to do so.
- iv. Properly select, inspect (see **Section V – Inspections**), operate, handle, and store material handling equipment in accordance with this program and manufacturer’s guidelines.
- v. Read, understand, and adhere to all safety and manufacturer guidelines, instructions, and safety labels prior to operation.
- vi. Immediately halt operations if any problems, hazardous conditions, or malfunctions occur. Operations may only resume once all issues have been fully resolved and safety is ensured.
- vii. Prohibited from altering or repairing material handling equipment, unless authorized to do so.
- viii. Report all maintenance issues, malfunctions, accidents, or observed unsafe practices to supervisors.
- ix. Wear appropriate and assigned personal protective equipment (PPE) correctly, as required.

D. Contractors

- i. Adhere to the requirements of this program.
- ii. Ensure subcontractors adhere to the requirements of this program.
- iii. Ensure operators adhere to the requirements of **Section III – Responsibilities, C. Operators**.
- iv. Responsible for supplying, maintaining, inspecting, repairing, testing, and operating their own material handling equipment.
- v. Prohibited from operating Northwestern material handling equipment, except in extenuating circumstances with authorization from Northwestern, including EHS.

IV. Requirements

A. General

- i. Material handling equipment operators must be trained and authorized, and familiar with the equipment, prior to operation.
- ii. Material handling equipment is to be used only as intended and designed, as specified by the manufacturer and this program.
- iii. Material handling equipment design, manufacturing, and inspection must conform to applicable consensus standards.
- iv. All features that were received on material handling equipment from the dealer or manufacturer (e.g., guards) must be in operable working condition, and not disabled, tampered, or removed from the equipment.
- v. Modifications or additions to material handling equipment must be approved in writing by the manufacturer. If the manufacturer no longer exists, modifications to material handling equipment must be made under the direction of an

engineer with expertise in the equipment. In addition, capacity, operation, and maintenance instruction plates, tags, or decals must be changed accordingly by the manufacturer.

- vi. Barricades, signage, flaggers, and other measures must be utilized as necessary to prevent unauthorized access to work areas and to prevent potential hazards and conflicts with other operations, vehicles, and pedestrians.

B. Forklifts, Motorized Pallet Jacks, Tractors, and Other Similar Equipment (i.e., Powered Industrial Trucks)

- i. If installed, seat belts must be worn at all times during operation.
- ii. Stunt driving and horseplay are prohibited.
- iii. Operators must yield the right-of-way to workers, pedestrians, and all vehicular traffic, and must obey all roadway and traffic regulations.
- iv. When unloading materials from vehicles (e.g., trucks, trailers), vehicles must have the brake set and wheel chocks or restraints in place under the rear wheels to prevent movement.
- v. Equipment must be parked in secure or designated areas that do not:
 - a. Interfere with University operations,
 - b. Block doorways, egress routes, fire lanes, or safety equipment, or
 - c. Create other potential hazards.
- vi. Keys must be removed from the equipment ignition when not in use; equipment that is not visible or more than 25 feet from the operator is considered unattended and must have the keys removed and be in the proper parked position.
- vii. When operating near unprotected edges, such as loading docks and theater stages, always maintain as much distance from the edge as possible, and use a ground spotter when moving/positioning the equipment.
- viii. Verify surfaces (e.g., theater stages, temporary platforms) are designed and capable of supporting the weight of the equipment, personnel, and materials, such as by reviewing engineering documents.
- ix. Only trained and authorized personnel, with the appropriate PPE, may fuel, charge batteries, or replace propane cylinders.
- x. Battery charging areas must meet manufacturer requirements and be designated for such use, well-ventilated, and equipped with emergency eyewash stations and fire extinguishers. Smoking and other ignition sources are prohibited in battery charging areas.
- xi. Defective or damaged equipment must be locked or tagged out, and use is prohibited until repaired or replaced.

