Overhead Crane & Powered Hoist Program
Appendix B

Operator Training and Operation

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1. CRANE OPERATOR TRAINING
1.1 Purpose of Crane Operator Training
Crane operator training shall be provided to promote proficient performance of a crane operator in conformance with the provisions of this policy.

1.2 Crane Operator Training: General
(a) Training shall include those items that apply to the crane and the particular application of the crane. Refer to section 1.3 as a guide for sources of training material.
(b) Training programs and their contents shall be based upon but not limited to:
   (1) Physical characteristics of the workplace.
   (2) Performance characteristics and complexity of the crane.
   (3) Type of load to be handled, such as, but not limited to, the following:
      (a) Multiple piece loads
      (b) Raw materials
      (c) Bulk materials
      (d) Machine assemblies
      (e) Hot molten materials
      (f) Hot materials
      (g) Fragile or durable materials
   (4) Responsibilities of the crane operator and other persons involved in the movement of the load. Refer to section 3.2 and 3.4.

1.3 Sources of Training Material
Examples of sources of training material are as follows:
(a) Information outlined in the manual provided with the equipment.
(b) Information available through trade associations
(c) Government training resources, such as the Department of Labor
(d) Organized labor groups
(e) Courses, seminars, and literature offered by manufacturers of cranes, consultants, trade schools, continuing education schools, employers, and manufacturers of crane component parts

(f) Requirements and recommendations found in National Consensus Standards such as this policy.

2. TRAINING FOR PERSONS OTHER THAN CRANE OPERATORS

2.1 Scope

Other persons, such as, but not limited to, maintenance personnel, test personnel, and crane inspectors, when it is necessary to operate a crane in the performance of their duties, shall be trained in accordance with the training requirements of this policy.

3. OPERATION

3.1 Scope of Crane Operation

The operation of overhead and gantry cranes shall be in accordance with the provisions included in this policy and in manuals furnished by the manufacturer of the crane. The requirements of section 3.3© and (d) for certification as an operator of a crane apply to both dedicated operators, whose primary job is the operation of a crane (cab or pulpit), and non-dedicated operators who use a crane (floor or remote) as another tool in performing their job.

3.2 General Requirements

The following requirements shall be followed by all personnel involved with the crane operation:

(a) A warning sign, lock, or tag that is on any switch that controls power to the crane, such as, but not limited to, the crane disconnect, motion disconnect, or runway disconnect, shall not be removed by any person other than the person who placed the sign, lock, or tag on the device.

(b) Warning or safety signs, labels, plates, or tags furnished on the lifting equipment shall not be removed or obscured.

(c) The crane shall not lift, lower, or travel while anyone is on the load or hook.

(d) The hoist rope shall be free from kinks or twists and shall not be wrapped around the load.

(e) A hook latch shall be used when provided.

(f) The hook latch (when provided) shall be closed and shall not be used to support any part of the load.

(g) The load, sling, or lifting device shall be seated in the bowl of the hook.

(h) The hoist rope shall be seated in the drum grooves and the sheave grooves.

(i) Persons shall stay clear of a suspended load.

(j) Caution shall be exercised when using a crane having a lifting magnet, due to hazard of possible falling metal.

(k) The crane shall be used to lift loads vertically without side pull except when specifically authorized by a qualified person who has determined that:

   a. The various parts of the crane will not be overstressed
   b. The hoist rope will not bear or rub against other members of the crane, such as girders or trolley frame, except members specifically designed for such contact
   c. Such side pulls will not cause the hoist rope to be pulled out of the sheave or across the drum grooves

(l) The crane shall not be used to lift loads in excess of the rated load of the crane except during properly authorized tests or planned engineered lifts in accordance with Section 4.

(m) A load-limiting device shall not be used to measure the weight of the load.
(n) The hoist rope shall be protected so far as is practical from weld spatter or other damaging contaminants.

