

University of Pittsburgh Safety Manual	EH&S Guideline Number: 01-019	
Subject: USE OF CRANES, HOISTS, AND SLINGS	Effective Date: 12/10/2013 Review Date: 08/12/2026	Page 1 of 6

These Guidelines define the work practices and inspection procedures to help ensure that the operators of the overhead cranes are protected from potential hazards associated with the movement of equipment and material; and to comply with the OSHA standards entitled “Overhead Cranes” (29CFR 1910.179, 1926.550) and American National Standards Institute standards (ANSI B30).

By OSHA definition, a crane is a machine for lifting and lowering a load and moving it horizontally, with the hoisting mechanism an integral part of the machine. Cranes can be driven manually or by power.

These guidelines also include information on safe operation and inspection procedures for small portable overhead hoists, chains, and slings, which are also regulated by OSHA and ANSI.

The provisions of this Guideline shall apply to all employees who operate and use overhead cranes, portable hoists, chains and slings and they shall attend training on these requirements and the appropriate inspection procedures for chains, slings and hoists. The Environmental Health and Safety Department (EH&S) will provide technical assistance regarding cranes, slings, and hoists.

1. General Requirements

- 1.1. When a crane or hoist is installed, the user department must notify EH&S of its location prior to initial use. The crane or hoist must be inspected by a Qualified Person prior to use. All operators must be trained on the crane or hoist prior to initial use.
- 1.2. Any unsafe condition noted during an inspection shall be corrected before the equipment is used.
- 1.3. Operators shall comply with the manufacturer's specifications and limitations applicable to the operation of the equipment. Operators shall follow safe work practices when operating a crane or hoist, and when rigging with slings.
- 1.4. Where manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a qualified engineer competent in this field. All such determinations will be appropriately documented, recorded and retained by the user.

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2. Training

- 2.1. Training of crane and hoist operators will consist of classroom instruction and hands-on training. Hands-on training and hands-on evaluation portions of the training can be conducted by a foreman, chief engineer or designated employee in the department who is experienced and competent with the equipment. Training shall include:

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- 2.1.1. Characteristics of safe crane and hoist operation
- 2.1.2. Inspection procedures
- 2.1.3. Basic load handling considerations
- 2.1.4. Operator responsibilities
- 2.1.5. Communication used during crane and hoist operation
- 2.1.6. Hands-on equipment training

- 2.2. Refresher training in relevant topics will be provided to a crane or hoist operator when any of the following occur:

- 2.2.1. The operator has been observed using the equipment in an unsafe manner.
- 2.2.2. The operator has been involved in an accident or a near-miss incident.
- 2.2.3. The operator is assigned to operate a different type of equipment.
- 2.2.4. A condition in the workplace changes in a manner that could affect safe operation of the equipment.

3. Inspections

The user department is responsible for ensuring that the following inspections are conducted:

3.1. Pre-Use Inspection

- 3.1.1. Prior to each use, the operator shall visually inspect the crane, hoist and/or slings for defects and for identification of conditions that could affect the safe use of the equipment.
- 3.1.2. Operators must immediately report any unsafe crane conditions to their supervisor. The supervisor is then responsible for ensuring the necessary arrangements are made for repair.
- 3.1.3. If any unsafe conditions exist, equipment shall be removed from service which includes locking and tagging it out to prevent use.
- 3.1.4. Only personnel authorized by the manufacturer shall perform repairs and adjustments.

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- 3.2. A documented monthly inspection of all cranes shall be performed. These inspections must be performed by a designated person trained as a crane/hoist operator and is compliant with monthly crane/hoist inspection training.
- 3.3. A documented annual inspection of all cranes shall be performed by a qualified third party, and all cranes and hoists shall be labeled or marked to show date of last annual inspection.
- 3.4. A documented annual inspection of all slings shall be performed by a designated person or qualified third party who has gone through sling inspection training.
- 3.5. Preventive maintenance shall be performed as prescribed by the manufacturer and detailed in the owner's manual.
- 3.6. Each department is responsible for maintaining the equipment's inspection and repair records.

4. Safe Work Practices

- 4.1. A personal protective equipment (PPE) hazard assessment must be performed for the task. PPE considerations should include a hardhat, safety glasses and safety shoes.
 - 4.1.1. If the crane or hoist requires a lift to inspect or perform maintenance, training and a personal fall arrest system is required.
- 4.2. Rated load capacities recommended operating speeds, special hazard warnings and/or instructions shall be conspicuously posted on all equipment. Instructions or warnings shall be visible to operators while they are at their control stations.
- 4.3. Do not exceed the rated load capacity of the crane, hoist, slings, or other components. Keep in mind that the hoist may be higher rated than the rail/beam, or vice versa.
- 4.4. Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or other moving parts or equipment shall be guarded if such parts are exposed to contact by employees, or otherwise create a hazard.
- 4.5. No modifications or additions which affect the capacity or safe operation of the equipment shall be made without the manufacturer's written approval. If such modifications or changes are made, the capacity, operation, and maintenance instruction plates, tags, or decals, shall be changed accordingly. In no case shall the original safety factor of the equipment be reduced.

