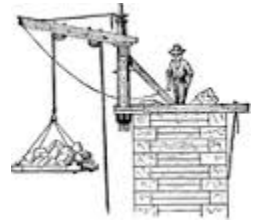


Desert Research Institute Crane & Hoist Safety Program

Fatalities and serious injuries can occur if cranes or hoists are not inspected and used properly. Incidents happen when workers are struck by the load, are caught inside the swing radius or fail to assemble/disassemble the crane properly.



Key points

- Cranes are to be operated only by qualified and trained personnel.
- A designated competent person must inspect the crane and all crane controls before use.
- Be sure the crane is on a firm/stable surface and level.
- During assembly/disassembly do not unlock or remove pins unless sections are blocked and secure (stable).
- Fully extend outriggers and barricade accessible areas inside the crane's swing radius.
- Watch for overhead electric power lines and maintain at least a 10-foot safe working clearance from the lines.
- Inspect all rigging prior to use; do not wrap hoist lines around the load.
- Be sure to use the correct load chart for the crane's current configuration and setup, the load weight and lift path.
- Do not exceed the load capacity while making lifts.
- Raise load a few inches, hold, verify capacity/balance, and test brake system before delivering load.
- Do not move loads over workers.
- Be sure to follow signals and manufacturer instructions while operating cranes or hoists.

References

- Crane, derrick and hoist safety OSHA guidelines: You will find links to the guidelines by going to [EH&S External Links](#) and clicking on "Occupational Safety" near the top of the page.
- ASME/ANSI B30 construction package for cranes, hoists, slings, gantries, lifting devices.

Attachments

Shift and Monthly Inspection Checklist

Annual Preventive Maintenance Inspection Checklist

Hook, Rope and Hoist Chain Inspection Record

Sheave and Rope Inspection Guidance

Desert Research Institute Crane & Hoist Safety Program

SHIFT and MONTHLY CRANE INSPECTION CHECKLIST (Prior to Each Shift Use)

Date _____ Time _____ Inspector _____

Crane (Make, Model & SN) _____ Location _____

Item Inspected	Pass	Fail	Action Taken
1. Check functional operating / control mechanisms for maladjustment.			
2. All control and drive mechanisms for excessive wear of components and contamination.			
3. Check air, hydraulic or other pressurized lines for deterioration or leakage, particularly those which flex in normal operation.			
4. Check hydraulic system for proper fluid level.			
5. Visually inspect hooks or latches for deformation, cracks, excessive wear, or damage such as from chemicals or heat.			
6. Visually check hoist chains, including end connections, for excessive wear, twist, distorted links interfering with proper function, or stretch beyond manufacturer's recommendations.			
7. Check slings and all fastenings and attachments for damage or defects.			
8. Check wire rope reeving for compliance with the manufacturer's specifications.			
9. Check electrical apparatus for malfunctioning, signs of apparent excessive deterioration, dirt or moisture accumulation			
10. Check tires (when in use) for proper inflation and condition.			
11. Check ground condition around the equipment for proper support, including ground settling under and around outriggers' stabilizers and supporting foundations, round water accumulation, or similar conditions.			

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12. Check the equipment for level position within the tolerances specified by the equipment manufacturer.			
13. Visually inspect operator cab windows for significant cracks, breaks or other deficiencies that would hamper the operator's view.			
14. Verify safety devices and operational aids for proper operation			
15. Check rails, rail stops, rail clamps and supporting surfaces when the crane has rail traveling.			
16. Perform a thorough inspection of all running ropes. Any deterioration, resulting in appreciable loss of original strength, must be carefully observed and determination made as to whether further use of the rope would constitute a safety hazard. (Keep track of what ropes have been inspected using the form in Appendix D). Some of the conditions that could result in an appreciable loss of strength are the following:			
a. Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.			
b. A number of broken outside wires and the degree of distribution or concentration of such broken wires.			
c. Worn outside wires.			
d. Corroded or broken wires at end connections.			
e. Corroded, cracked, bent, worn, or improperly applied end connections.			
f. Severe kinking, crushing, cutting, or unstranding.			

