

Overhead Crane Safety and Inspection Requirements



Notice

- It is the responsibility of the Owner/User to install, inspect, test, maintain, and operate a crane or associated lifting equipment in accordance with the applicable volume of the ANSI/ASME B30 Safety Standard, OSHA Regulations, and ANSI-NFPA 70, National Electric Code and local regulations and laws. If the crane or associated lifting equipments is installed as part of a total lifting system, it is also the responsibility of the owner/user to comply with the applicable ANSI/ASME B30 volumes that address other types of equipment used in the system.

Further, it is a responsibility of the Owner/User to require all personnel who install, inspect, test, maintain, and operate a crane or associated lifting equipment to read and to comply with the contents of the instruction manuals furnished by the manufacturer of the crane or associated lifting equipment, and the applicable portions of the volume of the ANSI/ASME B30 Safety Standard, OSHA Regulations, and the ANSI/NFPA 70, National Electric Code. If the crane or associated lifting equipment is installed as part of a total lifting system, the applicable ANSI/ASME B30 volumes that address other types of equipment used in the systems must also be read and followed by all personnel.



Daily Operator Inspection Requirements

- Tagged Crane or Hoist
- Control Devices
- Brakes
- Hook
- Hook Latch
- Reeving
- Limit Switches
- Oil Leakage
- Unusual Sounds



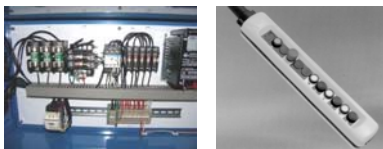
Daily Operator Inspection Reuirements

- Tagged Crane or Hoist
 - Check that the crane or hoist is not tagged with an out-of-order sign.



Daily Operator Inspection Requirements

- Control Devices
 - Check that all motions agree with control device markings e.g., Up/Down/Fwd/Rev.



Daily Operator Inspection Requirements

- Brakes (Travel)
 - Check that all motions do not have excessive drift and that stopping distances are normal (approx. 10% of high speed travel).
- Hoist Brakes
 - No drift permitted.



Daily Operator Inspection Requirements

- Hook

- Check for damage, cracks, nicks, gouges, deformity of the throat opening, wear on saddle or load bearing point, and twist. Refer to the manual furnished by the original manufacturer of the crane or hoist.



Daily Operator Inspection Requirements

- Hook Latch

- Check that hook latch, if provided, is not missing and that it operates properly.



Daily Operator Inspection Requirements

- Wire Rope

- Broken Wires
- Excessive Wear
- Kinks
- Crushing
- Stretching
- Birdcaging
- Rope Measurement



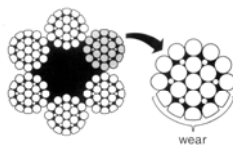
Wire Rope Inspection – Broken Wires



- 10 wires in one rope lay
- 5 wires in one strand in one rope lay



Wire Rope Inspection – Excessive Wear



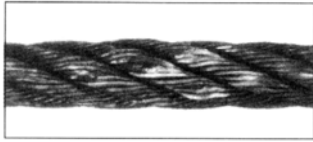
- Loss of 1/3 of the rope diameter of individual wires.



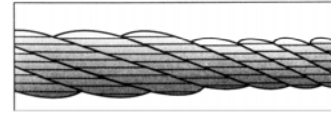
Wire Rope Inspection – Kinks



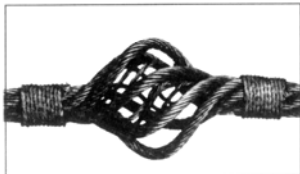
Wire Rope Inspection – Crushing



Wire Rope Inspection – Stretching

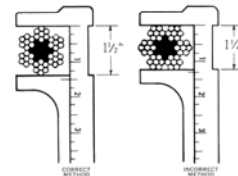


Wire Rope Inspection – Birdcaging



Wire Rope Inspection – How to Measure

- The components of a wire rope each have a small but definite size tolerance. Therefore, the rope itself must have a diameter at least equal to the nominal, or catalog, size – **never smaller**.



Wire Rope Inspection

- Replace any wire rope or **red tag** if you observe any of these conditions!



Daily Operator Inspection Requirements

- Load Chain
 - Check load chain, including end connections for excessive wear, twist, distorted links or stretch, beyond the manufacturer's recommendations.




