DRAFT RECLAMATION SAFETY AND HEALTH STANDARDS
RELEASE
Comments on this draft release must be submitted to acryns@usbr.gov by [7/26/20].

Background and Purpose of the Following Draft Reclamation Safety and Health Standards (RSHS)

The RSHS are being updated by the Bureau of Reclamation Safety and Occupational Health Office to reflect new guidance from Reclamation, the Department of the Interior, and the Occupational Safety and Health Administration. This public release is intended to provide the public an opportunity to comment on each updated section in draft form. This process will enhance transparency and eliminate potential confusion about Reclamation’s safety standards.

The RSHS are incorporated into the Reclamation Manual through SAF 01-01, *Occupational Safety and Health Directive – General*. The Reclamation Manual is used to clarify program responsibility and authority and to document Reclamation-wide methods of doing business. All requirements in the Reclamation Manual are mandatory for Reclamation employees.

See the following pages for the draft RSHS.
Section 19A  
*Permanently Installed Cranes*

19.1 **Scope**
This section sets forth safety requirements for permanently installed cranes and the safety roles and responsibilities for Bureau of Reclamation (Reclamation) personnel. Mobile crane safety is covered in RSHS Section 19B *Mobile Cranes*.

19.2 **General Requirements**
Crane safety is governed by the American Society of Mechanical Engineers (ASME) B30 standards and the Occupational Safety and Health Administration (OSHA) regulations (1910 Subpart N and 1926 Subpart CC). Reclamation Facilities Instructions, Standards, and Techniques (FIST) 4-1A *Maintenance Scheduling for Mechanical Equipment* covers the maintenance, operation, inspection content and requirements, removal from service, record keeping for inspection and testing, load testing, equipment design, performance, and modification.

19.3 **Responsibilities**

19.3.1 **Regional Safety Managers**

19.3.1.1 Shall conduct periodic checks to ensure area and field offices are implementing the requirements of this section.

19.3.2 **Area Office Managers**

19.3.2.1 Shall be an approving official for any critical lift operations within their area of responsibility.

19.3.2.2 Shall, in coordination with the Area Office Safety Professional, designate a Reclamation employee qualified evaluator (see 19.3.12) or agree to utilize third-party evaluator to evaluate qualifications of operators/signalpersons/riggers on Reclamation’s behalf.

19.3.3 **Area Office Safety Professionals**

19.3.3.1 Shall work with the first-line supervisors of crane operators to schedule physical appointment for medical clearance.

19.3.3.2 Shall develop an area level policy for tracking certification and qualification of crane operators, signalpersons and riggers.

19.3.3.3 Shall coordinate with the Regional Safety Manager to provide guidance for crane operators medical surveillance, including substance abuse testing.
19.3.3.4 Shall provide the criteria for knowledge, training, and experience as needed for identifying qualified persons not mentioned in paragraph 19.4.3.

19.3.3.5 Shall have a thorough understanding of procedure and requirements of a critical lift in order to approve critical lift plans and brief the Area Office Manager regarding a critical lift plan and conditions.

19.3.4 Facility Managers

19.3.4.1 Shall be responsible for selecting qualified personnel for maintenance, and repair on permanently installed crane equipment and components.

19.3.4.2 Shall ensure equipment is properly maintained, tested, and repaired and/or replaced by qualified personnel and the respective documentation is available for review.

19.3.4.3 Shall ensure permanently installed crane equipment has preventive maintenance established, as well as detailed and accurate maintenance job plans in accordance with FIST 6-2 Conduct of Power Maintenance.

19.3.4.4 Shall ensure maintenance, and repair personnel follow applicable safety procedures and have the tools and documentation, including equipment manuals to accomplish their work.

19.3.4.5 Shall verify equipment operators, signalpersons, and riggers are evaluated by a certified evaluator (third party or employee).

19.3.4.6 Shall verify crane inspections, per paragraph 19.7.1, are completed by a certified inspector (third-party or employee).

19.3.5 First-Line Supervisors

19.3.5.1 Shall ensure that crane operators under their supervision meet the OSHA 1926.1427 standard for certification and are evaluated for skills, knowledge, experience and ability to recognize and avert risk when operating equipment within their area of responsibility safely.

19.3.5.2 Shall ensure that once an operator has passed an evaluation on one piece of equipment, any other equipment that operator is working with would not require substantially different skills, knowledge or ability to recognize and avert risk.

19.3.5.3 Shall ensure the operator evaluation is documented and includes the name of certification organization, operator’s name, the evaluator’s name and signature, and the date of the evaluation.
19.3.5.4 Shall make the operator evaluation documentation available on the worksite for as long as the operator is employed, electronic availability is sufficient.

19.3.5.5 Shall provide/coordinate retraining and re-evaluation if an operator is not competent in a necessary aspect of safe crane operation.

19.3.5.6 Shall determine if an item being lifted is required to be handled as a critical lift and designate someone other than the crane operator to supervise the planning and execution of the critical lift (see paragraph 19.3.6) per FIST 4-1A, 6.9.3 Designated Person.

19.3.5.7 Shall ensure a job hazard analysis (JHA) is developed and followed for all crane erection/dismantling, hoisting, and rigging operations.

19.3.5.8 Shall ensure equipment is operated safely.

19.3.5.9 Shall ensure preplanned and approved hoisting and rigging instructions are used when necessary, and always for critical and engineered lifts.

19.3.5.10 Shall ensure all equipment problems have been resolved or properly tagged if found to be unsafe or requiring restrictive use.

19.3.5.11 Shall ensure a qualified lift supervisor is assigned to hoisting and rigging operations that require more than one person.

19.3.5.12 Shall ensure the signalperson is qualified and trained for the task assigned, prior to giving any signals.

19.3.5.13 Shall maintain an inventory of their employees who are crane operators with certification and medical clearance.

19.3.6 Lift Supervisors for Critical Lifts

19.3.6.1 Shall be designate by the first-line supervisor as the person to supervise the planning and execution of the critical lift.

19.3.6.2 Shall ensure that equipment is current on all inspections and load tests and ensure that all members participating in critical lift completely understand the work instruction and revisions of the critical lift.

19.3.6.3 Shall be a qualified crew member or other qualified person.

19.3.6.4 Shall ensure the activities listed in FIST 4-1A, 6.9 Critical Lifts, are performed.
19.3.7 Crane Operators

19.3.7.1 Shall ensure they are properly certified and evaluated for skills, knowledge and ability to recognize and avert risk and to operate equipment safety, prior to operating any permanently installed cranes with lifting capacities greater than 2,000 pounds.

19.3.7.2 Shall determine if an item being lifted is required to be handled as a critical lift.

19.3.7.3 Shall not assume the role of a qualified rigger, a certified operator does not necessarily meet the requirements of a qualified rigger.

19.3.7.4 Shall visually inspect equipment prior to or during each shift the equipment will be used, per 1926.1412(d).

19.3.8 Signalpersons

19.3.8.1 Shall be qualified and trained prior to giving any signals.

19.3.8.2 Shall ensure that communication signals and radio standards are understood and agreed upon with crane operator and other personnel involved.

19.3.9 Riggers

19.3.9.1 Shall be qualified and trained prior to performing any rigging duties.

19.3.9.2 Shall participate in hoisting activities for assembly and disassembly work, additionally whenever workers are within a fall zone hooking/unhooking/guiding a load or doing the initial connection of a load to a component or structure.

19.3.9.3 Shall perform the duties respective to their level of certification, including assembly and disassembly of rigging, inspection of rigging prior to lift, hooking/unhooking and guiding a load.

19.3.9.4 Shall understand and be familiar with RSHS Section 18 Slings, Rigging Hardware, and Wire Rope.

19.3.10 Crane Inspectors

19.3.10.1 Shall be certified by an accredited organization to inspect the type of the permanently installed crane(s) to be inspected.

19.3.10.2 Shall inspect any equipment that have had professional engineer (PE) approved modifications or additions which affect the safe operation of the equipment or capacity, per 1926.1412(a), prior to initial use.
19.3.10.3 Shall inspect any equipment that has had a repair or adjustment that relates to safe operation, per 1926.1412(b), prior to initial use.

19.3.10.4 Shall inspect equipment upon completion of assembly, per manufacturer’s equipment criteria and 1926.1412(c), prior to use.

