



OREGON DEPARTMENT OF FISH AND WILDLIFE POLICY

Human Resources Division

Title:	Crane and Hoist Operation	HR_480_11
Supersedes:	September 1, 2004 Crane and Hoist Operation and Training	
Applicability:	All employees who operate cranes and hoists	
Reference:	Oregon Administrative Rules (OAR) 437-002-0228, 437-2/N-1910.179, 437-002-0229 and 437-003-0081	
Effective Date:	May 15, 2012	Approved: 

I. PURPOSE

To ensure that all employees who work with cranes and hoists are familiar with their operation and that the cranes are properly inspected.

II. DEFINITIONS

- A. **Crane:** A machine for lifting and lowering a load, and moving it horizontally, with the hoisting mechanism an integral part of the machine. Crane types used by ODFW typically include gantry, overhead, and truck-mounted cranes. Note: forklifts, pallet jacks, front-end loaders and other similar equipment that may meet the above definition are not considered cranes in this policy.
- B. **Hoist:** An apparatus used for lifting and/or lowering. Note: Car jacks and vehicle-lifting hoists are not covered by this policy.
- C. **Overhead Crane:** A crane with a movable bridge carrying a hoisting mechanism and traveling on an overhead fixed runway.
- D. **Gantry Crane:** A crane similar to an overhead crane, except that two or more legs support the bridge running on fixed rails or other runway.
- E. **Truck-mounted Crane:** A crane typically used in construction work.
- F. **Competent Person:** A person who has the knowledge, training, and experience to perform functions associated with crane operations, and who also is authorized by the employer to take corrective action regarding crane use and safety. ODFW site managers, or region or division managers, will designate which employees are competent persons.
- G. **Qualified Employee or Engineer:** An employee or engineer who possesses a recognized degree, certificate of professional standing, or who by extensive knowledge, training, and experience has demonstrated the ability to solve problems relating to cranes and hoists. Site managers will determine who is a qualified employee or engineer.

- H. **Maintenance:** Work, such as fluid replacement and lubrication, that the manufacturer specifically states in their owner’s manual as “maintenance,” and that can generally be accomplished without the use of special tools or need for specialized knowledge.
- I. **Repair Work:** Work that generally requires special tools and knowledge about the equipment being worked on. This includes structural modifications and equipment installation.

III. POLICY

This policy specifically addresses the use of cranes and hoists that are owned by ODFW. Employees who are not familiar with the use or condition of a crane or hoist that is not owned by ODFW shall make a determination as to whether or not they will use the equipment. A representative of the owner of any non-ODFW crane or hoist shall operate the equipment if the ODFW employee is untrained or unqualified, or if the crane/hoist is in any way unsafe.

Employees shall follow all guidelines set forth in this policy when required to operate any crane or hoist, whether owned by ODFW or not.

A. Cranes Used in Construction

1. All employees performing construction work who operate a crane of 5 ton capacity or greater, must complete a training course as described in the OR-OSHA regulations at OAR 437-003-0081. This training consists of basic core training, crane-specific training, and practical training on a specific type of crane.
2. Employees who successfully complete the crane safety course will receive a laminated crane operator’s safety card containing the operator’s picture, which details:
 - a. The type(s) and size(s) of cranes the operator is trained to operate;
 - b. The original issue date of the card;
 - c. The expiration date of the card;
 - d. The name and signature of the operator; and
 - e. The name and signature of the training provider.
3. Refresher safety training for crane operators must be performed at least every three years. Refresher training consists of verifying that the operator has read the current OR-OSHA rules on cranes used in construction contained in OAR 437 Division 3, and has attended a refresher training class (minimum of 4 hours) as specified in OAR 437-003-0081.
4. Crane operators trained in states other than Oregon must undergo the training specified by OR-OSHA prior to operating any 5-ton or greater capacity crane used in construction work performed by ODFW.
5. The crane operator safety training detailed above is not offered in-house by ODFW. Outside vendors are available to provide this training. This training is required for cranes of 5-ton capacity or greater used in construction work. Cranes used in other settings will follow the crane operator safety training requirements detailed in subsequent sections of this policy.

