

Crane, Hoist and Sling Safety

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Applies To: This Guideline applies to all departmental units at the University of Michigan who own or operate cranes, hoists, and/or slings.

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Summary

The *Crane, Hoist, & Sling* Safety Guideline will aid in the establishment of a program designed to ensure this equipment is used properly and maintained in a safe manner. It requires all departments with cranes, hoists, and slings to implement a maintenance, training, and inspection program.

The Environment, Health & Safety (EHS) Department will conduct inspections of powered cranes and hoists on campus and maintain these inspection records, unless a department elects to develop and manage their own inspection program. In either case, departments will be responsible for conducting any necessary repairs. The Guideline requires the department to maintain written documentation of all aspects of the program under their control, including training, inspections, repairs and maintenance.

All crane, sling and hoist operators will be trained through their own department on the specific equipment they will be using.

In addition, operators of **overhead** or **gantry** (“MIOSHA Part 18”) cranes are required to complete both a written and performance test and to validate that they meet the necessary physical requirements. Currently, there are the following five **overhead** or **gantry** cranes at UM:

1. GG Brown (Structural Engineering room)
2. Michigan Memorial Phoenix Project building (Pool Floor room),
3. Randall Lab (two in Room 1288C), and
4. The Central Power Plant.

After these requirements have been completed for operators of **overhead** or **gantry** cranes, EHS will issue an Overhead and Gantry Crane Permit. This Guideline includes the procedures to be followed to receive the operator permit for these types of cranes.

NOTE: No permit is required for employees who only operate cranes other than **overhead** or **gantry** cranes, but similar training methods should be followed.

Reference Documents

- [Overhead and Gantry Cranes](#): MIOSHA Part 18
- [Underhung Cranes and Monorail Systems](#): MIOSHA Part 20
- [Slings](#): MIOSHA Part 49
- [Hand & Portable Power Tools \(Manual Hoists & Chain Falls\)](#): MIOSHA Part 38
- Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist): ANSI/ASME B30.2
- Slings: ANSI/ASME B30.9
- Hooks: ANSI/ASME B30.10
- Overhead Underhung and Stationary Hoists: ANSI/ASME B30.16
- Cranes and Monorails (With Underhung Trolley or Bridge): ANSI/ASME B30.17
- Monorail Systems and Underhung Cranes: ANSI/ASME B30.11

Glossary of Terms

TERM	DEFINITION
Bridge	The part of a crane consisting of girders, trucks, end ties, footwalks and the driving mechanism which carries the trolley or trolleys.
Chain fall	A manually powered hoisted device employing a load bearing chain and an endless hand chain to raise or lower loads.
Crane	A lifting device to move a load vertically and horizontally with the hoisting mechanism an integral part of the machine, whether driven manually or by power.
Designated Trainer	University of Michigan employee who has been designated by his/her department to conduct training in the safe use of equipment. Trainers will have experience, skill and knowledge in operating the equipment. Trainers conducting training on an overhead or gantry crane must have a valid Overhead and Gantry Crane permit issued by the University.
Gantry Crane	A crane similar to an <i>overhead crane</i> , except that the bridge for carrying the trolley(s) is rigidly supported by one or more legs running on a fixed rail or other runway.
Hoist	A system of power-driven drums, gears, cables, chains, or hydraulic cylinders capable of lifting and lowering a load
Monorail System	An overhead track from which hoisting equipment travels to transport loads and includes curves, switches, transfer devices, drop sections, hangers and related equipment.
Overhead Crane	A top-running crane that has a movable bridge carrying a movable or fixed hoisting mechanism for lifting and lowering, moving horizontally and traveling on an overhead fixed runway.
Permitted Operator	University of Michigan employee or approved contractor who has been issued a permit by EHS to operate overhead or gantry cranes.
Sling	An assembly which connects the load to the material handling equipment for the purpose of lifting or hoisting
Trolley	A unit that travels on the bridge rails and carries the hoisting mechanism.
Underhung Crane	A crane with a travelling bridge which is suspended under its runway track system. A hoist trolley may be under hung or top running.
University Medical Surveillance Contact Person	The EHS employee responsible for coordinating the permit process for EHS.