19.3.10.5 Shall inspect equipment on a monthly and annual basis per 1926.1412(e) and (f).

19.3.11 Crane Maintenance and Repair Persons (Reclamation Employee)
19.3.11.1 Shall only operate equipment to the extent necessary to perform maintenance, inspect equipment or verify performance, unless under direct supervision of a certified operator or are familiar with the operation, limitations, characteristics and hazards associated with the type of equipment.

19.3.11.2 Maintenance and repair personnel must meet the definition of a qualified person with respect to the equipment and maintenance/repair tasks performed.

19.3.12 Qualified Evaluators (Reclamation Employee)
19.3.12.1 Shall be designated by the Area Office Manager and the Area Office Safety Professional, based on qualifications of knowledge, training, and verifiable experience.

19.3.12.2 Shall evaluate the skills, knowledge, experience and ability to recognize and avert risk when performing the duties of crane operators, signalpersons, and riggers.

19.4 Training Requirements
19.4.1 Initial
19.4.1.1 Signalpersons. Signalpersons shall receive training that meet the requirements of OSHA1926.1428, in order to know and understand:
   - Types of signals used;
   - Application of signals used;
   - Basic equipment operation and limitations including crane dynamics when hoisting loads;
   - Signal general requirements;
   - Standard voice and hand signals; and
   - Radio, telephone and other electronic signals.

19.4.1.2 Crane Operators. Operators-in-training shall be provided training through a combination of formal and practical instruction so that they may develop the knowledge, skills and abilities to recognize and prevent hazards associated with
equipment and tasks. Operators-in-training may only operate equipment under supervision of a certified crane operator. Training shall include:

- OSHA1926 Subpart CC and the respective Appendix C;
- Safe operation of specific type(s) of equipment they will be operating (controls and operation, use and calculation of load/capacity information for various configurations of the equipment)
- Technical knowledge of surfaces operating on;
- Equipment manuals;
- Inspections
- Operational and maneuvering skills;
- Load chart application;
- Procedures for preventing and responding to powerline contact;
- Safe shut-down procedures; and,
- Electrical safety.

19.4.1.3 Crane Inspectors. Training and certification shall be provided by an accredited organization and shall include information specific to the type of permanently installed crane(s) to be inspected.

19.4.1.4 Area Office Safety Professional. In order to understand the procedure and requirements of a critical lift, so that they can review and approve a critical lift plan, Area Office Safety Professionals shall be trained on:

- Basic crane and equipment safety
- How to make the determination of a critical lift;
- Critical lift planning and approval;
- Equipment selection and inspection; and
- Facility critical lift procedures.

19.4.2 Certification

Operators shall be trained, certified by an accredited organization, licensed by the state (if required), and evaluated in accordance with OSHA 1926.1427, prior to operating equipment. Operators shall be certified for the type of crane they will be operating. Exception is recognized for operation of derricks, side boom cranes and equipment with a maximum manufacturer rated lifting capacity of 2,000 pounds or less.

19.4.3 Proficiency Qualification

19.4.3.1 Riggers. At a minimum, a qualified rigger:

- Possesses a recognized degree, certificate, or professional standing;
- Has extensive knowledge, training, and experience; and
- Can successfully demonstrate the ability to solve problems related to rigging loads.
The person designated as the qualified rigger must have the ability to properly rig the load for a job. It does not mean that a rigger must be qualified to do every type of rigging job. Riggers do not have to be certified by an accredited organization or assessed by a third party.

19.4.3.2 **Signalpersons.** The signalperson is considered qualified if they:

- Know and understand the type of signals used at the worksite;
- Are competent in using signals;
- Understand the operations and limitations of the equipment, including the crane dynamics involved in swinging, raising, lowering and stopping loads and in boom deflection from hoisting loads;
- Know and understand the relevant signalperson qualification requirements specified in subpart CC (1926.1419 through 1926.1422 and 1926.1428); and
- Pass an oral/written test and a practical test.

Signalpersons shall meet these requirements be determination of a qualified evaluator (third-party evaluator or employee).

19.4.4 **Refresher/Recertification**

Operators shall be re-certified every five years which shall include of both a written and practical examination. First-line supervisors shall provide or coordinate retraining for staff based on the performance, and/or an there is an indication that retraining is necessary.

19.4.5 **Recordkeeping**

A list of certified/qualified operators, riggers, and signalpersons shall be kept up to date. Training shall be tracked in the Department of the Interior (DOI) system for tracking training.

19.5 **Hazardous Environmental Conditions (Weather/Other)**

19.5.1 **Wind**

Outdoor crane activities shall have means for monitoring local weather conditions, including a wind speed device located where it can measure maximum wind speed for the area. Cranes will not be operated when wind speeds at the site attain the maximum wind velocity based on the recommendations of the manufacturer or 25 miles per hour (mph), whichever is less. At wind speeds greater than 20 mph, the operator, rigger, and lift supervisor will evaluate conditions and determine if the lift will proceed. This determination will be based on wind calculations per manufacturer’s recommendations. The determination whether to proceed will be documented in the crane operator’s logbook.

19.5.2 **Lightning**
Shut down crane and hoisting operations when lightning is present, and equipment is vulnerable to lightning strikes.

19.6 Other Safety Equipment

19.6.1 Fire Extinguishers and Maintenance
Fire extinguishers shall be provided for all crane operators, and operators shall be trained in the operation and care of the specific type of fire extinguisher provided. Carbon tetrachloride extinguishers shall not be used. A portable fire extinguisher, with a basic minimum extinguisher rating of 10 BC, shall be installed in crane cab/operator station. Portable fire extinguishers shall be maintained and inspected monthly per RSHS Section 10, Fire Protection and Prevention.

19.6.2 Lighting
Cab lighting, either natural or artificial, shall provide a level of illumination that enables the operator to observe the operating controls as well as the load and rigging when they are in operators line of sight.

19.6.3 Self-Rescue Devices for Cab Operated Cranes
Crane operators working in a cab operated crane shall have means for self-rescue in place. There should be a means of egress from cab-operated cranes to permit departure under emergency conditions. For additional guidance refer to RSHS 16 Fall Protection.

19.7 Safe Practices

19.7.1 Crane Inspections
Refer to OSHA 1926.1412 and FIST 4-1A, 6.5 Inspections. Any part of a manufacturer’s procedures regarding inspections that relate to safe operation that is more comprehensive or has a more frequent schedule of inspection than requirements of this section shall be followed. Previous inspection documents produced must be available to crane inspectors.

19.7.1.1 Initial/Startup. Shall be performed before initial use and when cranes have been altered in a manner that affects safe operation or load handling equipment components. Performed by manufacturer or qualified PE on all new or modified/reppaired cranes.

19.7.1.2 Daily/Shift. Shall be performed prior to use on each shift by a qualified person.

19.7.1.3 Frequent/Monthly. Shall be performed monthly or more frequently as conditions require, for all cranes in regular use, standby cranes (not in use for greater than 1
Permanently Installed Cranes

19.7.1.4 Periodic/Annual. Performed annually or more frequently as conditions require. Perform inspection based on time interval since last inspection. Performed by a qualified third party. Hoisting devices rated below 5 tons (non-construction and other hoists) will be inspected by a qualified Reclamation employee or by a qualified third party.

19.7.1.5 Third-party Inspection. A third-party qualified inspector may be a Reclamation employee, provided they hold a state or nationally issued certification and is outside the chain of command of the crane’s facility manager. A third-party may also be a contracted person/entity that specializes in the inspection of cranes and holds the required certifications specific to the type of the crane to be inspected.

19.7.1.6 Load Testing. Refer to FIST 4-1A, 6.7.2 Periodic Load Tests and 6.13.7 Testing, for additional guidance. Conduct load tests in accordance with applicable ASME standards and manufacturer’s recommendations. Load tests shall be conducted prior to use:

- When any loadbearing or load-controlling component has been altered, replaced or repaired;
- For a critical lift;
- For overhead cranes not load tested within the last 4 years; and
- At the discretion of the facility manager or a contracting officer’s representative.