B. General Requirements for All Cranes

Regardless of whether the crane is used in construction, the following requirements apply to all cranes used by ODFW:

1. The manufacturer's specifications and limitations of the crane will be adhered to. This includes performing only the type of maintenance and repair work that the manufacturer authorizes users to perform.
2. If the manufacturer's specifications are not available, a qualified engineer will determine the limitations of the equipment. This determination will be documented.
3. Any attachments used with the cranes shall not exceed the capacity, rating, or scope recommended by the crane manufacturer.
4. No modifications that may affect the capacity or safe operation of the crane will be made without the manufacturer's written approval. Upon any such modification, the crane must be thoroughly checked by the crane manufacturer or qualified engineer. The post-modification ratings, limitations, and specifications will be documented, maintained and posted on the crane accordingly.
5. Rated load capacities, recommended operating speeds, special hazard warnings, and other instructions will be conspicuously posted on the crane.
6. Any operating instructions or warning signs must be visible to the crane operator when he/she is at the controls.
7. A pre-use inspection checklist will be developed, and all equipment will be inspected prior to use.
8. Any noted deficiencies and/or defective parts noted during the inspection shall be repaired or replaced prior to continuing to use the crane.
9. A thorough annual inspection of each crane and/or hoist will be performed. This inspection will be documented and the results maintained.
10. An unimpaired horizontal clearance of at least 3 feet will be maintained between the rotating superstructure of a crane and any adjacent object or surface. If this clearance cannot be maintained, barricades must be used to isolate the hazard area.
11. Cranes operated at night must have their load hooks and work areas adequately lit.
12. A minimum 10 pound BC fire extinguisher must be at all operator stations or cabs of cranes. This requirement does not apply for manually operated hoists.
13. Any belts, gears, or other moving parts must be completely guarded to prevent employee contact.
14. Employees operating, or working in the vicinity of operating cranes, will wear hardhats.
15. A description of commonly used hand signals shall be posted for review (see Attachment A).

C. Maintenance and Repair Work

1. The maintenance schedule given in the manufacturer's equipment manual will be followed for maintenance. Any updates or revisions obtained from the manufacturer will be incorporated into the maintenance schedule.
2. All manufacturer's specifications regarding the frequency of maintenance activities, materials used, and instructions will be followed. No deviations will be allowed without the written approval of the manufacturer.
3. Repair work may only be performed by the manufacturer, a qualified vendor, or a qualified employee. Any proposed repair work will first be discussed with the manufacturer or authorized representative to ensure it is within the scope of work allowed to be performed by qualified ODFW employees.
4. If the manufacturer allows the repair work to be performed by qualified ODFW employees, the site manager must obtain a written, detailed procedure from the manufacturer that describes the repair work to be done, including all materials to be used and post-repair testing to be performed. No repair work will be performed without detailed, written procedures from the manufacturer.
5. Any repairs or maintenance involving welding, torch cutting, or other hot-work on any components or supporting members of the crane will only be performed by the manufacturer or the authorized repair contractor.

D. Inspections

1. OR-OSHA requirements require crane inspections to be performed prior to each use, periodically (generally monthly), and annually. The inspection items listed here are taken from the OR-OSHA regulations for overhead and gantry cranes. These will be considered the minimum inspection requirements. A more detailed inspection schedule must be developed for each specific crane and hoist based on information obtained from the manufacturer, qualified vendor, or qualified engineer.
2. Prior to each use:
 - a. Each crane or hoist will have a pre-use checklist developed that will include a check of the following;
 - A competent person must begin a visual inspection at the beginning of each shift looking for any deficiencies;
 - All controls for proper operation;
 - Control and drive mechanisms for excessive wear or contamination by lubricants, water, and foreign matter;
 - Deterioration or leakage in lines, tanks, valves, drain pumps, and other parts of the air or hydraulic system;
 - Check the hydraulic system for proper level.;

