

HOISTS AND CRANES

(For assistance, please contact EHS at (402) 472-4925, or visit our web site at <http://ehs.unl.edu/>)

This SOP applies to stationary hoists and cranes used by UNL personnel and is based on several Occupational Safety and Health Administration (OSHA) and American Society of Mechanical Engineers (ASME) standards, including but not limited to: 29 CFR 1910.179 (Overhead and Gantry Cranes); 29 CFR 1910.184 (Slings); ASME B30.21 (Manually Lever Operated Hoists); ASME B30.11 (Monorails and Underhung Cranes); ASME B30.16 (Overhead Hoists); ASME B30.17 (Overhead and Gantry Cranes); ASME B30.10 (Hooks); ASME B30.20 (Below-the-Hook Lifting Devices); ASME B30.26 (Rigging Hardware);

The intent of this SOP is to summarize the above referenced standards with regard to fundamental aspects of crane and hoist safety, specifically: 1) appropriate equipment selection and installation; 2) regular inspection to ensure good condition of the crane/hoist and accessories; 3) operator training, and; 4) adherence to safe operating procedures. Consult the referenced standards or contact EHS for detailed information.

Equipment Selection and Installation

Cranes, hoists, and all ancillary equipment (e.g., hooks, slings, etc.) must meet ASME/ANSI design and installation standards and have sufficient rated capacity for the intended load. The load must not exceed the lowest rated capacity of any single component. Each component should have readily visible load rating markings. A thorough inspection, including load testing, by a professional engineer or manufacturer representative of a crane and its supporting structure must be performed after installation and following modification.

Equipment Maintenance and Inspection

Cranes, hoists, and all ancillary equipment (e.g., hooks, slings, etc.) must be maintained in accordance with manufacturer recommendations. Defective or damaged components must be removed from service. Replacement of defective or damaged components is often advised (rather than repair).

Operators must inspect cranes and hoists prior to each day's use.

- Verify that the crane or hoist has not been removed from service.
- Visually confirm that controls are clean and function/direction labels are intact and legible.
- Test to confirm that control devices, limit switches, and brakes, as applicable, are functional. Test the upper limit switch of each hoist under no load conditions. If the switch does not operate properly, notify a supervisor and do not use the crane/hoist.

- Verify that guards are secured in place.
- Visually inspect hooks for damage, cracks, nicks, gouges, deformations of the throat opening, wear on saddle or load bearing point, and twist. If a hook latch is required, check for proper operation.
- Visually inspect ropes and chains for frays, broken strands, kinks, nicks, gouges, stretching, or other deformation or damage. Verify proper seating.
- Visually inspect slings for condition and sufficient rated load capacity for intended use. Remove from service if defective. Do not exceed the rated capacity and recognize that the rated capacity may need to be reduced based on sling angle.
 - Inspect nylon/synthetic fiber slings for holes, tears, cuts, burns, snags, embedded particles, or exposure of warning yarns. Look for excessive wear or elongation, knots, distortion, pitting, corrosion or broken fittings.
 - Inspect wire rope slings for broken wires, kinks, distortion, burns, or other defects.
 - Inspect wire mesh slings for broken welds, nicks, cracks, breaks, gouges, stretch, broken wires, corrosion, discoloration, broken or cracked fittings, or loss of flexibility.
- Verify proper lubrication, as applicable. Check for signs of motor failure, or oil leakage.
- Be alert to unusual sounds from the equipment.
- Check that warning and other safety labels are present and legible.
- Check the area for other hazards that may affect safe loading/operation.

These daily inspections are to be supplemented with monthly and annual inspections. Monthly inspections can be conducted by qualified persons designated by the department. Monthly inspections should be documented; include all items described for the daily inspections, as well as the following:

- Deformed, cracked, or corroded members and braces, or missing fasteners.
- Cracked or worn sheaves, drums, sprockets, clamping devices, bumpers, etc.

Annual inspections are conducted by qualified outside contractors, which is coordinated through UNL Building Systems Maintenance (BSM). Notify BSM of your hoist or crane to ensure that it is included in the annual inspection inventory.

Operator Qualification

All operators must be appropriately trained in the use, controls, limitations, inspection, proper rigging/loading, maintenance, and site operating conditions/characteristics of the specific crane or hoist that they are assigned to use. This is the responsibility of the employing department. Verify that new operators have acquired requisite skills through observation by an experienced operator.

Operation Considerations

- A load must be well secured and properly balanced in the sling or lifting device before it is lifted more than a few inches. Ideal sling angles are 60-90 degrees (but can be as low as 45) to avoid excessive tension, which can decrease the load capacity of the sling.

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- Lift loads slowly to take up slack, ensure that the load is balanced and holding action is secure, and that everything is seated and operating properly and smoothly.
- Use the proper load attachment slings or other approved devices with sufficient load rating. Do not wrap hoist chains/ropes around a load. Slings may be made from chain, wire rope, metal mesh, natural or synthetic fiber rope, or synthetic web and must be manufactured for this purpose- do not attempt to assemble a “sling” from ordinary materials.
- Keep fingers and other body parts from between the sling, hooks, and the load while securing and moving.
- Before moving a load, test the brake by raising the load a few inches and applying the brake.
- Avoid sudden acceleration or deceleration.
- Do not allow people under or near loads. Verify the absence of other nearby hazards and obstructions.
- If more than one person is involved in the operation/load movement, establish and maintain clear means of communication. Maintain visual contact when possible.
- Lift loads vertically. Do not use a side pull
- Do not use the hoist’s travel limits to stop operation. Approach end stops slowly and carefully to avoid load swings.
- Do not swing loads.
- Do not leave a load suspended.
- Do not use a crane or hoist to lift, support, or transport people.
- Pad loads with sharp edges to prevent them from damaging the sling.
- Do not shorten slings with knots, bolts, or other makeshift devices.
- Do not use the hoist upper and lower limit device/switch as an operating control. Stop load movement before reaching these limits.
- Move a load at the lowest safe height. Do not position the load unnecessarily high.
- Ensure that loads are not lifted over people, and the path of travel is clear of obstructions. The operator should be positioned in a manner that they will not be at risk of injury during movement of a load or a mishap.
- Avoid distractions and do not operate a crane or hoist if impaired.
- When not in use, position hoists/hooks above head level.