



## Department of Public Safety & Environmental Health

**Subject: Crane, Hoist, & Sling Safety**

**Date: September 21, 2006**

**Revision: 01**

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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. Departments will be responsible for conducting inspections of cranes and hoists on campus, maintain records, and conduct any necessary repairs. This 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 cranes are required to complete a written and performance test and to validate that they meet the necessary physical requirements. After these requirements are filled, EHS will issue an Overhead and Gantry Crane Permit. The following Guideline describes the procedures to be followed to receive an operator permit. No permit is required for employees who operate only cranes other than overhead or gantry, but similar training methods should be followed. Training information is included in [Appendix A](#).

**SCOPE:**

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

**REFERENCE**

**REGULATIONS:**

Overhead and Gantry Cranes [[29 CFR 1910.179](#) ([MIOSHA part 18](#))]  
Slings [[29 CFR 1910.184](#) ([MIOSHA part 49](#))]  
Hand & Portable Powered Tools (Manual Hoists and Chain Falls) ([MIOSHA part 38](#))  
Overhead and Gantry Cranes (ANSI/ASME B30.17-1992) ([MIOSHA part 20](#))]  
Overhead Hoists (ANSI/ASME B30.16-1987)  
Slings (ANSI/ASME B30.9-1990)



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**DEFINITIONS:** *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-Dearborn 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 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 overhead crane, 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-* an apparatus, which may be part of a crane, exerting force for lifting or lowering.

*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-Dearborn employee or approved contractor who has been issued a permit by EHS to operate gantry or overhead cranes.

*Sling-* a harness designed for attachment to load for movement.

*University Medical Surveillance Contact Person-* is the Environmental Health and Safety (EHS) Manager.

**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 a written and performance evaluation and obtain required permits.



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### Supervisors

Ensure inspections of cranes are completed on the required schedule. Overhead or gantry cranes will be inspected on a quarterly basis. Under hung cranes and monorails with power-driven bridges or trolleys will be inspected on a semi-annual basis. Under hung cranes and monorails with manually powered bridges or trolleys will be inspected yearly.

Inform dean, director, or department head of any deficiencies noted during inspection and track follow-up on repair or replacement or equipment.

Maintain all records of inspection conducted and all notes pertaining to deficiencies corrected.

Ensure 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 a written performance based test, and have been issued a permit by Public Safety before operating such equipment. Every three years, this permit must be renewed.

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 a 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 under hung cranes or monorails must maintain records of inspections and maintenance and should maintain training records. Maintain training records of designated trainers and operators trained.

Refer to the Work Connections website at [http:// www.umich.edu/~connect](http://www.umich.edu/~connect) to report an accident or injury.



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### 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. The permit must be renewed every three years, by filling out the Renewal Evaluation of Operator Performance for Overhead/Gantry Crane Operators ([Appendix C](#)).

Inspect each piece of equipment using the daily safety checklist ([Appendix B](#)) before use.

Report 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.



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

### Public Safety & Environmental Health

Provide technical assistance and oversight to programs implemented by the deans, directors, and department heads.

Maintain records of physical qualifications of operators and designated trainers of overhead or gantry cranes.

Issue permits to trained operators of overhead or gantry cranes upon receipt of training records from the department.

Review and revise the Guideline as necessary.

## **PROCEDURES:**

### **A. 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 B](#) 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.



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### B. Supervisors

1. Supervisor shall ensure 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.

2. Supervisors shall ensure 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:

- a. Contact the EHS Manager at extension 3-4914.

- b. Complete training package located at:

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

- i. [Overhead Crane and Gantry Training Instruction](#)
- ii. [Physical Qualification form](#)
- iii. [Written Permit Test](#)
- iv. [Performance Test Instructions](#)

- c. Every three years the permit must be renewed ([Appendix C](#))

3. Each supervisor shall effectively enforce compliance of the Guideline including the use of disciplinary action when necessary.
4. Retraining shall occur if there is a change in equipment or workplace, or if the employee is judged to need refresher training.

### C. Crane, Hoist & Sling Inspectors

1. Inspectors will be chosen based upon experience and knowledge of the equipment and in accordance with manufacturer's recommendations. All overhead or gantry cranes will be inspected quarterly. All power-driven under hung or monorail cranes will be inspected on a semi-annual basis. Cranes with manually moved trolley or bridges will be inspected on an annual basis. Inspections will comply with all regulatory requirements of OSHA and ANSI/ASME. The inspection shall include deformed, cracked,



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corroded, worn, or loose members or parts, the brake system, limit indicators, power plant and electrical apparatus.

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 within the department for at least two years.
- D. The Departmental Unit
1. 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. The unit shall also develop a training program that included the elements of [Appendix A](#) for overhead or gantry crane users, records of this training shall be kept by the departmental unit. Departments that have under hung cranes or monorail shall develop a training program for all users. Appendix A should be used as a guideline for training users. The unit should document all training for under hung cranes or monorails.

### RELATED

#### DOCUMENTS:

“*Sling Safety*” brochure US Department of Labor OSHA 3072 *Training videos* on crane safety are available from a number of suppliers.

