

CRANE AND RIGGING SAFETY

Supplement to Standard Training Module

TRAINING REQUIREMENTS OVERVIEW

This standard Vivid training module provides a general overview of employee training for the operation of overhead and gantry cranes. Although no particular training regimen is required by the OSHA standard, designated employees who use cranes **must** be trained to know how to inspect, care for, and safely use cranes and other hoisting equipment.

In addition to the general overview, employees ***must*** receive facility and work area specific training. This additional training ***should*** cover:

- Type of cranes, hoists and other hoisting devices in the facility
- Type and function-specific training on the equipment, controls, and use of the hoisting devices
- Load handling safety practices unique to facility
- Daily inspection requirements specific to the facility
- Design, construction, care, use, and inspection requirements of chains, slings and attachments as outlined in 29 CFR 1910.184 (appropriate to operational needs).

Additional training ***must*** be provided for maintenance personnel who will perform monthly inspections and associated documentation

In summary, the crane standard requires employers to provide effective information and training to designated crane users on operation, daily inspections and testing, and safe hoisting practices. Maintenance personnel must receive training specific to the facility's equipment and the required procedures to properly maintain and inspect the equipment.

It is considered a Best Practice to have a written program in place to detail the facility's inspection and maintenance system. The program should cover responsibilities of managers, supervisors, maintenance personnel and employees. It should also outline frequent and periodic inspection schedules/procedures, and safe operating rules.

Frequency: This training ***must*** be provided at the time of initial assignment and whenever new or modified equipment is introduced into the workplace.

GENERAL OVERVIEW OF THE STANDARD

OVERHEAD AND GANTRY CRANES - 29 CFR 1910.179

PURPOSE: To ensure that employers and employees understand the hazards of using cranes and hoists while lifting materials and equipment. To ensure that overhead lifting devices are properly inspected and maintained.

1. **SCOPE:** This regulation applies to overhead and gantry cranes, including semi-gantry, cantilever gantry, wall cranes, storage bridge cranes, and others having the same fundamental characteristics. These cranes are grouped because they all have trolleys and similar travel characteristics.
2. **GENERAL REQUIREMENTS:** Load rating and layout criteria are stated for new and existing equipment. Specifications are also identified for:
 - Equipment modifications
 - Load ratings - must be posted and legible on both sides of equipment
 - Clearance from obstructions and other cranes
 - Identification of designated operators authorized for use.
3. **CABS:** General requirements for arrangement are stated for:
 - Location of crane cabs
 - Access to cranes by ladders, stairs and platforms
 - Fire extinguishers
 - Lighting
4. **FOOTWALKS AND LADDERS:** For cab-operated cranes, general arrangements and construction requirements are stated for:
 - Footwalks and ladders
 - Safe access to cranes and cabs by the operator.
5. **STOPS, BUMPERS, RAIL SWEEPS AND GUARDS:** Safety-related design, installation and operational requirements are designated for:
 - Trolley stops
 - Bridge bumpers
 - Trolley bumpers
 - Rail sweeps
 - Guards for moving parts
6. **BRAKES:** Design and capacity requirements are outlined for independent hoist, trolley and bridge brakes, including:

- Self-setting brakes (holding brakes).
- Control brakes to prevent overspeeding.

7. ELECTRIC EQUIPMENT: Electrical requirements are outlined for:

- General equipment
- Controllers
- Resistors
- Switches
- Runway conductors
- Extension lamps

This section of the standard provides important information that should be included in designated operator training – i.e. satisfactory crane use and function, inspections, and safety devices.

8. HOISTING EQUIPMENT: Specific information regarding the design and use of hoisting equipment is detailed for:

- Sheaves
- Ropes
- Equalizers
- Hooks

9. WARNING DEVICES: Except for floor operated devices – a gong or other effective warning signal shall be provided for each crane equipped with a power traveling mechanism

10. INSPECTION: An initial inspection shall be conducted on all new and altered cranes, prior to initial use. “Frequent” and “Periodic” inspections are also defined in the standard.

Frequent Inspections – Daily to monthly intervals;

Daily inspections are not required to be documented. A daily inspection, from floor level, includes:

- Operational test of the crane’s functions, including an upper limit switch test and motor brake test
- Visual inspection for deterioration of air and hydraulic system components
- Visual inspection of hooks, chain and/or wire rope
- Load blocks/sheaves

Monthly inspections are to be performed by a qualified individual and are required to be certified (documented) and signed by the inspector. These

inspections should include a higher level of detail than the daily inspection, as outlined in the standard.