C. Overhead Cranes, Hoists, and Rigging Equipment (e.g., Slings, Shackles, Hooks, Swivels, Rings, Chains, Wire Ropes, Eyebolts)

- i. Conduct a risk assessment prior to operation to identify and control or eliminate hazards, factoring in the environment and other nearby operations.
- ii. Keep unauthorized individuals clear of the lift area.
- iii. Determine the load's weight and center of gravity, and never exceed rated equipment capacities.
- iv. Know the limitations of all equipment.
- v. Do not exceed the maximum allowable lifting angles when using slings, wires, chains, and other similar equipment.
- vi. Ensure shackle pins, nuts, and/or cotter pins are fully seated.

- vii. Rig loads in a manner that will ensure loads are hoisted evenly.
- viii. Ensure loads are balanced and centered under the hoist to avoid load swings.
- ix. Use proper hitching techniques when using slings (e.g., vertical, basket, choker).
 - x. Do not wrap slings around sharp edges without padding.
 - xi. Protect loads from rigging, if necessary.
 - xii. Do not tie knots in slings.
 - xiii. Use spotters and effective communication as necessary.
 - xiv. Operate cranes and hoists slowly and smoothly, and avoid shock-loading.
 - xv. Maintain load control and use tag lines when necessary to control suspended loads.
- xvi. Watch for obstructions and maintain at least 10 feet from energized power lines at all times.
- xvii. Keep body parts clear of pinch points and stay clear of suspended loads (never stand or pass under a load).
- xviii. Do not leave suspended loads unattended.
- xix. Defective or damaged equipment must be locked or tagged out, and use is prohibited until repaired or replaced.

V. Inspections

- A. **Forklifts, Motorized Pallet Jacks, Tractors, and Other Similar Equipment (i.e., Powered Industrial Trucks)**
 - i. Pre-use inspections
 - a. A documented pre-use inspection by a competent person that meets the manufacturer's requirements is required prior to operation.
 - b. Northwestern operators (e.g., staff, faculty, students) may utilize the pre-use [inspection checklists](#) or other equally effective pre-use inspection checklists if they meet the requirements of this program.
 - c. Contractors are responsible for providing and completing their own pre-use inspection checklists.
 - d. Pre-use inspections are subject to the requirements of **Section VIII – Recordkeeping**.
 - ii. Additional inspections by a qualified and authorized person must be performed as required by the manufacturer's guidelines.
 - iii. Any material handling equipment defects, impairments, damage, or malfunctions must be reported to supervisors, and the equipment must be immediately removed from service and tagged with a label "Dangerous: Do Not Use" or similar wording until repaired or replaced.
- B. **Overhead Cranes, Hoists, and Rigging Equipment (e.g., Slings, Shackles, Hooks, Swivels, Rings, Chains, Wire Ropes, Eyebolts)**
 - i. Pre-Use Inspections
 - a. A pre-use inspection by a competent person that meets the manufacturer's requirements is required prior to operation.
 - b. Northwestern operators (e.g., staff, faculty, students) may utilize the [inspection checklists](#) or other equally effective pre-use inspection checklists if they meet the requirements of this program.
 - c. Contractors are responsible for providing and completing their own pre-use inspection checklists.

- d. Pre-use inspections are subject to the requirements of **Section VIII – Recordkeeping.**
- ii. Frequent Inspections
 - a. A frequent inspection by a competent person of overhead cranes, hoists, and similar equipment is required:
 - 1. Prior to placing the equipment into service,
 - 2. At least monthly if it is in regular use, and more frequently if environmental conditions require a shorter period,
 - 3. Prior to use, if the equipment is idle for 1 to 6 months, and
 - 4. In accordance with the manufacturer’s guidelines.
 - b. Northwestern operators (e.g., staff, faculty, students) may utilize the [inspection checklists](#) or other equally effective inspection checklists if they meet the requirements of this program.
 - c. Contractors are responsible for providing and completing their own inspection checklists in accordance with this section.
Frequent inspections are subject to the requirements of **Section VIII – Recordkeeping.**
- iii. Annual Inspections (i.e., Periodic Inspections)
 - a. An annual inspection must be performed by a qualified and authorized vendor:
 - 1. No later than 12 months from the date of the previous annual inspection, and
 - 2. Prior to use, if the equipment is idle for more than 6 months.
 - b. Annual inspections must include all criteria specified by the manufacturer for frequent and annual inspections.
 - c. Contractors are responsible for providing and completing their own annual inspections in accordance with this section.
 - d. Annual inspections are subject to the requirements of **Section VIII – Recordkeeping.**
- iv. Additional inspections by a qualified and authorized person must be performed as required by the manufacturer’s guidelines.
- v. Load Tests (Overhead Cranes and Hoists)
 - a. Documented load tests are required for new or altered overhead cranes and hoists, including the structural support to which they are connected, and must be conducted by a qualified and authorized vendor pursuant to the applicable American National Standards Institute (ANSI) and Occupational Safety and Health Administration (OSHA) standards.
 - b. Load tests must include all items specified by the manufacturer or engineer who designed and approved the equipment.
 - c. Test loads must not be more than 125 percent of the rated load unless otherwise recommended by the manufacturer.
- vi. Operational Tests
Prior to initial use, all new, repaired, or altered cranes and hoists must be tested by a qualified and authorized party (e.g., vendor, engineer) to ensure proper operation, including but not limited to hoisting and lowering, limit switches, and locking and safety devices.