19.7.2 Medical Surveillance

Medical surveillance of crane operators shall be conducted per the DOI Office of Occupational Health and Safety, Medical Program Handbook, Crane Operators (page 215-224). Medical evaluations are to be conducted both as pre-placement for crane operators as well as every three years thereafter or more frequently as required. Medical clearance will be directly transferred to the employee’s profile through a designated point of contact at the employee’s local HR office.

19.7.3 Electrical Safety

For Reclamation’s electrical safety standards refer to RSHS Section 12 Electrical Safety Requirements. In accordance with OSHA 1926.404 and 1926.406, cranes shall have a disconnecting means, a limit switch shall be provided to prevent passing the safe upper limit of travel, minimum clearance shall be met, and proper grounding shall be ensured.
19.7.4 Authority to Stop Operation
Whenever there is a concern as to safety, the operator must have the authority to stop and refuse to handle loads until a qualified person has determined that safety has been assured. Other onsite personnel will alert the operator if they believe unsafe operating conditions exist. Reclamation stop work procedures are described in SAF P01, Appendix A & B.

19.7.5 Duty Periods
Operators will not work, or be at the jobsite, more than 12 hours in any 24-hour period. The operator will not engage in any activity that will divert their attention while operating the equipment, nor will the operator leave their position while a load is suspended.

19.7.6 Critical Lifts
A critical lift is a nonroutine lift requiring detailed planning and additional or unusual safety precautions. Refer to FIST 4-1A, 6.9 Critical Lifts, for critical lift plan content, approval, pre-lift meeting, and documentation. Critical lift plan approval shall, at minimum, include the review and signature of the (1) area office manager, (2) area office safety professional, (3) facility manager, and (4) a qualified PE. Additional approval may be needed based on the location, conditions and critical lift plan. As referenced in paragraph 19.3.5.6, a designated person shall be identified by the first-line supervisor to supervise the planning and execution of the critical lift. The designated person shall have an understanding and familiarity with the equipment, inspections, load tests (of required), and the work instruction so that they can clearly communicate and coordinate during the execution of the critical lift.

19.7.7 Engineered Lifts
Planned engineered lifts are any lift that exceeds the specific rated crane capacity. Engineered lifts shall be planned in accordance with ASME B30.2-3.4 Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist), ASME B30.16-3.5 Overhead Underhung and Stationary Hoists, and ASME B30.17-3.4 Cranes and Monorails (With Underhung Trolley or Bridge).

19.7.8 Powerline Safety
Refer to OSHA 1926.1407-.1411 for power line safety. The owner of the power line shall be contacted and informed of work near the power line. Assume all power lines are energized until the utility owner/operator confirms that the line has been, and continues to be, deenergized and visibly grounded. Prior to equipment operations, conduct a hazard assessment and identify the work zone by limiting operations within a boundary or defining the work zone as 360 degrees around the equipment up to the equipment maximum working radius. Maintain a clearance of 20 feet between the power line and the equipment’s...
maximum operating radius. If the 20-foot distance could be entered, precautions shall be taken per the OSHA equipment operation standard for applicable voltage.

19.7.9 **Restriciton of Hoisting Personnel**
Unless there is a specific exception from OSHA, no person may ride loads, blocks, buckets, hooks, scaffolding, boatswain’s chairs, cages, or other devices attached to hoist lines, booms, or attachments of any crane, derrick, or materials hoist. Designated maintenance personnel may ride the carriage service platform of a cableway to perform inspection testing or maintenance. Operations using crane-supported personnel platforms are considered critical lifts. Employees may only ride in/on a personnel platform specifically manufactured for lifting personnel.

19.7.10 **Cranes with Capacity 2,000 pounds or less**
Cranes and hoisting equipment with maximum rated lifting capacity of 2,000 pounds or less shall comply with OSHA 1926.1441 *Equipment with a rated hoisting/lifting capacity of 2,000 pounds or less*. Inspection and use of this equipment shall comply with manufacturer instructions, recommendations, limitations, and specifications. If this documentation is not available, a qualified PE who is familiar with the type of equipment shall be consulted. Facility Managers are responsible for ensuring that operators and signalpersons are trained for use of permanent cranes with capacity of 2,000 pounds or less.

19.7.11 **Hoist Equipment for Spillway Gates**

19.7.12 **Modifications**
Any modification or repair to a permanently installed crane shall have a qualified PE to oversee, inspect and approve all changes per 1926.1412(a), prior to initial use.

19.8 **Tower Cranes**
In addition to the safe practices previously listed, tower cranes will conform to manufacturer’s instructions, OSHA 1926.1435 *Tower Cranes*, and the current edition of ASME B30.3 *Tower Cranes*.

19.8.1 **Design**
All load bearing foundations, supports, and rail tracks shall be constructed or installed in accordance with the crane manufacturer’s instructions or a qualified PE.

19.8.2 **Crane Erection and Dismantling**

Erect and dismantle cranes in accordance with the manufacturer’s instructions and ASME B30.3. These minimum requirements shall be observed for erection and dismantling:

- Supervision by a qualified person;
- The manufacturer’s or a qualified PE’s written instructions and the weights of each component are provided and available;
- Develop/implement a JHA that includes include consideration of temporary guying and bracing requirements during the erection and dismantling.

19.8.2.1 **Environmental Conditions.** Place the crane into its most favorable protected position to protect personnel and property when environmental conditions require lifting operations to cease.

19.8.2.2 **Unattended Tower Cranes.** Place unattended tower cranes in a weathervane configuration.

19.8.2.3 **Limiting Devices.** Where applicable, install the following limiting devices:

- Trolley limit switches to prevent further trolley motion beyond predetermined points on tower crane booms;
- Anti-two-block switches that cause the hoist drum to automatically stop, preventing contact between the load hook and the head block;
- Load-limiting switches to avoid exceeding crane capacities;
- Limit switches and stops or buffers at each end of the tracks of track-mounted cranes.

19.8.2.4 **Boom Angle Indicator.** Install boom angle indicators on machines having booms capable of moving in the vertical plane.

19.9 **Derricks**

In addition to the safe practices previously listed, derricks will conform to the requirements of OSHA 1910.181 and 1926.1436 *Derricks*, the current edition of ASME B30.6 *Derricks*.

19.9.1 **Design**

Derrick installations and equipment shall be in accordance with manufacturer’s instructions, or a qualified PE.

19.9.2 **Foundation**

Set derricks on foundations designed and constructed to support the weight of the crane plus the maximum rated load.
19.9.3 **Boom Angle Aid**

If the derrick is not equipped with a boom angle indicator, use a device that automatically prevents movement past the minimum and maximum allowable boom angles or mark the boom hoist cable, within the operator’s view, with caution and stop marks that correspond to the minimum and maximum allowable boom angle.

19.10 **Base-Mounted Drum Hoist**

Base-mounted drum hoists will conform to the requirements of ASME B30.7 *Winches*. Air-powered hoists must conform to the requirements of ASME HST-6M *Performance Standard for Air Wire Rope Hoists*, or more stringent requirements of this section. Hoisting machines used in personnel related systems must also meet the requirements in paragraph 19.11.

19.10.1 **Design.**

The hoist manufacturer or a qualified PE must design base mounted hoisting systems.

19.10.2 **Restrictions.**

Base-mounted drum hoist systems involving personnel use or exposure (e.g., movable work platforms, raising or lowering drilling machines, and personnel hoists) must conform to the provisions of this subsection.

19.11 **Overhead Hoists**

Install, operate, and maintain overhead hoists in compliance with the more stringent provision of this subsection and ASME B30.16 *Overhead Underhung and Stationary Hoists*.

19.11.1 **Design**

The manufacturer or a qualified PE will design hoists and hoist suspensions and anchorages.

19.11.2 **Safe Working Load**

Indicate the safe working load, as determined by the manufacturer, on the hoist. Do not exceed the safe working load.

19.11.3 **Support**

Design the supporting structure to withstand the loads and forces imposed by the weight of the hoist and its rated load. The support will provide unobstructed movement of the hoist and load. It will also permit the operator to stand clear of the load in all hoisting positions.

19.11.4 **Limit Switch**
Equip power-operated overhead hoists with a limit switch to prevent the load hook from exceeding the upper travel limit.

19.11.5 Hoist Controls
Controls on powered hoists will return to a neutral position when released, and load hook movement will stop.