Periodic Inspections – 1 to 12 month intervals; Complete inspections of the crane shall be performed at intervals as defined in the standard, depending upon the crane's activity, severity of service, and environment. Specific details for periodic inspection content are outlined for physical and operational condition of component parts.

TESTING: Operational testing requirements are detailed for all new and altered cranes, including means to test:

- Hoisting and lowering movement
- Trolley travel
- Bridge travel
- Limit switches/locking/safety devices

11. MAINTENANCE: Requirements are detailed for equipment service and maintenance, and the associated notification for affected employees. Adjustment and repair requirements are also stated for:

- Functional components, including limit switches
- Control systems
- Brakes
- Power plants
- Hooks
- Attachment chains/ropes/slings.
- Pendant control stations
- Labels

12. ROPE INSPECTION: Thorough inspection and certification by documented record (at least once per month) are required for all running ropes. Specific damage and wear indicators are also covered in this section of the standard.

13. HANDLING THE LOAD: Size/weight of the load cannot exceed rated capacity. Requirements are stated for:

- Attaching loads by use of appropriate slings, chains and other devices
- Prevention of slings wrapping the load, and developing kinks & twists.
- Securing and balancing the load prior to movement

SLINGS - 29 CFR 1910.184

PURPOSE: To ensure that employers and employees understand the hazards of using slings while lifting materials and equipment. To ensure that overhead lifting devices are properly inspected and maintained.

1. **SCOPE:** This regulation applies to slings used in conjunction with other material handling equipment for the movement of material by hoisting. The types of slings covered are those made from:
 - Alloy steel chains
 - Wire rope
 - Metal mesh
 - Natural or synthetic fiber rope
 - Synthetic web
2. **SAFE OPERATING PRACTICES:** A number of minimum safe operating practices are outlined by the standard regarding sling damage, use, load attachments, and employee clearances, etc.
3. **INSPECTIONS:** Requirements are stated for conditions warranting removal from service, and for daily and periodic inspections of:
 - Slings
 - Fasteners
 - Attachments
4. **ALLOY STEEL CHAINS:** Requirements are stated for alloy steel chain slings, including requirements for:
 - Durable identification tags
 - Daily and periodic inspections
 - Records of inspections
 - Proof testing, and associated certifications
 - Means of attachment, use, and wear
 - Allowable load limits
 - Safe operating temperatures
 - Repair, reconditioning, and removal from service.
5. **WIRE ROPE SLINGS:** Requirements are stated for wire rope slings and end attachments, including requirements for:
 - Acceptable capacity ratings specified in reference tables of the standard, if not indicated by the manufacturer
 - Minimum lengths
 - Exposure to safe operating temperatures
 - Removal from service
 - Welded components

- Proof testing, and associated certifications
6. METAL MESH SLINGS: Requirements are stated for metal mesh slings, including requirements for:
- Durable identification tags
 - Handles and attachments
 - Acceptable capacity ratings and load distribution specified in reference tables of the standard, if not indicated by the manufacturer
 - Proof testing, and associated certifications
 - Sling use and wear
 - Safe operating temperatures
 - Repair, reconditioning, and removal from service.
7. NATURAL AND SYNTHETIC FIBER ROPE SLINGS: Requirements are stated for natural and synthetic fiber rope slings and end attachments, including requirements for:
- Handles and attachments
 - Acceptable capacity ratings and load distribution specified in reference tables of the standard, if not indicated by the manufacturer
 - Fiber type
 - Construction
 - Rope diameter
 - Sling use
 - Safe operating temperatures
 - Environmental conditions
 - Webbing, fittings
 - Splicing, repairing, reconditioning, and removal from service.

REFERENCE MATERIALS

Publications

*Department of Energy - Hoist and Rigging Manual
DOE/EH-0341 --- Issue No. 93-08 --- 10/93*

Can be downloaded at: <http://www.tis.eh.doe.gov/docs/sn/nsh9308.html>

Crane and Hoist Safety.

Publication # 3111

Can be downloaded at: <http://www.osha.gov/Publications/Osha3111.pdf>

Sling Safety

Publication # 3072

Can be downloaded at: <http://www.osha.gov/Publications/Osha3072.pdf>

Website

OSHA website: <http://www.osha.gov/SLTC/cranehoistsafety/index.html>