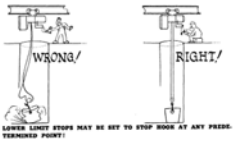

Daily Operator Inspection Requirements

- Reeving
 - Check that the wire rope or load chain is properly reeved and that rope or load chain parts are not twisted about each other. Make sure wire rope is properly seated in drum grooves.





Daily Operator Inspection Requirements

- Limit Switches
 - Check that the upper limit device stops lifting motions of the hoist load block before striking any part of the hoist or crane.
 - **Caution: exercise extreme care during this test to avoid striking any part of the hoist or trolley with the hoist load block or lift beam in the event of a faulty limit switch.**


Daily Operator Inspection Requirements

- Oil Leakage
 - Check for any sign of oil leakage on the crane and on the floor area beneath the crane.

Daily Operator Inspection Requirements

- Unusual Sounds
 - Check for any unusual sounds such as
 - Squealing
 - Grinding
 - Unusual vibration
 - from the crane or hoist mechanism while operating the crane and hoist.



Daily Operator Inspection Requirements



- Warning and Safety Labels and Warning Devices
 - Check that warning and other safety labels are not missing and that they are legible. Check that audible and visual warning devices are operational.






Periodic Inspection

- A Periodic Inspection is a detailed visual and operational inspection whereby individual components are examined to determine their condition. The Periodic Inspection is performed as often as quarterly based on service, environmental and application factors as determined by a qualified person or as outline in the following table.

Periodic Inspection Chart (as required by OSHA)

ASME B30.2 Service Class	Number of Shifts Operated per Day		
	1 Shift	2 Shifts	3 Shifts
	Frequency of Inspection		
Normal	ANNUAL	ANNUAL	ANNUAL
Heavy	ANNUAL	SEMI-ANNUAL TO ANNUAL	SEMI-ANNUAL
Severe	QUARTERLY	QUARTERLY	QUARTERLY



- ### Periodic Inspection Items Required by OSHA
- A. Structural Members
 - B. Signs and Labels
 - C. Connection Points
 - D. Sheaves and Drums
 - E. Shafts, Axles, Wheels, Couplings
 - F. Brakes (holding and control)
 - G. Indicators, Gauges
 - H. Self-contained Electric, Hydraulic, or Gasoline Powered Generating Units
 - I. Transmissions
 - J. Electrical Components
 - K. Covers and Guards
 - L. Bumpers and End Stops
 - M. Trolley and Runway Rail
 - N. Runway Structure
 - O. Conductor System
 - P. Below-the-Hook Devices
- 

Periodic Inspection Items Required by OSHA

A. Structural members, such as girders, end trucks, footwalks, trap doors, ladders, handrails, trolley frame, cab, etc.

- Check for deformed, cracked, corroded or unsecured members. Are foot walks free of debris, grease, etc.?
- Does cab have a fire extinguisher, proper type?




Periodic Inspection Items Required by OSHA

B. Signs and Labels


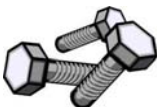

- Check for proper capacity labels. Are they legible from the floor? Are warning signs in place and legible?
- Was crane test loaded? Did you record in your records?




Periodic Inspection Items Required by OSHA

C. Connection Points

- Check for loose/broken bolts or rivets. Check for cracked or insufficient welds.

Periodic Inspection Items Required by OSHA

D. Sheaves and Drums

- Check for worn grooves, worn groove lands, sharp edges, and cracks.





Periodic Inspection Items Required by OSHA

- E. Shafts, Axles, Wheels, Couplings
 - Check for worn, cracked bent or broken parts. Check for loose/missing hardware.



Periodic Inspection Items Required by OSHA

- F. Brakes (Holding and Control)
 - Check for excessive wear and proper adjustment on brake system parts, linings, pawls and ratchets. Check for proper functioning of electric control brake.



Periodic Inspection Items Required by OSHA

- G. Indicators, Gauges or Other Devices
 - Check for load, wind, and other indicators over their full range, re-calibrate as required.



Periodic Inspection Items Required by OSHA

- H. Transmissions
 - Check for excessive wear of chain drive sprockets and excessive chain stretch. Open gearbox inspection covers and check for gear teeth wear and proper lubrication.



Periodic Inspection Items Required by OSHA

- Electrical Components
 - Check all electrical apparatus for signs of pitting or any deterioration of controller contactors, limit switches, pushbutton stations, motor slip rings, brushes, resistors.
 - Check for any loose wire connections for damaged wiring.
 - Check for evidence of overheating.
 - Make sure door or cover closed properly.