[Appendix A](#)- University of Michigan Training Package for Overhead or Gantry Cranes:

- [Crane and Hoist Operator’s Training Instructions](#)
- [Physical Qualification Form](#)
- [Written Permit Test](#)
- [Performance Test](#)

[Appendix B](#)- Daily Inspection Checklist

[Appendix C](#)- Renewal Evaluation of Operator Performance for Overhead/Gantry Crane Operators

# Appendix A

## Crane and Hoist Training Instructions

### **Training Procedures**

Each department using cranes or hoists will appoint at least one designated trainer to train employees to operate them. The trainer must be a supervisor, principle investigator, or other person that is knowledgeable in the operation of cranes, hoists, and slings in their unit and is familiar with all safety principles applicable to their operation. Trainers for overhead or gantry cranes must have an Overhead and Gantry Crane Permit.

Your department must have the written manufacturers' guide and/or training videos for the specific equipment in the department. The training/permitting process should begin immediately so that the permit is issued in a timely manner.

The training for all cranes must consist of a combination of:

- Instruction such as a discussion or written material based on the MIOSHA standard and the specific equipment operation.
- Review of daily inspection (attached checklist should be posted in the workplace).
- Practical training of the operator in the workplace by the designated trainer.

Include any other pertinent information you think is important. You may also contact the EHS Manager at 3-4914 with technical questions.

Training for overhead and gantry cranes must also include a written and performance test. At the conclusion of the training, employee(s) must be administered the written test. After completion of the written exam, each employee will undergo a performance test. Test materials can be found at

### **Record Keeping**

Upon completion of the training, the department will keep written documentation of the name of the trainee, dates of the training, and the equipment trained on. The employee operating an overhead or gantry crane will complete the physical qualification form and attach a copy of their valid State of Michigan driver's license. If the employee already has a Permitted Equipment Operator's license, s/he does not need to submit a driver's license. The designated trainer will send the physical qualification form and copy of driver's license to EHS along with the written and performance test. EHS will evaluate the packet and issue a permit or contact the department for missing/additional requirements.

### **Refresher Training**

Refresher training for any type of crane or hoist is required of the operator IF the operator is observed or reported: performing unsafe operation, involved in an accident or near-miss incident, evaluation indicated need, different type of equipment is introduced, or workplace conditions change.

### **Permits**

Overhead or gantry crane operators must carry the permit with them at all times when operating this equipment. Tracking of physical qualifications will be the responsibility of EHS.

### **Crane and Hoist Equipment Maintenance and Testing**

The University will only purchase crane and hoist equipment that meets the specifications listed in MIOSHA Safety Standards, Parts 18 and 20. The responsible department will conduct inspections for all powered hoists and cranes.

It is responsibility of each department to assure their cranes and hoists are in proper working order and to follow manufacturers' specifications with respect to inspection and maintenance.

Administrative or technical questions pertaining to the tracking system and issuance of overhead or gantry crane permits may be directed at the EHS Manager at (3-4914) or by email at [ldrabczy@umd.umich.edu](mailto:ldrabczy@umd.umich.edu).

University of Michigan-Dearborn  
Environmental Health & Safety  
Physical Qualification Form  
Overhead and Gantry Crane Operators

Operator's Name: \_\_\_\_\_ ID #: \_\_\_\_\_

Specific Equipment: \_\_\_\_\_ Equipment Location: \_\_\_\_\_

I have a valid Permitted Equipment Operator's License: expiration date: \_\_\_\_\_

**If you have a valid University of Michigan Permitted Equipment Operator's License, skip to signature and date.**

I have a valid DOT medical card issued by MWorks: expiration date: \_\_\_\_\_

**If you have a DOT medical card, skip to signature and date, no driver's license copy needed**

I certify that I meet the following minimum physical qualifications for operating permitted equipment.

(Check yes or no for each question)

YES    NO

\_\_\_\_    \_\_\_\_ I have (corrected or uncorrected) that meets the same requirements as those for a valid Michigan's driver's license. Evidence of meeting this requirement shall be an attached copy of my Michigan driver's license.

\_\_\_\_    \_\_\_\_ I have effective use of all four limbs.

\_\_\_\_    \_\_\_\_ I am of sufficient height to operate the controls and have an unobstructed view over the controls and dashboard of the equipment listed.

\_\_\_\_    \_\_\_\_ I have coordination between eyes, hands and feet.

\_\_\_\_    \_\_\_\_ I am able to hear and understand conversational levels of sound in an ordinary environment.

\_\_\_\_    \_\_\_\_ I am able to understand signs, labels, and instructions.

\_\_\_\_    \_\_\_\_ I have attached a copy of my valid Michigan driver's license.

\_\_\_\_    \_\_\_\_ I have known convulsive disorders or episodes of unconsciousness.

\_\_\_\_    \_\_\_\_ I am taking medication that affects perception, vision or physical ability.

\_\_\_\_    \_\_\_\_ I have known neurological disorders that effect balance or consciousness.