19.11.6 Brakes
Except for hand-powered hoists, all overhead hoists will have brakes that apply automatically when the controls are in neutral.

19.11.7 Air-Operated Hoists
Connect air hoists to an air supply of sufficient capacity and working pressure to safely operate the hoist with maximum load.

19.11.8 Hand-Powered Hoists
Hand-powered hoists will be worm-gear driven or equipped with a pawl or ratchet system that provides continuous effective control and braking reliability.

19.12 Cableways
In addition to the requirements previously listed, cableways shall comply with the installation, testing, operation, and maintenance requirements in the current edition of ASME B30.19 Cableways:

19.12.1 Design and Installation
A qualified PE will design cableways. Install and operate cableways according to the PE’s design drawings, specifications, and operating, maintenance, and inspection instructions.

19.12.2 Cableway Log
Maintain a log for each cableway to record inspections, lubrication, maintenance, and repair activities. The log will also include operating time and downtime, and the employee responsible for performing the maintenance or repair work will sign it. Make the log available for review.

19.12.3 Signal System
Continuously maintain at least two systems of communication between the operator and the signalperson. At least one of the systems will provide voice communication by telephone or radio. The second system may use lights or bells as the signaling means. When the dual system is not functioning properly, the operator may deliver the load suspended from the
cableway, but the operator will rig no further load until both communication systems are functioning.

19.12.4 Control Consoles
During operation of the cableway, permit only the operator(s) in the control console room. The console room windows will be safety glass that introduces no distortion that would interfere with the safe operation of the cableway.

19.12.5 Operating Controls
All controls will automatically return to neutral and set the brakes when released. Plainly mark each control to indicate its function and ensure that it is within easy reach of the operator.

19.12.6 Cableway Platforms and Carriages
Provide cableway inspection platforms, moving and stationary, with standard guardrails and toeboards. Enclose open areas on carriages and moving platforms with wire mesh to reduce the hazard from falling objects.

19.12.7 Concrete Buckets
Design concrete buckets with a safety device to prevent accidental opening of the bucket while in transit to the discharge site. Construct buckets to prevent aggregate from lodging on any part of the bucket. Refer to RSHS Section 25 Concrete, Masonry, Construction, and Formwork.

19.12.8 Riding Cableways
Prohibit riding the cableway, except for designated maintenance personnel who may ride the carriage service platform of a cableway to perform inspections or maintenance. Prepare and review a JHA before performing inspections or maintenance.

19.12.9 Track-Mounted Towers
Equip track-mounted cableway towers or structures with both limit switches and rail stops, or with buffers at each end of the tracks. Equip the wheel with track or rail sweeps that extend below the top of the rail and are effective in all directions of travel. When two or more towers operate on the same track, install an automatic control system to prevent the towers from colliding.

19.13 Communication Requirements
A signalperson shall be present when the point of operation is not in full view of the operator, when the view in the direction of travel is obstructed, or the operator feels a signalperson is necessary.

19.13.1 Hand Signal Standards

Standard Method hand signals, per OSHA 1926 Subpart CC App A, shall be used unless it is infeasible, or an operation is not covered by the standard method. When non-standard hand signals are used, the signalperson, operator and lift supervisor shall review and agree upon the signals to be used.

19.13.2 Radio Signal Standards

Radio devices used to transmit signals shall be tested to ensure transmission is reliable, clear, and effective. A dedicated radio channel shall be used, unless the coordination or conditions of the work prohibit.

19.14 Definitions

**Accredited organization**
An officially recognized group being qualified to perform a particular activity. In the context of this document accredited organizations shall be formally recognized by OSHA, for example the National Center for Construction Education and Research (NCCER) and the National Commission for the Certification of Crane Operators (NCCCO).

**Competent person**
A person who by training and/or experience can perform specifically assigned duties and responsibilities. Further, the person can recognize existing and predictable hazards or conditions which are unsanitary, hazardous, or dangerous and is authorized to initiate prompt corrective action.

**Engineered lift**
A noncritical lift that management has designated as requiring additional controls by having a qualified individual or engineer independently pre-identify load weight, load center of gravity, lift attachment points, and minimum lifting hardware (slings, below-the-hook lifting devices, shackles, etc.) capacities that will be used for the lift or series of lifts. Pre-identified information shall be provided to the personnel involved in the lift.

**Qualified person**
Refers to one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated ability to solve or resolve problems relating to the subject matter, the work, or the project.

19.15 References

American Society of Mechanical Engineers. ASME B30.16 *Overhead Underhung and Stationary Hoist*
American Society of Mechanical Engineers. ASME B30.17 Cranes and Monorails (With Underhung Trolley or Bridge)

American Society of Mechanical Engineers. ASME B30.19 Cableways

American Society of Mechanical Engineers. ASME B30.2 Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)

American Society of Mechanical Engineers. ASME B30.3 Tower Cranes.

American Society of Mechanical Engineers. ASME B30.6 Derricks

American Society of Mechanical Engineers. ASME B30.7 Winches

American Society of Mechanical Engineers. ASME HST-6M, Performance Standard for Air Wire Rope Hoists.


Section 19B

Mobile Cranes

19.1 Scope
This section sets forth safety requirements for mobile cranes and handling loads with helicopters for Bureau of Reclamation (Reclamation) personnel. Permanently installed crane safety as well as critical and engineered lift guidance is covered in RSHS Section 19A *Permanently Installed Cranes*.

19.2 General Requirements
Mobile crane use is governed by the American Society of Mechanical Engineers (ASME) B30 standards and the Occupational Safety and Health Administration (OSHA) regulations (1910 Subpart N and 1926 Subpart CC). Reclamation Facilities Instructions, Standards, and Techniques (FIST) 4-1A *Maintenance Scheduling for Mechanical Equipment* covers the maintenance, operation, inspection content and requirements, removal from service, record keeping for inspection and testing, load testing, equipment design, performance, and modification.

19.3 Responsibilities

19.3.1 Regional Safety Managers
19.3.1.1 Shall conduct periodic checks to ensure area and field offices are implementing the requirements of this section.

19.3.2 Area Office Managers
19.3.2.1 Shall, in coordination with the Area Office Safety Professional, designate a qualified evaluator (refer to paragraph 19.3.11) or agree to utilize third-party vendors to evaluate qualifications of operators/signalpersons/riggers on Reclamation’s behalf.

19.3.3 Area Office Safety Professionals
19.3.3.1 Shall work with the first-line supervisors of crane operators to schedule physical appointment for medical clearance.

19.3.3.2 Shall develop an area level policy for tracking certification and qualification of crane operators, signalpersons and riggers.

19.3.3.3 Shall coordinate with the Regional Safety Manager to provide guidance for crane operators medical surveillance, including substance abuse testing.
19.3.4 Facility Managers

19.3.4.1 Shall be responsible for selecting qualified personnel for maintenance, and repair on mobile crane equipment and components.

19.3.4.2 Shall ensure equipment is properly maintained, tested, and repaired and/or replaced by qualified personnel and the respective documentation is available for review.

19.3.4.3 Shall ensure mobile crane equipment has preventive maintenance established, as well as detailed and accurate maintenance job plans in accordance with FIST 6-2 Conduct of Power Maintenance.

19.3.4.4 Shall ensure maintenance, and repair personnel follow applicable safety procedures and have the tools and documentation, including equipment manuals to accomplish their work.

19.3.4.5 Shall verify equipment operators, signalpersons, and riggers are evaluated by a certified evaluator (third party or employee).

19.3.4.6 Shall verify crane inspections, per paragraph 19.7.1, are completed by a certified inspector (third-party or employee).

19.3.5 First-Line Supervisors

19.3.5.1 Shall provide/coordinate mobile crane operator training by a qualified and certified instructor.

19.3.5.2 Shall ensure that mobile crane operators under their supervision meet the OSHA 1926.1427 standard for certification and are evaluated for skills, knowledge, experience and ability to recognize and avert risk when operating equipment within their area of responsibility safely.

19.3.5.3 Shall ensure that once an operator has passed an evaluation on one piece of equipment, any other equipment that operator is working with would not require substantially different skills, knowledge or ability to recognize and avert risk.

19.3.5.4 Shall ensure the operator evaluation is documented and includes the name of certification organization, operator’s name, the evaluator’s name and signature, and the date of the evaluation.