Periodic Inspection Items Required by OSHA

- Electrical Components
 - Controller contactors
 - Limit switches
 - Push button stations



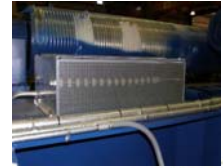
Periodic Inspection Items Required by OSHA

- Electrical Components
 - Motor slip rings
 - Brushes
 - Resistors



Periodic Inspection Items Required by OSHA

- J. Covers and Guards
 - Check that all covers or guards are in place, secure, and undamaged.



Periodic Inspection Items Required by OSHA

- K. Bumpers and End Stops
 - Check all bumpers and end stops for damage. Check for proper restraints and obvious under sizing or improper energy absorption capabilities.



Periodic Inspection Items Required by OSHA

- L. Trolley and Runway Rail
 - Check rails and fastening devices for looseness, gaps, misalignment, wear.



Periodic Inspection Items Required by OSHA

- L. Trolley and Runway Rail

ITEM	FIGURE	OVERALL TOLERANCE	MAXIMUM RATE OF CHANGE
CRANE SPAN (E)		$L \pm 0.02''$ $A = \pm 1/4''$ $L/500 \pm 0.002''$ $A = \pm 1/2''$ $L/1000''$ $A = \pm 1/2''$	$1/2''$ IN 20'-0"
STRAIGHTNESS (H)		$B = \pm 1/4''$	$1/2''$ IN 20'-0"
ELEVATION (I)		$C = \pm 1/4''$	$1/2''$ IN 20'-0"
RAIL TO RAIL ELEVATION (J)		$L \pm 0.02''$ $D = \pm 1/4''$ $L/500 \pm 0.002''$ $D = \pm 1/2''$ $L/1000''$ $D = \pm 1/2''$	$1/2''$ IN 20'-0"



Periodic Inspection Items Required by OSHA

- M. Runway Structures
 - Check runway structure for proper anchors, loose bolted connections, corrosion, cracked or deformed members.



Periodic Inspection Items Required by OSHA

N. Conductor System

- Check the conductor systems for:
 - Alignment
 - Fastening
 - Splices
 - Power feeds
 - Conductor shoes for wear.



Periodic Inspection Items Required by OSHA

o. Below-the-Hook Devices

- Check for cracks or structural damage. Check mechanical components for wear, alignment, and missing/loose hardware. Check all motors, controls, wiring. Check that all guards are in place and secure.

- For details, see below-the-hook presentation



Operational Safety – Before Lifting

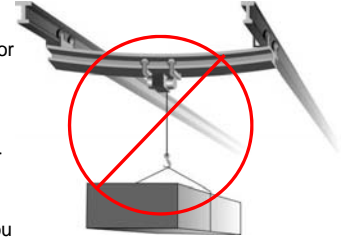


- Lifters must only be used by trained operators.
- Do not allow yourself to be distracted. Pay attention to what you are doing.
- Test operation of moving lifter parts and controls at the beginning of each shift.



Operational Safety – Before Lifting

- Do not overload crane or hoist. Make sure the combined weight of the lifter and load does not exceed the rated load capacity of the crane or hoist.
- Refuse to make lift if you are unsure of any issues. Do not proceed until all issues are resolved.



Operational Safety – Before Lifting

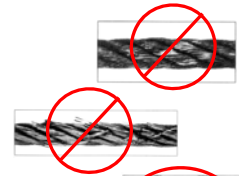
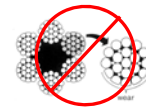


- To ensure load is balanced and stable, make a preliminary lift of a few inches.
- Do not overload lifter. Do not try to lift a load that is too big for the lifter.
- Do not pick up hot loads unless the lifter is specially designed for high temperature service.



Operational Safety – Before Lifting

- Make sure hoist rope or chain is free from twists, knots and kinks. Multiple part lines should not be twisted around each other.



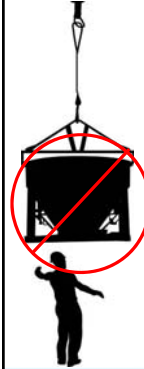
Operational Safety – Moving a Load

- Take instructions only from the person designated to give signals.
- Do not ride or allow other people to do so.
- Do not lift load higher than necessary to avoid obstructions in its path.