\_\_\_\_    \_\_\_\_ I have sleep disorders, pauses in breathing while asleep, daytime sleepiness and/or loud snoring.

**I will report any impairment of these physical qualifications immediately to my supervisor.**

Operator's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

**Please attach a copy of your valid Michigan driver's license and return with tests to the EHS Manager at 1330 CSS, Department of Public Safety.**

For Office Use Only

Permit Checklist:

<input type="checkbox"/> Written Test	<input type="checkbox"/> Physical Qualification form
<input type="checkbox"/> Performance Test	<input type="checkbox"/> Valid, readable Michigan driver's license
<input type="checkbox"/> Renewal Evaluation form	<input type="checkbox"/> Permit Restrictions
<input type="checkbox"/> Permit Sent	<input type="checkbox"/> Permit Expiration
<input type="checkbox"/> Permit entered in database	



- 9) A lift can be made with a kinked or twisted rope.
- a) True
  - b) False
- 10) If the crane fails the inspection, you should
- a) Use caution when operating the crane
  - b) Not use the crane until corrections or repairs are made
  - c) Make a note of it before using the crane
- 11) When moving a load, you should
- a) Keep both hands on the pendant control
  - b) Avoid swinging the load
  - c) Face the load
  - d) All of the above
  - e) Only b and c
- 12) When setting a load, you should
- a) Place the bridge and trolley to the left of where you will set the load
  - b) Swing the load into place
  - c) Quickly set the load down
  - d) Lower the hooks the sling can be easily removed from the hook
- 13) Tying knots in a sling can increase its capacity
- a) True
  - b) False
- 14) As a crane operator, you are responsible for your safety and your co-workers
- a) True
  - b) False

Answer Key:

1. False
2. Stop the movement
3. False
4. False (use the controls to stop the hoist, the limit switch is a safety stop)
5. False
6. A
7. True
8. E
9. False
10. B
11. D
12. D
13. B
14. A

# Employee Performance Test for Overhead and Gantry Cranes

Employee: \_\_\_\_\_ Date: \_\_\_\_\_

Trainer: \_\_\_\_\_

Equipment used during the test: \_\_\_\_\_

## *Instructions to Trainer:*

*Demonstrate how to do a daily inspection. Have a load reading for lifting and demonstrate how to properly lift the load and move it to another location. Then have the employee take the controls and perform a daily inspection and lift the load in the same manner as demonstrate.*

*Rate the employee on how well he/she performs the crane inspection and operates the crane in lifting and moving the load:*

E- excellent- no mistakes were made

G- good- only minor mistakes were made, or employee recognized and corrected on own

F-fair-employee made serious mistakes that could result in injury

## **Categories to observe and rate:**

## **Rating**

### **Section I- Crane Inspection**

Ability to identify items inspected and to explain what they are look for \_\_\_\_\_

### **Section II- Basic Control Skills**

Ability to use controls accurately \_\_\_\_\_

Lifting and handling load properly and accurately \_\_\_\_\_

Operating in a safe manner, aware of people and obstacles \_\_\_\_\_

Overall Performance rating: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Signature of trainer: \_\_\_\_\_

## Appendix B

### University Of Michigan-Dearborn

### Daily Inspection Form

*All cranes and hoists must be inspected before each day's use by the operator. Use this checklist as a guide in performing your daily inspection.*

Item	Inspect Daily	Comments
All Components	Check for loose objects, grease, oil or contaminates on rails	
Hoist Equipment	Check guards	
Limit Switches	Visual and operational for function	
Air Systems	Visual for leaks	
Hydraulic Systems	Visual for leaks	
Hooks	Visual for deformation and cracks	
Chains	Visual for wear, elongation and twist	
Wire Rope	Visual for wear, elongation and twist	
Slings	Visual for war, broken, wire, kinks	
Rope Reeving	Visual for proper seating in drum and sheave grooves	
Brake system	Functional test	
End Stops on Bridge	Visual to ensure they are in place	
Operating Mechanisms	Visual for function	

*Do not use the equipment if you identify any damaged or defective components. Inform your supervisor or the individual responsible for the equipment immediately.*

Appendix C  
University of Michigan-Dearborn  
Environmental Health & Safety

Renewal Evaluation of Operator Performance for Overhead/Gantry Crane Operators

Operators Name: \_\_\_\_\_ ID #: \_\_\_\_\_

Specific Equipment: \_\_\_\_\_ Equipment Location: \_\_\_\_\_

I certify that the operator listed above has operated the indicated equipment in a safe manner and does not require refresher training at this time. The operator has not been involved in any equipment accidents or near miss incidents. The equipment listed has not been modified and the equipment location has not been altered. The operator continues to safely and effectively operate the equipment, including (but not limited to) the following functions:

- Shows familiarity with the controls
- Maneuvers load properly
- Follows proper procedures at both start and finish

**Return this evaluation with a completed physical qualification form**

Evaluator: \_\_\_\_\_ Date: \_\_\_\_\_

Print

\_\_\_\_\_  
Signature

Return to: Laura L. Drabczyk, EHS Manager  
Public Safety & Environmental Health  
1330 CSS Building