- vii. **Removal from Service**
Any safety defects, impairments, damage, or malfunctions discovered during pre-use, frequent, or annual inspections, or load or operational tests, must be reported to supervisors, and the equipment must be immediately removed from service and tagged with a label “Dangerous: Do Not Use” or similar wording until repaired or replaced.
- viii. **Markings**
 - a. **Overhead cranes and hoists**
 1. The rated load must be marked on the hoist or its load block and must be legible from the ground or floor.
 2. Controls must be marked to indicate the direction of the resultant motion.
 3. Must be marked with the name of the manufacturer, model or serial number, electrical supply specifics (for electrical-powered equipment), and rated air pressure (for air-powered equipment).
 4. Must have labels with product safety information, operating procedures, and other relevant information as required by ANSI B30.16 standards and the manufacturer.
 - b. Rigging equipment must be marked with the name of the manufacturer, rated load, and other relevant information as required by ANSI B30.26 and the manufacturer.

VI. Maintenance and Repairs

- A. Adhere to the applicable standards and manufacturer’s guidelines to establish a material handling equipment preventative maintenance program, considering the environment of the workplace and severity of use.
- B. Only authorized, competent, and qualified personnel can perform maintenance and repairs on material handling equipment.
- C. Material handling equipment maintenance and repairs must be conducted within a designated area for equipment or vehicle maintenance and repairs, and away from storm drains and sanitary sewers.
- D. Adhere to the Northwestern [Control of Hazardous Energy Program](#) when activities involve hazardous energy, such as battery-, air-, or electric-powered equipment.
- E. Adhere to the Northwestern [Personal Protective Equipment \(PPE\) Program](#) and wear the appropriate and assigned PPE (e.g., gloves, protective eyewear) when activities involve exposure to potential hazards.
- F. Adhere to the Northwestern [Hazardous Waste Program](#) when maintenance or repair activities produce hazardous waste, such as oils or solvents.
- G. Adhere to the Northwestern [Hazard Communication Program](#) when maintenance or repair activities involve exposure to hazardous chemicals, including but not limited to reviewing and adhering to safety data sheets (SDSs).
- H. Contractors are responsible for providing and completing their own equipment maintenance and repairs in accordance with this section. Northwestern approval is required for maintenance and repair activities performed on campus property.

VII. Training

A. General

- i. Schools and units are responsible for ensuring their operators are properly trained and authorized to operate equipment.
- ii. Operators must be competent to operate equipment safely, which includes the successful completion of the required training and evaluation prior to operation (except when operating for training purposes under the supervision of a qualified trainer).
- iii. Training and evaluations may only be performed by those who have the knowledge, training, and experience to train operators and evaluate their competence.
- iv. Operator training must be specific to the type of equipment they will be operating, and training must be documented in accordance with **Section VIII – Recordkeeping**.
- v. EHS is generally responsible for coordinating training and evaluations and ensuring they meet the requirements of this program, which includes but is not limited to online theory training, classroom instruction, performance evaluations, and the use of third parties (e.g., vendors, unions) in certain situations.
- vi. Schools and units may coordinate their own training and evaluations with EHS approval.
- vii. Contractors are responsible for providing, completing, and documenting their own training and evaluations to meet the requirements of this program.