19.3.5.5 Shall make the operator evaluation documentation available on the worksite for as long as the operator is employed, electronic availability is sufficient.

19.3.5.6 Shall provide/coordinate retraining and re-evaluation if an operator is not competent in a necessary aspect of safe crane operation.
19.3.5.7 Shall ensure a job hazard analysis (JHA) is developed and followed for all crane erection/dismantling, hoisting, and rigging operations.

19.3.5.9 Shall ensure equipment is operated safely.

19.3.5.10 Shall ensure all equipment problems have been resolved or properly tagged if found to be unsafe or requiring restrictive use.

19.3.5.11 Shall ensure a qualified lift supervisor is assigned to hoisting and rigging operations that require more than one person.

19.3.5.12 Shall ensure the signalperson is qualified and trained for the task assigned, prior to giving any signals.

19.3.5.13 Shall maintain an inventory of their employees who are crane operators with certification and medical clearance.

19.3.6 Crane Operators

19.3.6.1 Shall ensure they are properly certified and evaluated for skills, knowledge and ability to recognize and avert risk and to operate equipment safety, prior to operating any mobile cranes with lifting capacities greater than 2,000 pounds.

19.3.6.2 Shall not assume the role of a qualified rigger, a certified operator does not necessarily meet the requirements of a qualified rigger.

19.3.6.3 Shall visually inspect equipment prior to or during each shift the equipment will be used, per 1926.1412(d).

19.3.7 Signalpersons

19.3.7.1 Shall be qualified and trained prior to giving any signals.

19.3.7.2 Shall ensure that communication signals and radio standards are understood and agreed upon with crane operator and other personnel involved.

19.3.8 Riggers

19.3.8.1 Shall be qualified and trained prior to performing any rigging duties.

19.3.8.2 Shall participate in hoisting activities for assembly and disassembly work, additionally whenever workers are within a fall zone hooking/unhooking/guiding a load or doing the initial connection of a load to a component or structure.
19.3.8.3 Shall perform the duties respective to their level of certification, including assembly and disassembly of rigging, inspection of rigging prior to lift, hooking/unhooking and guiding a load.

19.3.8.4 Shall understand and be familiar with RSHS Section 18 Slings, Rigging Hardware, and Wire Rope.

19.3.9 Crane Inspectors

19.3.9.1 Shall be certified by an accredited organization to inspect the type of the permanently installed crane(s) to be inspected.

19.3.9.2 Shall inspect any equipment that have had professional engineer (PE) approved modifications or additions which affect the safe operation of the equipment or capacity, per 1926.1412(a), prior to initial use.

19.3.9.3 Shall inspect any equipment that has had a repair or adjustment that relates to safe operation, per 1926.1412(b), prior to initial use.

19.3.9.4 Shall inspect equipment upon completion of assembly, per manufacturer’s equipment criteria and 1926.1412(c), prior to use.

19.3.9.5 Shall inspect equipment on a monthly and annual basis per 1926.1412(e) and (f).

19.3.10 Crane Maintenance and Repair Persons (Reclamation Employee)

19.3.10.1 Shall only operate equipment to the extent necessary to perform maintenance, inspect equipment or verify performance, unless under direct supervision of a certified operator or are familiar with the operation, limitations, characteristics and hazards associated with the type of equipment.

19.3.10.2 Maintenance and repair personnel must meet the definition of a qualified person with respect to the equipment and maintenance/repair tasks performed.

19.3.11 Qualified Evaluators (Reclamation Employee)

19.3.11.1 Shall be designated by the Area Office Manager and the Area Office Safety Professional, based on qualifications of knowledge, training, and verifiable experience.

19.3.11.2 Shall evaluate the skills, knowledge, experience and ability to recognize and avert risk when performing the duties of crane operators, signalpersons, and riggers.

19.4 Training Requirements
19.4.1 Initial

19.4.1.1 Signalpersons. Signalpersons shall receive training that meet the requirements of OSHA 1926.1428, in order to know and understand:

- Types of signals used;
- Application of signals used;
- Basic equipment operation and limitations including crane dynamics when hoisting loads;
- Signal general requirements;
- Standard voice and hand signals; and
- Radio, telephone and other electronic signals.

19.4.1.2 Crane Operators. Operators-in-training shall be provided training through a combination of formal and practical instruction so that they may develop the knowledge, skills and abilities to recognize and prevent hazards associated with equipment and tasks. Operators-in-training may only operate equipment under supervision of a certified crane operator. Training shall include:

- OSHA 1926 Subpart CC and the respective Appendix C;
- Safe operation of specific type(s) of equipment they will be operating (controls and operation, use and calculation of load/capacity information for various configurations of the equipment);
- Technical knowledge of surfaces operating on;
- Equipment manuals;
- Inspections
- Operational and maneuvering skills;
- Load chart application;
- Procedures for preventing and responding to powerline contact;
- Safe shut-down procedures; and,
- Electrical safety.

19.4.1.3 Crane Inspectors. Training and certification shall be provided by an accredited organization and shall include information specific to the type of mobile crane(s) to be inspected.

19.4.1.4 Area Office Safety Professional. In order to understand the procedure and requirements of a critical lift, so that they can review and approve a critical lift plan, Area Office Safety Professionals shall be trained on:

- Basic crane and equipment safety
- How to make the determination of a critical lift;
- Critical lift planning and approval;
- Equipment selection and inspection; and
- Facility critical lift procedures.

19.4.2 Certification
Operators shall be trained, certified by an accredited organization, licensed by the state (if required), and evaluated in accordance with OSHA 1926.1427, prior to operating equipment. Operators shall be certified for the type of crane they will be operating. Exception is recognized for operation of derricks, side boom cranes and equipment with a maximum manufacturer rated lifting capacity of 2,000 pounds or less.

19.4.3 Proficiency Qualification

19.4.3.1 Riggers. At a minimum, a qualified rigger:

- Possesses a recognized degree, certificate, or professional standing;
- Has extensive knowledge, training, and experience; and
- Can successfully demonstrate the ability to solve problems related to rigging loads.

The person designated as the qualified rigger must have the ability to properly rig the load for a job. It does not mean that a rigger must be qualified to do every type of rigging job. Riggers do not have to be certified by an accredited organization or assessed by a third party.

19.4.3.2 Signalpersons. The signalperson is considered qualified if they:

- Know and understand the type of signals used at the worksite;
- Are competent in using signals;
- Understand the operations and limitations of the equipment, including the crane dynamics involved in swinging, raising, lowering and stopping loads and in boom deflection from hoisting loads;
- Know and understand the relevant signalperson qualification requirements specified in subpart CC (1926.1419 through 1926.1422 and 1926.1428); and
- Pass an oral/written test and a practical test.

Signalpersons shall meet these requirements be determination of a qualified evaluator (third-party or employee).

19.4.4 Refresher/Recertification

Operators shall be re-certified every five years which shall include of both a written and practical examination. First-line supervisors shall provide or coordinate retraining for staff based on the performance, and/or an there is an indication that retraining is necessary.

19.4.5 Recordkeeping

A list of certified/qualified operators, riggers, and signalpersons shall be kept up to date.

Training shall be tracked in the Department of the Interior (DOI) system for tracking training.

19.5 Hazardous Environmental Conditions (Weather/Other)
19.5.1 Wind
Outdoor crane activities shall have means for monitoring local weather conditions, including a wind speed device located where it can measure maximum wind speed for the area. Cranes will not be operated when wind speeds at the site attain the maximum wind velocity based on the recommendations of the manufacturer or 25 miles per hour (mph), whichever is less. At wind speeds greater than 20 mph, the operator, rigger, and lift supervisor will evaluate conditions and determine if the lift will proceed. This determination will be based on wind calculations per manufacturer’s recommendations. The determination whether to proceed will be documented in the crane operator’s logbook.

19.5.2 Lightning
Shut down crane and hoisting operations when lightning is present, and equipment is vulnerable to lightning strikes.

19.6 Other Safety Equipment

19.6.1 Fire Extinguishers
Fire extinguishers shall be provided for all crane operators, and operators shall be trained in the operation and care of the specific type of fire extinguisher provided. Carbon tetrachloride extinguishers shall not be used. A portable fire extinguisher, with a basic minimum extinguisher rating of 10 BC, shall be installed in crane cab/operator station. Portable fire extinguishers shall be maintained and inspected monthly per RSHS Section 10 Fire Protection and Prevention.