- Damaged, frayed, corroded, kinked, or broken strands of wire rope or cable;
 - Wire rope reeving for compliance with the manufacturer's specifications;
 - Electrical apparatus for malfunctions, signs of deterioration, dirt or moisture accumulation;
 - Ground conditions around the equipment for proper support. Check for ground settling under the stabilizers;
 - Tires are properly inflated;
 - Limit switches and brake with no load on the hook;
 - Deformation and cracking of the hook; and
 - Load attachment chain and end connections for excessive wear, twist, and distorted or stretched links beyond manufacturer's recommendations.
- b. Any defects must be brought to the attention of the supervisor, and the problems corrected before the equipment is used.
- c. Written documentation that the pre-use inspection was performed is not required.
3. Periodic inspections:
- a. For cranes and hoists in routine use, periodic inspections must be performed each month. For equipment used less often, the periodic inspection should be performed prior to each use.
- b. The periodic inspection will include the items in the pre-use inspection,. The inspection will be documented on a check off list or like document and be signed by the person performing the inspection and dated. The check-off sheet must be kept for three (3) months.
- c. Written documentation of the periodic inspection is required to be maintained. The documentation must include the date of the inspection, the name and signature of the person who performed the inspection, and the serial number or other identifier of the equipment inspected. Note that for hooks and hoist chains, the serial numbers of these components must be itemized in the documentation.
4. Annual inspections:
- a. The equipment shall be inspected at least annually by a qualified person (usually a vendor), for the items covered in the periodic inspection, as well as the following:

- Deformed, cracked, or corroded members;
 - Welds for cracks;
 - Loose bolts or rivets;
 - Cracked or worn sheaves and drums;
 - Worn, cracked, or distorted parts such as pins, bearings, shafts, gears, rollers, and locking and clamping devices;
 - Excessive wear on the brake system parts, linings, pawls, and ratchets;
 - Load, wind, and other indicators over their full range for any significant inaccuracies;
 - Gasoline, diesel, electric, or other power plants for improper performance or noncompliance with applicable safety requirements;
 - Safety devices and operational aids are in working order for proper operation;
 - Travel steering, brakes and locking devices;
 - All hydraulic and pneumatic hoses, pistons, pumps, valve housing cracks, seals, cylinder, rods, etc;
 - Warning labels and decals;
 - All structural members such as steps, ladders, handrails, guards are in position and performing their safety function;
 - A functional test actually running the unit;
 - Excessive wear of chain drive sprockets and excessive chain stretch; and
 - Electrical apparatus for signs of pitting or any deterioration of controller contractors, limit switches, and push button stations.
- c. Written documentation of the annual inspection is required to be maintained. The documentation must include the date of the inspection, the name and signature of the person who performed the inspection, and the serial number or other identifier of the equipment inspected. The serial numbers of hooks and hoist chains must be itemized in the documentation.
- Because of the complexity of the annual inspection, this service likely will be performed by the manufacturer or qualified vendor.
- d. Equipment not in regular use that has sat idle for 3 months or more must have the equivalent periodic inspection.

E. Crane Operator Training

1. Crane operator training will include the following:
 - a. A thorough review of the operator's manual. If this manual is not available, the documented limitations and specifications as determined by the manufacturer or qualified engineer will be reviewed.
 - b. Attend a crane operator's class put on by a accredited crane training organization. Training must include information on the types of cranes ODFW operates as well as "core information" contained in OAR 437-003-0081.
 - c. A review of this policy and OR-OSHA Division 3 (Section CC)
 - d. A demonstration and discussion of the specific crane or hoist the employee will use. A qualified ODFW employee, the manufacturer or their authorized representative, or other qualified individual may conduct this demonstration and discussion.
 - e. An evaluation of the employee's ability to operate the crane. A qualified person from an accredited crane training organization, a qualified ODFW employee, the crane manufacturer or authorized representative may perform this evaluation.

F. Rigger Training

1. Training for employees who are engaged in hooking, unhooking or guiding the load, or in the initial connection of a load to a component or structure and work within the fall zone must be accredited by a crane training organization.
2. Training for qualified rigger must be taught by a certified instructor.

G. Signal Training

1. Training for signal person can be done using a certified ODFW employee and must cover the types of signals outlined in OR-OSHA Division 3 Subdivision Z (CC) 126.1419-126.1422. Training may also be done by a qualified trainer or accredited crane training organization.

H. Crane safety training must be documented in the employee's safety training record and ILearn. This will include the employee's name, date of training, and type of crane trained on. All employees taking accredited training must have a laminated crane operator's card.

1. When purchasing a new or remanufactured crane or hoist from an outside vendor, the purchaser should require in the purchase order that the vendor will provide at least one on-site training session to the employees who will use the crane. The session should be complete covering all aspects of the crane or hoist operation safety, inspection and any user required maintenance.