B. Forklifts, Motorized Pallet Jacks, Tractors, and Other Similar Equipment (i.e., Powered Industrial Trucks)

- i. Initial training
 - a. Operators must receive initial training on the applicable topics required by OSHA and ANSI standards and any additional training required by the manufacturer.
 - b. Initial training must consist of a combination of formal instruction (e.g., lecture, discussion, interactive computer learning, video, written material), practical training (i.e., demonstrations performed by the trainer and practical exercises performed by the trainee), and evaluation of the operator's performance in the workplace.
- ii. In addition to initial training, Northwestern operators (e.g., staff, faculty, students) must complete the following online training:
 - a. Powered pallet jack operators must complete biennial online [Pallet Jack Safety](#) training.
 - b. Forklift operators must complete biennial online [Forklift Operator](#) training.
- iii. Operator performance must be re-evaluated and documented at least once every 3 years.

C. Overhead Cranes, Hoists, and Rigging Equipment (e.g., Slings, Shackles, Hooks, Swivels, Rings, Chains, Wire Ropes, Eyebolts)

- i. Northwestern operators (e.g., staff, faculty, students) must complete biennial online [Crane Safety](#) training.

- ii. Additional training and evaluation may be required in certain situations (e.g., equipment for which operators are not competent to operate) as required by the applicable standards, manufacturer, or EHS.

D. Refresher Training and Evaluation

Refresher training in relevant topics, including a performance evaluation, must be provided to operators when:

- i. The operator has been observed operating the equipment in an unsafe manner,
- ii. The operator has been involved in an accident or near-miss incident,
- iii. The operator has been observed or received an evaluation that reveals that the operator is not operating the equipment safely,
- iv. The operator is assigned to new or significantly different equipment for which they are not trained or qualified to operate,
- v. A condition or procedure in the workplace changes in a manner that could affect the safe operation of the equipment, or
- vi. Deemed necessary by EHS or a qualified trainer.

VIII. Recordkeeping

- A. EHS is responsible for maintaining training and evaluation records in myHR Learn, and such records are kept for the duration of employment, plus 1 year.
- B. Schools and units are responsible for maintaining the following records:
 - i. Pre-use inspection checklists for at least 1 year (not required for rigging equipment and overhead hoists).
 - ii. Frequent (e.g., monthly) and annual inspections, and load and operational test records for as long as the equipment is in operation.
 - iii. Maintenance, inspection, testing, and repair documentation for as long as the equipment is in operation.
 - iv. Maintenance and operator manuals for as long as the equipment is in operation.
- C. Contractors are responsible for maintaining their own records in accordance with the applicable standards.

IX. Regulatory Authority

Northwestern and contractors will comply with the Occupational Safety and Health Administration (OSHA) standards, American National Standards Institute (ANSI) standards, and any other applicable codes and standards, including:

ANSI B30.17-2020 – Cranes and Monorails

ANSI B30.10-2024 – Hooks

ANSI B30.2-2022 – Overhead and Gantry Cranes

ANSI B30.16-2022 – Overhead Hoists

ANSI B30.26-2015 – Rigging Hardware

ANSI B56.1-2020 – Safety Standard for Low Lift and High Lift Trucks

ANSI B30.9-2021 – Slings

[Northwestern Contractor Safety Program](#)

[Northwestern Control of Hazardous Energy \(Lockout/Tagout\) Program](#)

[Northwestern Hazard Communication Program](#)

[Northwestern Hazardous Waste Program](#)

[Northwestern Personal Protective Equipment Program](#)

OSHA 29 CFR 1910.178 – Powered Industrial Trucks

OSHA 29 CFR 1910.179 – Overhead and Gantry Cranes

OSHA 29 CFR 1926.602 – Material Handling Equipment

[OSHA Compliance Directive CPL 2-1.28A – Compliance Assistance for the Powered Industrial Truck Operator Training Standards](#)

X. Contact

For questions, contact Environmental Health and Safety at ehs@northwestern.edu.