3.3 Responsibilities of Management (Owners/Users)
Management (owners/users) shall:
(a) Identify, document, and assign responsibilities of the crane operator and other persons involved in the movement of the load for each crane installation. (See section 3.2 and 3.4)
(b) Provide training to persons who will operate a crane.
(c) Provide written and practical examinations that verify that the person has acquired the knowledge and skill to operate the particular crane(s) that will be operated by the person. The examinations shall be defined by the owner/user and in accordance with any local, state and federal provisions that may apply.
(d) Issue a certificate, or formal record, that verifies that the person has been training and has passed the examination required in para.3.3(c), or confirm that the person has a valid certificate or formal record that satisfies the requirements of section. 3.3(c).

3.4 Responsibilities of Crane Operators
(a) Lifting and Moving the Load
(1) Three phases of lifting and moving the load shall be address as follows:
   (a) Before the lift
   (b) During the lift
   (c) After the lift
(2) In most crane operations, all the requirements listed in section 3.4(b) are the responsibility of the operator crane.
(3) Rigging the load, attaching the load to the crane hook, and other tasks related to moving the load are sometimes handled by persons other than the crane operator.
(4) Crane operation characteristics, such as, but not limited to, the type of crane, cab, floor, pulpit, or remote operated, the vantage point of the operator, and the purpose for which the crane is being used are conditions that determine whether the crane operator or another person is responsible for lift and move functions.
(5) Assignment of responsibilities is determined, identified, and documented by management for each crane application.
(b) Before the Lift. Crane operators shall:
   (1) Read and be familiar with the applicable provisions of crane equipment safety standards and the instructions listed in manual(s) provided with the equipment
   (2) Be familiar with controls, instructions, and warnings located on the lifting equipment
   (3) Operate the equipment only when physically and otherwise fit
   (4) Not energize the main switch (crane disconnect) if a warning sign, lock, or tag is on the device until the sign, lock, or tag is removed by the person who placed it on the device, or by an authorized person
   (5) Not remove a warning sign, lock, or tag that is on any switch that controls power to the crane, such as, but not limited to, the crane disconnect, motion disconnect, or runway disconnect, if the sign, lock, or tag was placed on the device by another person
   (6) Place all controllers in the “off” position before closing the main line disconnect device
   (7) Verify that no worker is on or adjacent to the crane before closing the main switch (crane disconnect)
   (8) Perform a functional test inspection and test in accordance with the requirements of Appendix A, Section 1.3
   (9) Not remove or obscure the warning or safety labels, plates, or tags furnished on the lifting equipment
(10) Be familiar with and understand hand signals (See Section 6 and Fig. 6.1-1)
(11) Verify that the hook, bridge, and trolley travel in the same direction as shown on the controls
(12) Verify that the hoist rope is free from kinks or twists and is not wrapped around the load
(13) Attach the load to the hook or have the load attached to the hook by means of slings or other lifting devices
(14) Verify that the load, sling, or lifting device is seated in the bowl of the hook
(15) Use a hook latch when provided
(16) Verify that the hook latch (when provided) is closed and not supporting any part of the load
(17) Verify that the rope is seated in the drum grooves and in the sheave(s) grooves if there is or has been a slack rope condition
(18) Activate the warning device (when a device is furnished)
   a) Before starting the bridge or trolley motion of the crane
   b) Intermittently during travel of the crane when approaching persons in the path of the load
(19) Board the crane (cab) only at authorized locations and designated boarding entrances
(20) Verify that the transmitter selected is the correct transmitter for the crane to be operated

(c) During the Lift. Crane operators shall
(1) Respond to signals from the person directing the lift or a designated signal person
(2) Be responsible for the lift when a signal person is not used
(3) Obey any “stop” signal regardless of who gives it
(4) Lift a load only if its weight and the weight of any lifting device are within the rated load of the crane and hoist(s) as marked on the crane and hoist load block or load blocks.
   a) The operator shall verify the weight of the total load if there is a question whether the total load to be lifted exceeds the rated load of the crane and/or hoist(s).
   b) The operator shall not use a load-limiting device to measure the load.
   c) A total load exceeding the rated load shall not be lifted except during properly authorized tests or planned engineered lifts in accordance with Section 4.
(5) Stop the crane’s functions in a controlled manner when the operator has doubt as to the safety of crane operations. Lift operations shall resume only after the safety concerns have been addressed.
(6) Verify multiple part lines are not twisting around each other when the lift is made.
(7) Take up slack rope carefully, lift the load a few inches (cm) to check the load holding brake action, and verify that the load is secured, balanced, and positioned on the hook and in the sling or lifting device.
(8) Minimize swinging of the load or load hook.
(9) Maintain firm footing when operating lifting equipment.
(10) Avoid sudden acceleration and deceleration of the load.
(11) Use the crane to lift vertically, without side pull, except when specifically authorized by a qualified person who has determined that
   a) The various parts of the crane will not be overstressed
   b) The hoist rope will not bear or rub against other members of the crane, such as girders or trolley frame, except members specifically designed for such contact
(c) Such side pulls will not cause the hoist rope to be pulled out of the sheaves or across drum grooves