19.6.2 Lighting
Cab lighting, either natural or artificial, shall provide a level of illumination that enables the operator to observe the operating controls as well as the load and rigging when they are in operators line of sight.

19.6.3 Self-Rescue Devices for Cab Operated Cranes
Crane operators working in a cab operated crane shall have means for self-rescue in place. There should be a means of egress from cab-operated cranes to permit departure under emergency conditions. For additional guidance refer to RSHS 16 Fall Protection.

19.6.4 Personal Protective Equipment
See RSHS Section 8 Personal Protective Equipment for additional information.

19.7 Safe Practices

19.7.1 Crane Inspections
Refer to OSHA 1926.1412 and FIST 4-1A, 6.5 *Inspections*. Any part of a manufacturer’s procedures regarding inspections that relate to safe operation that is more comprehensive or has a more frequent schedule of inspection than requirements of this section shall be followed. Previous inspection documents produced must be available to crane inspectors.

19.7.1.1 Initial/Startup. Shall be performed before initial use and when cranes have been altered in a manner that affects safe operation or load handling equipment components. Performed by manufacturer or qualified PE on all new or modified/repaired cranes.

19.7.1.2 Daily/Shift. Shall be performed prior to use on each shift by a qualified person.

19.7.1.3 Frequent/Monthly. Shall be performed monthly or more frequently as conditions require, for all cranes in regular use, standby cranes (not in use for greater than 1 month but less than 3 months) are inspected prior to use. Performed by a qualified person. This also applies to non-reclamation owned crane and hoisting equipment brought to a Reclamation jobsite and prior to onsite use. When equipment is returned to use after an idle period of 3 or more months, it shall be inspected per 1926.1412(e).

19.7.1.4 Periodic/Annual. Performed annually or more frequently as conditions require. Perform inspection based on time interval since last inspection. Performed by a qualified third party. Hoisting devices rated below 5 tons (non-construction and other hoists) will be inspected by a qualified Reclamation employee or by a qualified third party.

19.7.1.5 Third-party Inspection. A third-party qualified inspector may be a Reclamation employee, provided they hold a state or nationally issued certification and is outside the chain of command of the crane’s facility manager. A third-party may also be a contracted person/entity that specializes in the inspection of cranes and holds the required certifications specific to the type of crane to be inspected.

19.7.1.6 Load Testing. Refer to FIST 4-1A, 6.7.2 Periodic Load Tests and 6.13.7 Testing, for additional guidance. Conduct load tests in accordance with applicable ASME standards and manufacturer’s recommendations. Load tests shall be conducted prior to use:

- When any loadbearing or load-controlling component has been altered, replaced or repaired;
- For a critical lift;
- For overhead cranes not load tested within the last 4 years; and
19.7.2 Medical Surveillance
Medical surveillance of crane operators shall be conducted per the DOI Office of Occupational Health and Safety, Medical Program Handbook, Crane Operators (page 215-224). Medical evaluations are to be conducted both as pre-placement for crane operators as well as every three years thereafter or more frequently as required. Medical clearance will be directly transferred to the employee’s profile through a designated point of contact at the employee’s local HR office.

19.7.3 Electrical Safety
For Reclamation’s electrical safety standards refer to RSHS Section 12 Electrical Safety Requirements. In accordance with OSHA 1926.404 and 1926.406, cranes shall have a disconnecting means, a limit switch shall be provided to prevent passing the safe upper limit of travel, minimum clearance shall be met, and proper grounding shall be ensured.

19.7.4 Authority to Stop Operation
Whenever there is a concern as to safety, the operator must have the authority to stop and refuse to handle loads until a qualified person has determined that safety has been assured. Other onsite personnel will alert the operator if they believe unsafe operating conditions exist. Reclamation stop work procedures are described in SAF P01, Appendix A & B.

19.7.5 Duty Periods
Operators will not work, or be at the jobsite, more than 12 hours in any 24-hour period. The operator will not engage in any activity that will divert their attention while operating the equipment, nor will the operator leave their position while a load is suspended.

19.7.6 Powerline Safety
Refer to OSHA 1926.1407-.1411 for power line safety. The owner of the power line shall be contacted and informed of work near the power line. Assume all power lines are energized until the utility owner/operator confirms that the line has been, and continues to be, deenergized and visibly grounded. Prior to equipment operations, conduct a hazard assessment and identify the work zone by limiting operations within a boundary or defining the work zone as 360 degrees around the equipment up to the equipment maximum working radius. Maintain a clearance of 20 feet between the power line and the equipment’s maximum operating radius. If the 20-foot distance could be entered, precautions shall be taken per the OSHA equipment operation standard for applicable voltage.
19.7.7 Restriction of Hoisting Personnel
Unless there is a specific exception from OSHA, no person may ride loads, blocks, buckets, hooks, scaffolding, boatswain’s chairs, cages, or other devices attached to hoist lines, booms, or attachments of any crane, derrick, or materials hoist. Designated maintenance personnel may ride the carriage service platform of a cableway to perform inspection testing or maintenance. Operations using crane-supported personnel platforms are considered critical lifts. Employees may only ride in/on a personnel platform specifically manufactured for lifting personnel.

19.7.8 Moving Mobile Cranes
Do not move mobile crane when employees are aloft. Carefully observe the area when moving a crane. Observe state requirements regarding special license to drive mobile cranes on roads.

19.7.9 Cranes with Capacity of 2,000 Pounds or Less
Cranes and hoisting equipment with maximum rated lifting capacity of 2,000 pounds or less shall comply with OSHA 1926.1441, Equipment with a rated hoisting/lifting capacity of 2,000 pounds or less. Inspection and use of this equipment shall comply with manufacturer instructions, recommendations, limitations, and specifications. If this documentation is not available, a qualified PE who is familiar with the type of equipment shall be consulted. Facility Managers are responsible for ensuring that operators and signalpersons are trained for use of mobile cranes with capacity of 2,000 pounds or less.

19.7.10 Hoist Equipment for Spillway Gates

19.7.11 Modifications
Any modification or repair to a mobile crane shall have a qualified PE to oversee, inspect and approve all changes per 1926.1412(a), prior to initial use.

19.8 Mobile and Locomotive Cranes
In addition to the safe practices previously listed, mobile and locomotive cranes will conform to the manufacturer’s instructions, OSHA 1910.180 Crawler locomotive and truck cranes, and the current edition of ASME B30.5 Mobile and Locomotive Cranes. Side boom wheel or crawler tractors will
conform to ASME B30.14 Side Boom Tractors. Articulating boom cranes will conform to ASME B30.22 Articulating Boom Cranes.

19.8.1 Operating Instructions
Rated load capacities and recommended operating speeds, special hazard warnings, or instruction will be conspicuously posted on all equipment. Instructions or warnings will be visible to the operator while at the control station.

19.8.2 Boom Angle/Radius Indicator
Equip mobile cranes with a boom angle or radius indicator located within the operator’s view.

19.8.3 Boom Stops
Provide cranes or other hoisting devices with cable-supported booms with stops to resist the boom falling over backwards. Design boom stops to provide increasing resistance from the initial point of contact to a stopping point no more than 87 degrees above horizontal.

19.8.4 Boom Hoist Disengagement Device
Provide mobile crane booms with a functional boom hoist disengagement device that will automatically stop the boom hoist mechanism when the boom reaches its highest rated angle.

19.8.5 Anti-Two-Blocking Device
Equip all mobile cranes with a two-block damage prevention feature or an anti-two-blocking device. Two-block damage prevention features will prevent damage to the crane or hoist line in case of a two-block condition. Anti-two blocking devices will have automatic capabilities to disengage all crane functions in which movement can cause two-blocking. For lattice-boom cranes manufactured before 1992, two-block warning features may be used to alert the operator to an impending two-blocking condition. Cranes lacking automatic capabilities to disengage all crane functions in a two-block condition are prohibited for use in critical lifts.