Responsibility

Deans, Directors, and Department Heads

- Ensure compliance with this Guideline.
- Designate an adequate number of trainers to train departmental employees in the safe use of cranes, hoists and slings. Trainers for overhead or *gantry cranes* must also successfully complete both a written and performance evaluation and obtain the required permit(s).

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- Ensure purchasing of cranes, hoists and associated equipment meets the specifications listed in MIOSHA safety standards, [Part 18](#) or [Part 20](#), as applicable.

Supervisors

- Ensure that all crane, hoist, and sling operators, including contractors, are trained and able to safely operate each piece of equipment.
- Ensure users of overhead or gantry cranes have received medical clearance, completed both a written and performance based test, and have been issued a permit before operating such equipment. This permit must be renewed every three years.
- Ensure all equipment is in proper working condition and all operators perform inspections before operating equipment. Manufacturer's guidelines concerning crane capacity, rating, scope and maintenance must be followed. Deficiencies indicated by an EHS compliance inspection must be fixed immediately.
- Maintain written documentation. For departments with overhead or gantry cranes, documentation must be kept of quarterly inspections and maintenance along with training records. Departments with underhung cranes, monorail systems and all other cranes, hoists, slings or chain falls not listed above, must maintain records of inspections and maintenance and should maintain training records.
- Report accidents on the Work Connections [Illness or Injury Report Form](#).

Designated Trainers

Be knowledgeable in the operation of cranes, hoists and slings in their unit; be familiar with all safety principles applicable to their operation; and provide training to employees as required.

Crane, Hoist & Sling Operators

- Follow this Guideline and use the above equipment in a safe and appropriate manner. Operators shall consult with their supervisor or other appropriate knowledgeable management personnel whenever they have questions regarding their protection.
- Users of all cranes, hoists, and slings must receive training before using such equipment. Users of **overhead** or **gantry** cranes must complete the requirements in Appendix A and receive their permit before using such equipment. Users will carry the issued permit at all times during operation of equipment. Requirements for users of underhung cranes, monorail systems and all other cranes, hoists, slings or chain falls not listed above are included in Appendix B.
- **Overhead** or **gantry** permits must be renewed every three years, by filling out the Permitted Equipment Operator's Renewal Form in Appendix C.
- Inspect each piece of equipment using the daily safety inspection checklist (Appendix D) before use.
- Report any job-related injuries or illnesses, questions on health and safety, or any unsafe or unhealthy working conditions to your supervisor.
- Report any impairment of any physical qualification needed to operate equipment to your supervisor.

Contractors

Comply with this Guideline in the same manner as a University employee if required to use a crane, hoist, or sling during the course of job duties. Complete training on specific equipment before using.

If using an **overhead** or **gantry** crane, contractors must have a valid permit from the University of Michigan. If not, they must apply for a University permit before using the overhead or gantry crane.

Crane, Hoist & Sling Inspectors

Shall be knowledgeable and familiar with each piece of equipment they inspect as well as all regulatory requirements of the inspection procedure.

EHS

- Conduct inspections of cranes using the following schedules.
 - Overhead or gantry cranes: quarterly (every three month) for heavy use, semi-annually (every six months) for less frequent use.
 - Underhung cranes and monorails (*with power-driven bridges or trolleys*): semi-annually (every six months).
 - Underhung cranes and monorails (*with manually powered bridges or trolleys*): annually (every twelve months).
- EHS will perform the inspection unless a department elects to have their own formal inspection program.
- Inform departments of any deficiencies noted and track follow-up on repair or replacement of equipment.
- Maintain all records of inspections conducted by EHS and all **NOTEs** pertaining to deficiencies corrected.
- Provide technical assistance and oversight to programs implemented by the deans, directors and department heads.
- Maintain records of training and physical qualifications of operators and Designated Trainers of overhead or gantry cranes.
- Issue permits to trained operators of overhead or gantry cranes.
- Review and revise this Guideline as necessary.