(12) Verify that the load and rigging are free to move and will clear all obstructions.

(13) Check the hoist brake(s), if a load approaching the rated load is to be handled, by lifting the load a short distance and applying the brake(s).

(14) Stop the lifting of the load before the upper limit device is engaged. The hoist limit device that controls the upper limit of travel of the load block shall not be used as an operating control in normal operation unless additional means are provided to prevent damage from over-travel.

(15) Avoid carrying loads over people.

(16) Concentrate on operating the crane and shall not allow attention to be diverted while operating the crane.

(17) Activate the warning device (when a device is furnished)

   (a) Before starting the bridge or trolley motion of the crane

   (b) Intermittently during travel of the crane when approaching persons in the path of the load

(18) Promptly report, to the person responsible for the crane, any malfunction, unusual performance or sound, or damage of equipment that could indicate the need for adjustment, repair, or replacement in order to maintain proper operation.

(19) Contact runway stops or another crane with caution for the safety of the operator and persons on or under the cranes.

(20) Warn persons on or under a crane when contact is to be made with another crane prior to contact being made.

(21) Place all controllers or master switches is the “off” position when power is interrupted during normal operation.

(22) Check the controllers for correct direction of motion when power is restored after a power outage.

(23) Follow the directions of the designated person in charge of the operation when two or more cranes are used to lift a load.

(24) Not leave a suspended load unattended unless provisions have been made to provide auxiliary supporting means under the suspended load, or guards or barriers are utilized on the floor to prevent people from entering the area affected by the suspended load.

(25) Not lower the load below the point where two wraps of rope remain on each anchorage of the hoisting drum unless a lower-limit device is provided, in which case no less than one wrap shall remain.

(26) Stop the lowering of the load before the lower-limit device, if furnished, is engaged. The lower-limit device shall not be used as an operating device during normal operation.

(27) Properly secure an outdoor overhead or gantry crane when the wind indicating alarm is activated in accordance with the requirements listed.

(28) Use the harness or belt, if provided, for use with the transmitter or place the transmitter in the location intended for its support.

(29) Not override safety devices on the transmitter.

(30) Not wear gloves that interfere with the operation of the controls.

(31) Shut off the transmitter when a power failure occurs.

(d) After the Lift. Crane operators shall

   (1) Lift the load block and attachments above the highest movable obstruction under the crane when the crane is not in use.
(2) Notify the next operator if required adjustment, repair, or replacement has not been made.

(3) Properly secure an outdoor overhead or gantry crane when the crane is shut down.

(4) Open the crane main line disconnect device and the magnet disconnect switch (when applicable) before leaving the crane cab.

(5) Place the controllers in the “off” position, before leaving the crane cab.

(6) Shut off the power to pendant-operated cranes before leaving area. Shut off and store transmitter in a designated and protection location.

4. PLANNED ENGINEERED LIFT

Lifts in excess of the rated load may be required from time to time on a limited basis for specific purposes, such as new construction or major repairs. Every planned engineered lift exceeding the rated load shall be treated as a special and separate event. Limitations and planned requirements shall be applicable as follows:

(a) Planned engineered lifts shall be limited to powered cranes having a load rating of five tons and above.

(b) When planned engineered lifts are made, the load shall not exceed 125% of the crane load rating, except as provided in section 4(d).