19.8.6 Level Indicator
Provide a way for the operator to visually determine the levelness of the crane.

19.8.7 Jib Stops
On addition to boom stops, jibs will have a positive stop to prevent overtopping.

19.8.8 Cab Windows
Windows in crane cabs will be safety glass or equivalent. Cab windows will not introduce any distortion that interferes with the crane’s safe operation.
19.8.9 Audible Warning Device
Mobile cranes will have an audible warning signal device that is distinguishable and audible above background noise.

19.8.10 Foot Pedal Brakes
Equipment with foot pedal brakes will have locks, except for portal and floating cranes.

19.8.11 Hydraulic Outrigger Jacks
Hydraulic outrigger jacks will have an integral holding device (check valve).

19.8.12 Load Weighing or Similar Device
Equipment manufactured after March 29, 2003, with a rated capacity over 6,000 pounds will have a load weighing device, load moment (or rated capacity) indicator, or a load moment (or rated capacity) limiter.

19.8.13 Outrigger/Stabilizer Position and Hoist Drum Rotation Indicators
Equipment manufactured after November 8, 2011, will be equipped with an outrigger/stabilizer position sensor or monitor if the equipment has outriggers or stabilizers and a hoist drum rotation indicator if the drum is not visible from the operator’s station.

19.8.14 Securing Booms
When they are not in use, lower crane booms to the ground or otherwise secure them to prevent displacement by wind or other outside forces.

19.9 Floating Cranes and Floating Derricks
In addition to the safe practices previously listed, floating cranes and floating derricks will conform to the manufacturer’s instructions, OSHA 1926.1437 Floating cranes/derricks and land cranes/derricks on barges, and the current edition of ASME B30.8 Floating Cranes and Floating Derricks.

19.9.1 Design
The manufacturer or a qualified PE will design and certify all floating cranes and floating derricks.

19.9.2 Rescue
Make available a rescue skiff and personal floatation devices meeting the requirements in RSHS Section 8 Personal Protective Equipment.

19.9.3 Load Rating Chart
When reducing load ratings to compensate for “barge list,” provide a new rating chart. The manufacturer will rate barge-mounted cranes designed and constructed as a unit. All other barge-mounted cranes will be large enough to limit the “list” under maximum load to 5 degrees.

19.9.4 Wave Action
Suspend crane operation when significant wave action affects the stability of the barge.

19.9.5 Mobile Cranes
Block and secure mobile cranes mounted on barges or pontoons to prevent shifting.

19.10 Material Hoists
In addition to the safe practices previously listed, material hoists shall conform to the manufacturer’s instructions, OSHA 1926.552 Material hoists, personnel hoists, and elevators, and the current edition of ASSP A10.5 Safety Requirements for Material Hoists.

19.10.1 Assembly
A qualified PE shall supervise erecting and dismantling of hoist towers and material hoists.

19.10.2 Car-Arresting Devices
Test car-arresting devices before initial use and every 4 months thereafter. Conduct tests in accordance with ASSP A10.5.

19.10.3 Posting
Post operating rules, including signals, line speeds, and loading, at the operator’s station and on the cage frame or crosshead. A copy of the hoist operating manual shall always be available during operation.

19.10.4 Riding
Do not permit anyone to ride a material hoist, except for inspection and maintenance. Conspicuously post with “NO RIDERS ALLOWED.”

19.10.5 Hoistway Entrances
Protect entrances to the hoistway in accordance with 1926.552(b)(2), using substantial gates or bars that are installed the full width of the landing entrance and equip with a latching device. Paint entrance bars and gates with diagonal contrasting colors, such as black and yellow stripes.

19.10.6 Overhead Protection
Protect the top of the cage or platform with 2-inch planking, 3/4-inch plywood, or material of equivalent strength.

19.10.7 Tower Enclosures
The following requirements will apply:

19.10.7.1 Enclosed. An enclosed hoistway or tower will be enclosed on all sides for its entire height, with 1/2-inch wire mesh screen, No. 18 U.S. gauge wire or equivalent, except at access points.

19.10.7.2 Open Sides. For an unenclosed hoist tower, totally enclose the hoist cage or platform on all sides between the floor and the protective top with 0.5-inch wire mesh screen, No. 14 U.S. gauge wire or equivalent. The hoist cage or platform enclosure will include the required gates for loading and unloading. Install an enclosure at least 6 feet high on the unused sides of the hoist tower at ground level.

19.10.8 Operator’s Station
Protect the operator’s station with overhead planking not less than 2 inches thick or with material of equivalent strength.

19.10.9 Tower Support
Towers will rest on solid foundations. Ensure that the towers are plumb and well guyed or otherwise anchored in four directions to resist lateral movement and displacement.

19.10.10 Hinged Roof
The protective covering on top of cage or platform may be hinged to accommodate long materials being hoisted.

19.10.11 Electric Hoists
Electric hoists will be provided with an automatic motor brake to stop and hold the load in case of a power failure.

19.10.12 Operating Restrictions
One hoisting machine, or one operator, will operate only one cage, bucket, or hoist platform at a time.

19.10.13 Hoisting Machines
Design and install hoisting machines to raise and lower the maximum rated load, plus the weight of equipment and ropes. Hoisting machines will incorporate the following features:
19.10.13.1 **Brakes.** The brakes will be capable of stopping and holding 150 percent of the rated hoisting capacity under all operating conditions.

19.10.13.2 **Mechanical Brakes.** Install mechanical brakes to stop movement of the hoist drum and equip the mechanical brakes with a positive acting device that will hold the brake in the engaged position.

19.10.13.3 **Ratchet and Pawl.** Equip friction-clutch-driven winding drum hoisting machines with an effective pawl and ratchet capable of holding the rated load capacity when suspended.

19.10.13.4 **Controls.** All controls will, when released, automatically return to neutral and set the brake. Plainly mark each control to indicate its function; it will be within easy reach of the operator.

19.10.14 **Position Indicator**
Use a positive system to indicate when the hoist car or platform has reached specific locations, including the top and bottom landings.

19.10.15 **Communications**
Hand signals may be used on a single drum hoist when the hoist tower is no more than 50 feet high and the signals are always visible to the operator. Use audio communications on all other material hoist installations. The system will be two-way, with a speaker located at the hoist operator’s station and at each landing. The hoist operator will be able to communicate by voice to and from each station.

19.11 **Pile Driving Equipment**
Equipment used for pile driving shall be designed and manufactured for that specific purpose. In addition to the safe practices previously listed, use of pile driving equipment shall conform to the manufacturer’s instructions, OSHA 1926.603 *Pile driving equipment* and 1926.1439 *Dedicated pile drivers*.

19.11.1 **Qualifications**
Pile driving will be carried out only under the supervision of a qualified person. Only qualified persons will be permitted to operate pile drivers.

19.11.2 **Site Conditions**
Prior to start of operations, thoroughly inspect the site to determine conditions that require special safety measures. Locate all underground and overhead utilities. Safe clearance
requirements will be met for overhead utilities, and all underground services in the area will be rendered safe.

19.11.3 Setup
Pile driving equipment will be erected on a firm foundation. If necessary, use adequate guy lines, outriggers, thrust boards, counterbalances, or rail clamps to stabilize pile driving equipment during operation.

19.11.4 Boilers and Pressure Vessels
Boilers and pressure vessels used in pile driving operations will conform to standards set in RSHS Section 17 Hand Tools, Power Tools, Pressure Vessels, Compressors, and Welding.

19.11.5 Driving Leads
Provide pile driving equipment leads with fixed ladders and attachment points for safety harness lanyards.

19.11.6 Hose Connections
Secure high-pressure hose connections (air, steam, hydraulic) with a whip-check device that is adequate to prevent whipping in case of disconnection.

19.11.7 Hammer
Adequate precautions will be taken to prevent the hammer from missing the pile. When employees will work under the hammer, place a blocking device in the leads that can support the hammer. Provide pile driver leads with stops to prevent the hammer from being raised into the headblocks.

19.11.8 Floating Pile Driving Equipment
Hulls for floating pile driving equipment will be at least as wide as 45 percent of the height of the lead above the water. Protect the operating deck to prevent suspended piling from swinging or drifting in over the deck. The weight of machinery on floating pile driving equipment will be evenly distributed so that the deck is horizontal.