Crane, Hoist & Sling Operators

1. Conduct a daily visual inspection at the beginning of each shift. All functional operating mechanisms, air and hydraulic systems, chains, ropes, slings, hooks and other lifting equipment shall be inspected. The rated load of each crane shall be plainly marked on both sides of the crane and visible from the ground floor. Each hoist and sling shall also be marked with the load limit. Unsafe conditions found during the inspection shall be reported to the supervisor and corrected before operation is resumed. See Appendix D for the complete checklist.
2. Employees shall consult with their supervisor or other appropriate knowledgeable management personnel whenever there are any questions regarding their protection.

Supervisors

1. Supervisor shall ensure that all employees and contractors complete the requirements of this Guideline before operating any crane, hoist, or sling.

All crane, hoist, and sling operators must receive training specific to the equipment that they will be using. Training must be provided before the first time an employee uses the equipment. Training must be documented within the department's records.

- a. Supervisors shall ensure that overhead or gantry crane operators obtain a permit prior to using overhead or gantry cranes. The following steps will be followed to obtain an Overhead or Gantry Crane Permit:

Contact the University Medical Surveillance Coordinator at 615-2140.

Complete the applicable training package for overhead or gantry cranes in Appendix A.

The forms in the Appendix should be printed and used by the Designated Trainer and includes:

- i. Training Procedures,
- ii. Physical Qualification Form,
- iii. Written Permit Test, and
- iv. Performance Test Instructions and Score Sheet.

Every three years the permit must be renewed (Appendix C).

- b. Supervisors shall ensure that operators for all other underhung cranes, monorail systems, cranes, hoists, slings or chain falls not listed above complete the training package noted in Appendix B.
2. Each supervisor shall effectively enforce compliance of this Guideline including the use of disciplinary action when necessary.
 3. Retraining shall occur if there is a change in equipment or workplace, or if the employee is judged to need refresher training.

Crane, Hoist & Sling Inspectors

1. Inspectors will be chosen based upon experience and knowledge of the equipment. All overhead or gantry cranes will be inspected quarterly (every three months) for high frequency use or semi-annually (every six months) for less frequent use. All power-driven underhung or monorail cranes will be inspected on a semi-annual basis (every six months). Cranes with manually moved trolleys or bridges will be inspected on an annual basis (every twelve months). Manual chain-falls will not be inspected by EHS, but should be inspected prior to use by the operator.

Inspections will comply with all regulatory requirements of MIOSHA and ANSI/ASME. The inspection shall include identifying deformed, cracked, corroded, worn, or loose members or parts and examining the brake system, limit indicators, power plant and electrical apparatus, as applicable.

2. The inspector will document all inspections and maintain records of each crane in the departmental unit. The inspection shall list all potential safety problems or equipment defects determined during the inspection. Records must be maintained for at least two years.

The Departmental Unit

The departmental unit shall develop a program that complies with this Guideline. The unit must correct any unsafe conditions found during the daily, quarterly, or annual inspection before operation is resumed. Any units with overhead or gantry cranes shall also develop a training program that includes the elements of Appendix A for users of this equipment. Records of the training for this permitted equipment will be maintained by EHS.

Departments that have underhung cranes, monorail cranes or other cranes, hoists, slings or chain falls not listed above shall develop a training program for all users, as described in Appendix B and should document this training.

Related Documents

- [Slings Safety](#): U.S. Department of Labor (OSHA 3072) Publication
- [Safety Manual for Overhead Crane Operators](#): MIOSHA
- Training videos on crane safety are available from a number of suppliers as well as from EHS. Please call EHS at 7-1143 for more information.

Technical Support

All referenced guidelines, regulations and documents are available through EHS (734) 647-1143 or on-line.

Attachments

- [Appendix A – University of Michigan Training Package for Overhead or Gantry Cranes](#)
- [Appendix B – University of Michigan Training Package for Other Cranes, Hoists, Slings](#)
- [Appendix C – Permitted Equipment Operator’s Renewal Form](#)
- [Appendix D – Daily Inspection Checklist](#)