(c) Planned engineered lifts shall be limited to two occurrences on any crane within any continuous 12-month period, except as provided in 4(d). If greater lift frequency is desired, consideration shall be given to rerating or replacing the crane.

(d) The crane manufacturer shall be consulted if the planned engineered lift exceeds 125% of rated load or if the frequency of planned engineered lifts exceeds two during a continuous 12-month period.

(e) Each planned engineered lift shall comply with the following requirements:

a. A written review of the crane service history shall be prepared, including reference to previous planned engineered lifts, structural repairs, and modifications of original design.

b. The design of the structural, mechanical, electrical, pneumatic, and hydraulic components of the crane shall be reviewed by means of applicable calculations for the load to be lifted and approved by the crane manufacturer or a qualified person, in accordance with accepted crane design standards if the load to be lifted exceeds 125% of rated load or if the frequency of planned engineered lifts exceeds two during a continuous 12-month period.

c. The design of the crane-supporting structure shall be reviewed and approved by a qualified person for conformance to applicable design criteria. The crane support shall be inspected and any deterioration or damage shall be taken into consideration in design calculations for the load to be lifted.

d. The crane shall be inspected in accordance with Appendix A, section. 1.5 Just prior to making the lift.

e. The lift shall be made under controlled conditions under the direction of a designated person in accordance with a previously prepared lift plan. All persons in the area of the crane shall be alerted that the lift is being made.

f. The operator shall test the crane at the planned engineered load by lifting the load a short distance and setting the brakes. The lift shall only be continued if the brake stops and holds the load. Any failure to hold the load shall be corrected before proceeding with the lift.

g. The crane shall be inspected in accordance with Appendix A, para.1.5 after the lift is completed and prior to being used for the lifting of any other load.

h. A record of the planned engineered lift, including calculations, inspections, and all distances moved, shall be placed on file for availability to appointed personnel.
(f) The rated load test specified in Appendix A, section 3.2 is not applicable to planned engineered lift provisions.

5. HOIST LIMIT DEVICES (SWITCHES)

(a) Prior to the initial use of any hoist during each shift, the operator shall verify operation of the upper limit device under no-load conditions. If more than one upper limit device is present, only the operation of the primary upper limit device needs to be verified. Care shall be exercised; the block shall be inched into the limit or run at slow speed. If the device does not operate properly, the operator shall immediately notify the appointed person.

(b) The hoist limit device that controls the upper limit of travel of the load block shall not be used as an operating control in normal operation unless additional means are provided to prevent damage from over-travel.

6. SIGNALS

6.1 Standard Signals
(a) Signals to the operator shall be in accordance with this policy, unless voice communication (telephone, radio, or equivalent) is utilized.
(b) Signals should be discernible or audible to the operator.
(c) Hand signals shall be posted conspicuously and should be as illustrated in Fig. 6.1-1.

6.2 Special Signals
(a) Special operations may require additions to or modifications of standard signals.
(b) Special signals shall be agreed upon and understood by the signal person and the operator.
(c) Special signals shall not conflict with standard signals.

7. MISCELLANEOUS

7.1 Ladders
(a) Hands shall be free from encumbrances while personnel are using ladders.
(b) Articles that are too large to be carried in pockets or tool belts shall be lifted and lowered by hand line.

7.2 Cabs
(a) Necessary clothing and personnel belongings shall be stored in a manner that does not interfere with access or operation.
(b) Tools, oil cans, rags, and other necessary articles shall be stored in the fire-resistant container and shall not be permitted to lie loose in or around the cab.

7.3 Fire Extinguishers
Operators shall be familiar with the location, operation, and care of fire extinguishers provided.

8. CRANE LOCKOUT/TAGOUT

8.1 General
(a) A lockout/Tagout policy and procedure shall be developed, documented, and implemented by the owner or user of overhead cranes.
(b) The lockout/Tagout policy and procedure shall comply with the requirements of ANSI Z244.1.
(c) The policy shall give consideration to the following areas:
   a. Single-crane runways
b. Multiple-crane runways

c. Cranes on an adjacent runway

d. Runway disconnecting means

e. Crane disconnecting means

f. Work to be done on the crane

g. Work to be done other than on a crane but with the path of a crane where its movement creates a hazard