2. Regardless of the type of crane or who performs the training, the following key points will be covered in all training:
 - a. Safety
 - Overview of causes of crane accidents and training in managing the work environment safely
 - b. OR-OSHA Crane Rules
 - Familiarity with OR-OSHA'S Division 3, Construction, Subdivision N, Cranes, Derricks, Hoists, Elevators, and Conveyors.
 - c. Cranes And Components
 - Types of cranes, names of crane components, selection of cranes for job
 - d. Definitions Of Terms
 - Center of gravity, radius, gross and net load, static load and dynamic load(s), effective weights, ultimate strength and rated strength, safety factors, stowed and stored, tipping axis, jib angle to ground
 - e. Technical Data
 - Leverage: when using the crane in general, the hook, block and the boom hoist.
 - Changes in leverage, rate of tipping, forward stability, backward stability, crane failures, gantries, live and high masts, counterweights, effect of boom angle, effects of jib angle, jib as a boom extension, effect of load on booms, production lifts, rope safety factors
 - f. Quadrants Of Operation
 - g. Definitions
 - Over the rear, over the side, 360 degree rotation
 - h. Weight Of The Lift
 - Sources of weight data, calculating weights, principles examples, lifting in water, tests lifts, check lifts
 - i. Conditions & Capacities
 - Summary of conditions affecting crane capacities: off-level, wind, eccentric reeving, swingout, sidelading, impact loading, outrigger position, ground conditions, counterweights, gantries and high masts, equipment condition, swing bearing wear, tire condition and inflation, boom pad wear, outrigger and pad condition, bent chords and lacings.
 - j. Multiple Crane Lifts
 - Types of equalizer beams, pivot points in lines, pivot points not in-line, load as an equalizer beam, necessary calculations

k. Calculations

- Crane capacities: results of over loading, division of load charts, gross and net capacity, gross and net load, radius between values, boom length between values, boom angle between values, parts of line; calculating capacities: on the boom, on the pinned section, on the extension, on the jib

l. Preparing For A Lift

- Boom assembly and disassembly, reasons to repair/scrap boom sections, Wire rope installation, reeving, wedge sockets, telescoping booms, setting-up, measuring radius, radius over boom angle, outrigger set-up, block outriggers, leveling methods

m. Conditions During Lifts

- Swingout, slack rope on drums, pick and carry, lifting on tires, protection of personnel around high voltage and results of making contact, working in the vicinity, effects of electrical current, hitting booms, boom over back, causes of two-blocking, shifts of center of gravity, cold weather operation, tipping over backwards

n. Leaving Cranes Unattended

- Short periods, extended periods

o. Responsibilities

- Management and operator responsibilities

p. Miscellaneous

- Signals, composition of wire rope, rope strengths, tables of rates and capacities, determine sling loadings, using blocks and tackle

q. Crane Checklist

- Operator's daily checklist

r. Erection, Dismantling, Transport

- Erection checklist, bolting procedures, bolting

s. Inspection & Testing

- Frequency of inspections, testing maintenance, and storage of crane components

I. Recordkeeping

1. Documentation of all periodic and annual inspections is required to be maintained.

2. Documentation of all service, maintenance, repairs, and any changes made to the equipment also is required to be maintained.
3. Employee training will be documented in the employee's safety training record and shall be available for inspection by an OR-OSHA representative..

J. Responsibilities

1. Employees shall:
 - a. Use only those cranes/hoists for which they are trained.
 - b. Follow all pre-use inspection procedures, and
 - c. Report any discrepancies or problems to their supervisor immediately.
2. Supervisors shall:
 - a. Ensure all crane/hoist operators have proper accredited training,
 - b. Ensure all required inspection and maintenance is being properly performed, and
 - c. Not allow anybody to use equipment with any problems.
3. The Safety and Health Manager shall:
 - a. Assist sites with implementing this program, and
 - b. Consult with sites concerning OR-OSHA crane regulations.

IV. POLICY CLARIFICATION

- A. The terms "crane" and "hoist" are generally used interchangeably in this policy. Where an item in this policy applies to only one specific piece of equipment, that piece will be identified.
- B. Winches, such as those on the front of some pickup trucks or operated by a hand crank, are not covered by this policy.

Attachment A -Basic Crane Hand Signals

Weblink A - [OR-OSHA Guidebook on Cranes](http://www.cbs.state.or.us/external/osha/pdf/pubs/4927.pdf) (http://www.cbs.state.or.us/external/osha/pdf/pubs/4927.pdf)