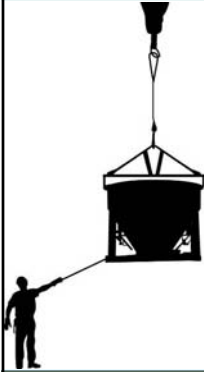
Operational Safety – Moving a Load

- Do not allow loads to come in contact with other objects. Make sure the path of travel is free of obstructions before moving the load.
- Do not lift loads over people. Stay out from under the load and make sure other people remain at a distance.
- Avoid sudden starts and stops. This prevents shock loading which can stress the system beyond its capacity.



Operational Safety – Moving a Load

- Stay clear while moving load. Do not allow load to swing. Use a rod to push load or a tag line to pull the load. Exercise particular caution with sheet lifters. Be sure to keep load level. Tilting the lifter could cause the load to slide off the lifter.
- Always lower load to ground and check its stability before leaving the area.



Operational Safety – Moving a Load

- Make sure the lifter is properly stored after use. Lifters are big and heavy and can cause personal injury or property damage if they fail. Some lifter require a specially designed stand. Others may be stored on a level surface.



Crane Inspector – Definition



■ Any person engaging in the testing, examination and/or certification of cranes, including but not limited to top running and under-running bridge and gantry type, single or double girder overhead traveling cranes and associated hoisting equipment.



Crane Inspector – Work Experience

- Shall have a minimum of **2,000** field hours of experience related to maintaining, servicing, repairing, modifying and functional testing of cranes and associated hoisting equipment.
- Experience should provide a working knowledge of how to identify deficiencies in mechanical, structural, electrical systems and components of cranes.



Crane Inspector – Physical Qualifications

- Vision of at least 20/30 in one eye and 20/50 in the other with or without correction.
- Normal depth perception, field of vision, hand-eye coordination, and no tendencies to dizziness or similar conditions.
- Not have evidence of physical restrictions; not be subject to seizures or loss of physical control, or emotional instability that could render a hazard to the technician or others.



Crane Inspector – Physical Qualifications

- Be able to hear, with or without hearing aid, adequately for a specific task.
- Have sufficient strength, endurance agility, coordination, manual dexterity and speed of reaction to meet the demands of the job.
- Be capable of working at extended heights in a safe manner under varying environmental and adverse physical conditions.



Crane Inspector – Other Qualifications

- Should demonstrate proficiency to read and write in English.
- Should demonstrate proficient oral and written communication skills.
- Should be subject to other safety, drug or other specific Seller and/or Purchaser's requirements.
- Should be able to distinguish colors, if color differentiation is required for the task.



Crane Inspector – Required Training

- Should have received formal training in the areas of: safety and design codes related to cranes: Federal, State and local codes and regulations; safe operating practices of cranes; report writing and documentation; and communication skills.
- An inspector should receive additional formal training every two years as a minimum and be able to provide documentation of such training.



Crane Inspector – Required Training

- Additional training should include, but not be limited to the following areas:
 - Trade skills
 - Products
 - Safety
 - Tolls & Equipment
 - Job-site Conduct



Crane Inspector – Required Training

- Testing
 - Inspector shall be required to demonstrate proficiency by passing both a written and practical examination. Inspector should be able to present documentation of successful completion of above qualifications.
- Certification/Licensing
 - If local code bodies or governments mandate, additional testing and registration for inspector certification or licensing may be required.



Recommended Forms – OSHA Crane Inspection Report

- Maintenance Log
- OSHA Crane Inspection Report
- Trouble Shooting Guide



Recommended Forms – Maintenance Log

- Click on picture to open .pdf file.



Recommended Forms – OSHA Crane Inspection Report

- Click on picture to open .pdf file.



Recommended Forms – OSHA Crane Inspection Report – Alternate Version

- Click on picture to open .pdf file.

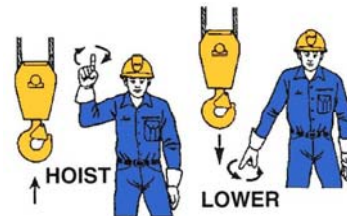


Recommended Forms – Trouble Shooting Guide

- Click on picture to open .pdf file.



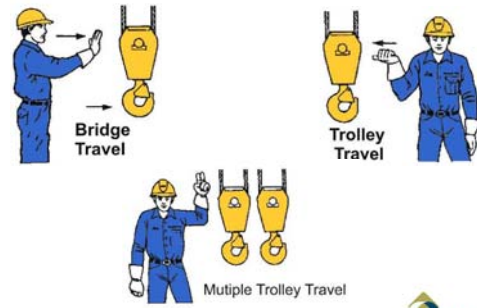
Standard Hand Signals



Standard Hand Signals



Standard Hand Signals



Standard Hand Signals