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ANNUAL PREVENTIVE MAINTENANCE AND CRANE INSPECTION CHECKLIST

Date _____ Time _____ Inspector _____

Crane (Make, Model & SN) _____ Location _____

Item Inspected	Pass	Fail	Corrective Action
1. Hoisting and lowering mechanisms			
2. Monorail travel			
3. <i>Bridge travel</i>			
4. Functional test for proper operation			
5. Equipment structure			
6. Deformed, cracked, or corroded structural members.			
7. Welds for cracks			
8. Safety devices and operational aids for proper operation			
9. Bolts, rivets, or other fasteners - loose, failed or corroded			
10. Cracked or worn sheaves and drums.			
11. Worn, cracked or distorted parts such as pins, bearings, shafts, gears, rollers, locking and clamping devices.			
12. Excessive wear on brake (and clutch) system parts, linings, pawls, and ratchets.			
13. Load, (boom angle), wind, and other indicators over their full range, for any significant inaccuracies.			
14. Gasoline, diesel, electric, or other power plants for improper performance or noncompliance with applicable safety requirements.			
15. Excessive wear of chain drive sprockets and excessive chain stretch.			
16. Electrical components and wiring for cracked or split insulation and loose or corroded terminations			

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(Travel, steering, braking, and locking devices for malfunction, and tires for excessive wear.)			
Excessive wear or cracks of slider pads			
Hydraulic and pneumatic pumps and motors -Performance indicators: unusual noises or vibration, low operating speed, excessive heating of fluid, low pressure -loose bolts or fasteners -shaft seals and joints between pump sections for leaks			
Hydraulic and pneumatic cylinders: -Drifting caused by fluid leaking across the piston -Leaking rod seals and welded joints -Scored, nicked or dented cylinder rods -Significant dents of Case (barrel) -Loose and deformed rod eyes and connecting joints			
Hydraulic and pneumatic valves: -spools: sticking, improper return to neutral, and leaks -leaks -valve housing cracks -relief valves: fail to reach correct pressure (follow manufacturer's procedures)			
Hydraulic, pneumatic and other pressurized hoses, fittings and tubing – flexible hose or junction with fittings and threaded or clamped joints for leaks -other covering of hose for blistering, abnormal deformation or other signs of failure or impending failure -excessive abrasion or scrubbing of outer surface of a hose, rigid tube, or fitting			
Missing or unreadable warning labels and decals originally supplied with equipment			
Wire rope and crane/hoist chains and hooks			

Note: Items in parenthesis apply only to locomotive, crawler and wheel mounted cranes.

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The following requirements have been obtained from 29 CFR 1910. Additional inspection criteria must be included to the inspection regimen based upon manufacturer recommendations.

SHEAVES

1. Sheave grooves must be smooth and free from surface defects which could cause rope damage.
2. Sheaves carrying ropes which can be momentarily unloaded must be provided with close-fitting guards or other suitable devices to guide the rope back into the groove when the load is applied again.
3. The sheaves in the bottom block must be equipped with close-fitting guards that will prevent ropes from becoming fouled when the block is lying on the ground with ropes loose.
4. Pockets and flanges of sheaves used with hoist chains must be of such dimensions that the chain does not catch or bind during operation.
5. All running sheaves must be equipped with means for lubrication. Permanently lubricated, sealed and/or shielded bearings meet this requirement.

ROPES

1. In using hoisting ropes, the crane manufacturer's recommendations must be followed. The rated load divided by the number or parts of rope must not exceed 20% of the nominal breaking strength of the rope.
2. Rope must not be secured to the drum as follows:
 - No less than two wraps of rope must remain on the drum when the hook is in its extreme low position.
 - The rope end must be anchored by a clamp securely attached to the drum, or by a socket arrangement approved by the crane or rope manufacturer.
3. Rope clips attached with U-bolts must have the U-bolts on the dead or short end of the rope ("never saddle a dead horse"). Spacing and number of all types of clips must be in accordance with the clip manufacturer's recommendations. Clips must be drop-forged steel in all sizes manufactured commercially.
4. Swaged or compressed fittings must be applied as recommended by the rope or crane manufacturer.
5. Heavy wear and/or broken wires may occur in sections in contact with equalizer sheaves or other sheaves where rope travel is limited, or with saddles. Particular care must be taken to inspect ropes at these locations.
6. Particular care must be taken when inspecting non-rotating rope.