19.11.9 Overhead Protection
Provide overhead protection for the operator equivalent to 2-inch planking. Position the overhead protection in a way that does not interfere with the operator’s view of the pile driver.

19.11.10 Noise Survey
A noise survey using a sound level meter, A-scale, fast response will be conducted at the beginning of piledriving operations to determine a distance from the pile driver where noise
levels do not exceed 85 decibel A-weighting. Employees working inside of the boundary will always wear hearing protection when pile driving operations are conducted.

19.11.11 Preparation of Piles
As far as practicable, piles will be prepared at a distance at least equal to twice the length of the longest pile from the pile driving equipment.

19.11.12 Moving the Pile Driver
When moving the pile driver, lower the hammer to the bottom of the leads. When not in use, the pile driver hammer will be blocked at the bottom of the leads.

19.11.13 Signals
Suitable signals for the control of the pile driving operation will be developed prior to the start of the job.

19.11.14 Cutting Piles
Do not trim piles within a distance from the pile driver of twice the length of the longest pile.

19.11.15 Hoisting Piling
Remote release shackles will be used when possible; if not used, provide a closed shackle or other positive means of attachment. The length of the operating rope will be less than the length of the pile, and the rope will be secured around the pile to prevent snagging or being blown out of reach by the wind. Employees will be kept in the clear when hoisting piles. Use tag lines to control unguided piles and flying hammers.

19.11.16 Pulling Piles
Use extractors to pull piling that cannot be pulled without exceeding the safe load rating of the pulling rig. When pulling piling, do not elevate the crane boom more than 60 degrees from the horizontal.

19.12 Facility Maintenance Hoisting Systems.
Design, construct, install, and use hoisting systems to inspect and maintain facilities, such as penstocks, spillways, and airshafts, and for external building maintenance such as window washing, in accordance with ASSP A10.22 Safety Requirements for Rope-Guided and Nonguided Workers' Hoists for Construction and Demolition Operations, or ASME A120.1 Safety Requirements for Powered Platforms and Traveling Ladders and Gantries for Building Maintenance. The manufacturer or a qualified PE will certify such hoisting systems for the intended use. Hoisting systems used on an incline or other nontraditional use will undergo a peer
review by an independent PE. The review will include the structure, controls, operating procedures, and a performance test of the completed and assembled system.

19.13 Overhead and Gantry Cranes
OSHA 1926.1438 (b) addresses the applicable standard for overhead and gantry cranes that are not permanently installed in a facility. Sideboom cranes mounted on wheel or crawler tractors must meet all the requirements of ASME B30.14 Side Boom Tractors.

19.14 Helicopter Operations
Operators and aircraft will be licensed and will comply with the applicable requirements of the Federal Aviation Administration, DOI Office of Aviation Services, ASME B30.12 Handling Loads Suspended from Rotorcraft; OSHA 1910.183 Helicopters, and OSHA 1926.551 Helicopters.

19.14.1 Briefing
Before each day's operation, conduct a briefing for pilots and ground personnel and discuss in detail the plan of operation.

19.14.2 Loads
Secure suspended loads with pressed sleeves, swaged eyes, or equivalent means to prevent hand splices from spinning open or cable from loosening. Tag lines will be short enough to avoid being drawn into the rotors.

19.14.3 Cargo Hooks
Use self-locking cargo hooks that are equipped with a quick-release device that can be activated from the pilot's location. Electrically operated cargo hooks will have the electrical activating device designed and installed to prevent accidental operation. Also, equip these hooks with an emergency control to release the load. Test the hooks before each day's operation to ensure that they function properly.

19.14.4 Downwash
Remove or secure material and loose gear within 100 feet of the lift or delivery site.

19.14.5 Operator Responsibility
The helicopter pilot is responsible for the size, weight, and manner in which loads are connected to the helicopter. Do not make the lift if the pilot considers it unsafe.

19.14.6 Hooking and Unhooking
Employees will not perform work under the hovering helicopter, except as necessary to hook and unhook loads. Provide a safe means of access and egress for employees to approach the hook to engage or disengage cargo slings.

19.14.7 **Static Charge**
Unless ground personnel use a grounding device to dissipate the static charge, they will wear appropriate electrically rated rubber gloves.

19.14.8 **Weight Limitations**
The weight of the load and rigging will not exceed the aircraft manufacturer’s rating, considering altitude and ambient temperatures that exist at the time.

19.14.9 **Ground Lines**
Do not attach hoist wires or other gear, except for pulling lines or conductors that “payout” from a container or roll off a reel, to any fixed ground structure or allow wires or other gear to foul on any fixed structure. Use only pulling lines or conductor stringing systems designed with stress release hardware located so that it protects the aircraft against overload and line entanglement with rotors.

19.14.10 **Visibility**
When dust or other conditions reduce visibility, ground personnel will exercise special caution to keep clear of the rotor blades. The employer will reduce the possibility of dust to the extent practical.

19.14.11 **Approaching Helicopters**
Permit only authorized personnel to approach within 50 feet of a helicopter with turning rotor blades. People approaching or leaving a helicopter with the blades turning will keep within full view of the pilot and assume a crouched position. Persons will stay out of the area from the cockpit or cabin rearward unless the pilot authorizes them to enter that area.

19.14.12 **Radio Communication**
Provide reliable radio communication between the pilot and a designated member of the ground crew during all loading, unloading, and rigging operations.

19.14.13 **Hand Signals**
The signalperson on the ground will be distinguishable from other ground personnel. The aircrew and ground personnel shall review and agree upon the signal systems, both radio and hand signals, to be used prior to hoisting the load. Hand signals, where used, shall be standard “Helicopter Hand Signals” per OSHA 1910.183(n), Figure N-1.
19.15 Communication Requirements

A signalperson shall be present when the point of operation is not in full view of the operator, when the view in the direction of travel is obstructed, or the operator feels a signalperson is necessary. Radio communication is required if the anyone involved in the lift cannot see the signalperson/flagmen/rigger/operator. Additionally, a secondary means of communication shall be used.

19.15.1 Hand Signal Standards

Standard Method hand signals, per OSHA 1926 Subpart CC App A, shall be used unless it is infeasible, or an operation is not covered by the standard method. When non-standard hand signals are used, the signalperson, operator and lift supervisor shall review and agree upon the signals to be used.

19.15.2 Radio Signal Standards

Radio devices used to transmit signals shall be tested to ensure transmission is reliable, clear, and effective. A dedicated radio channel shall be used, unless the coordination or conditions of the work prohibit.

19.16 Definitions

Accredited organization

An officially recognized group being qualified to perform a particular activity. In the context of this document accredited organizations shall be formally recognized by OSHA, for example the National Center for Construction Education and Research (NCCER) and the National Commission for the Certification of Crane Operators (NCCCO).

Mobile crane

A lifting device incorporating a cable suspended lattices boom or hydraulic telescope boom designed to be moved between operating locations by transport over the road.

Qualified person

Refers to one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated ability to solve or resolve problems relating to the subject matter, the work, or the project.

19.17 References

American Society of Mechanical Engineers. ASME A120.1 Safety Requirements for Powered Platforms and Traveling Ladders and Gantry for Building Maintenance

American Society of Mechanical Engineers. ASME B30.12 Handling Loads Suspended from Rotorcrafts

American Society of Mechanical Engineers. ASME B30.14 Side Boom Tractors

(RSHS xxx) mm/dd/yyyy
NEW RELEASE or SUPERSEDES …
Minor revisions approved mm/dd/yyyy
American Society of Mechanical Engineers. ASME B30.2 *Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)*

American Society of Mechanical Engineers. ASME B30.22 *Articulating Boom Cranes*

American Society of Mechanical Engineers. ASME B30.5 *Mobile and Locomotive Crane*

American Society of Mechanical Engineers. ASME B30.8 *Floating Cranes and Floating Derricks*

American Society of Safety Professionals. ASSP A10.22 *Safety Requirements for Rope-Guided and Non-Guided Workers’ Hoists*

American Society of Safety Professionals. ASSP A10.5 *Safety Requirements for Material Hoists*


Infrastructure Health & Safety Association (IHSA). *Hoisting and Rigging Safety Manual.* [https://www.ihsa.ca/PDFs/Products/Id/M035.pdf](https://www.ihsa.ca/PDFs/Products/Id/M035.pdf)