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4.6. Never operate a hoist or crane that is unsafe to operate or is tagged out of use.

4.7. If a lift requires removal of any section of protective barriers, then appropriate steps must be taken to protect the operator. (For example, if a section of railing must be removed for a lift, the operator must wear fall protection equipment and be properly tied off BEFORE removing the railing.)

4.8. Engaging the Load

- 4.8.1. The sling or other device shall be properly seated and secured in the base of the hook.
- 4.8.2. The load shall not be applied to the point of the hook or the hook latch.
- 4.8.3. Before moving the load, the operator shall be sure chains and wire rope are not kinked or twisted, and that multiple part chains or ropes are not twisted about each other.
- 4.8.4. The rope or chain must be properly seated on the drum, sheaves, or sprockets before the lift takes place.
- 4.8.5. Remove slack from the sling, chain, or cable before lifting a load.
- 4.8.6. The hoist must be centered over the load.
- 4.8.7. The operator shall not pick up a load in excess of the rated load of the hoist or crane.
- 4.8.8. Specific attention should be given to balancing the load to prevent slipping.

4.9. Moving the load

- 4.9.1. The operator shall not engage in any activity that will divert his/her attention from the task.
- 4.9.2. The operator shall respond to signals from a designated person only.
However, the operator shall always obey a stop signal, no matter who gives it.
- 4.9.3. The operator shall make sure the load and hoist will clear all obstacles before moving or rotating the load.
- 4.9.4. A person shall be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means.
- 4.9.5. The operator shall inch powered hoists and cranes slowly in engagement with a load but should avoid unnecessary inching and quick reversals of direction.
- 4.9.6. A load shall not be lifted more than a few inches until it is well balanced in the sling or lifting device.

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- 4.9.7. When lifting loads at or near capacity, brake action shall be tested by lifting the load a few inches off the surface to verify that the brakes are holding.
- 4.9.8. On rope hoists, the load shall not be lowered below the point where less than two wraps of rope remain on each anchorage of the hoist drum, unless a lower limit device is provided. In this case no less than one wrap may remain on each anchorage of the hoist drum.
- 4.9.9. Loads shall not be suspended over personnel. Under no circumstances may anyone ride the hook.
- 4.9.10. Directional movement should be made smoothly and deliberately to avoid swing.
- 4.9.11. Never pull a hoist by the controller cable.
- 4.9.12. The operator shall not use the upper (or lower, if provided) limit device(s) as a normal means of stopping the hoist. These are emergency devices only.

4.10. Placing the Load

- 4.10.1. Never leave the controls unattended while a load is suspended. If it becomes necessary to leave the controls, lower the load to the floor.
- 4.10.2. The load block should be positioned above head level when the hoist is not in use.

5. Slings

- 5.1. Slings shall be inspected prior to each use. If there is any damage, remove from service.
- 5.2 Employers must use only wire-rope slings that have permanently affixed and legible identification markings as prescribed by the manufacturer, and that indicate the recommended safe working load for the type(s) of hitch(es) used, the angle upon which it is based, and the number of legs if more than one.
- 5.2. Slings shall not be shortened with knots or bolts or other makeshift devices.
- 5.3. Sling legs shall not be loaded in excess of their rated capacities.
- 5.4. Slings used in a basket hitch shall have the loads balanced to prevent slippage.
- 5.5. Slings shall be securely attached to their loads.
- 5.6. Slings shall be padded or protected from sharp edges of their loads.
- 5.7. Suspended loads shall be kept clear of all obstructions.

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5.8. Hands and fingers shall not be placed between the sling and its load while the sling is being tightened around the load.

5.9. Shock loading is prohibited (abrupt starting or stopping of the load).

5.10. A sling shall not be pulled from under a load when the load is resting on the sling

5.11. Slings shall be properly stored when not in use so that they are not subject to mechanical damage, moisture, corrosives, extreme temperature or kinking.

5.12. Care shall be exercised when removing a sling from under a landed and blocked load.

6. Removal from Service: The sling shall be immediately removed from service if any of the conditions are present:

6.1.Synthetic Slings

6.1.1. Abnormal wear, powdered fiber between strands, broken or cut fibers, variations in the size/roundness of strands, discoloration or rotting, distortion of hardware, missing identification.

6.2.Metal mesh slings

6.2.1. A broken weld or broken brazed joint along the sling edge, reduction in wire diameter of 25% due to abrasion, 15% due to corrosion, lack of flexibility, distortion of either handle, missing identification markings.

6. Cranes not in regular use

Any crane which has been idle for a period of 1 month or more, must be thoroughly inspected before being placed back in service. This inspection shall be documented.

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