

## **DRAFT RECLAMATION SAFETY AND HEALTH STANDARDS RELEASE**

**Comments on this draft release must be submitted to [acrysts@usbr.gov](mailto:acrysts@usbr.gov) by [11/13/20].**

### **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 26**

### ***Steel Erection***

#### **26.1 Scope**

This section establishes steel erection requirements for all Reclamation-owned, controlled, or occupied facilities and construction sites. Where this section does not provide specific instructions, it adopts, by reference, the current editions of the Occupational Safety and Health Administration (OSHA) regulations.

#### **26.2 General Requirements**

##### **26.2.1 Planning**

Steel erection operations must be conducted following the requirements of this section and OSHA 1926 Subpart R, *Steel Erection*. American Society of Safety Professionals (ASSP)/American National Standards Institute (ANSI) A10.13, *Safety Requirements for Steel Erection*, shall be used as a guideline for steel erection operations.

##### **26.2.2 Steel Erection Start**

Steel erection operations shall not start until the project manager and, as needed, the contracting officer representative have ensured the steel erector received written notification of concrete/masonry cure and anchor bolt status as required by OSHA 1926.752, *Site Layout, Site-Specific Erection Plan and Construction Sequence*.

##### **26.2.3 Fall Protection**

Section 16, *Fall Protection*, shall be followed during steel erection operations; except where specific requirements are provided by this section and OSHA 1926.760, *Fall Protection*.

##### **26.2.4 Hoisting and Rigging**

Section 18, *Slings and Rigging Hardware*, and Section 19, *Hoisting and Pile Driving Equipment*, shall be followed during steel erection operations except where specific requirements are provided by this section and OSHA 1926.753, *Hoisting and Rigging*.

#### **26.3 Responsibilities**

##### **26.3.1 Project Manager**

- 26.3.1.1** Shall provide written authorization for the commencement of steel erection operations after written verification has been received for concrete and masonry cure and anchor rod repairs.

### **26.3.2 Contracting Officer Representative**

- 26.3.2.1** Shall provide the project manager's written authorization to the contractor for the commencement of steel erection operations after written verification has been received for concrete and masonry cure and anchor rod repairs.
- 26.3.2.2** Shall verify contract personnel involved in steel erection operations have received training required by this section.

### **26.3.3 Construction Inspector**

- 26.3.3.1** Shall inspect steel erection materials for damage during transportation, handling, and storage.

### **26.3.4 First-Line Supervisors**

- 26.3.4.1** Shall ensure employees involved in steel erection operations have received training required by this section.

### **26.3.5 Qualified Person**

- 26.3.5.1** Shall develop and revise the site-specific steel erection plan.
- 26.3.5.2** Shall provide steel erection training required by this section.

### **26.3.6 People Doing the Work**

- 26.3.6.1** Shall complete training required by this section.

## **26.4 Training Requirements**

Training shall meet the requirements of OSHA 1926.761, *Training*. All training related to steel erection shall be provided by qualified person(s) with knowledge, training, and experience in steel erection procedures and operations.

### **26.4.1 Initial**

- 26.4.1.1 Fall Hazards.** Steel erection personnel exposed to fall hazards shall complete training in the following areas:

- recognition and identification of fall hazards;
- use and operation of guardrail systems, perimeter safety cable systems, personal fall arrest systems, positioning device systems, fall restraint systems, safety net systems, and other fall protection systems to be used;
- procedures for erecting, maintaining, disassembling, and inspecting fall protection systems;
- procedures to prevent falls to lower levels and through or into holes and openings in walking/working surfaces and walls; and
- fall protection requirements of this section, Section 16, and OSHA 1926 Subpart R, specifically OSHA 1926.760.

**26.4.1.2 Multiple Lift Rigging.** Steel erection personnel involved in multiple lift rigging shall complete training in the following areas:

- hazards associated with multiple lift operations; and
- procedures and equipment required by this section, Section 18, and OSHA 1926.753.

**26.4.1.3 Connectors.** Steel erection personnel involved in connector operations shall complete training in the following areas:

- hazards associated with steel erection connecting operations; and
- techniques and work practices for establishing, accessing, and conducting connecting operations meeting the requirements of this section and OSHA 1926.756, *Beams and Columns*, and fall protection requirements of this section, Section 16, and OSHA 1926.760.

**26.4.1.4 Controlled Decking Zone.** Steel erection personnel involved in controlled decking zone operations shall complete training in the following areas:

- hazards associated with steel erection work within a controlled decking zone; and
- techniques and work practices for establishing, accessing, and conducting controlled decking zone operations meeting the requirements of this section and OSHA 1926.754, *Structural Steel Assembly*, and fall protection requirements of this section, Section 16, and OSHA 1926.760.

#### **26.4.2 Refresher**

Steel erection personnel which have not conducted steel erection operations 2 years prior to start of work; shall complete the initial training outlined in 26.4.1.

#### **26.4.3 Recordkeeping**

Reclamation training records shall be kept in the Department of the Interior (DOI) official repository.

### **26.5 Hazard Identification, Assessment, and Safety Measures**

#### **26.5.1 Job Hazard Analysis (JHA)**

A JHA shall be completed for all steel erection operations. As needed, the JHA shall be part of the site-specific erection plan.

#### **26.5.2 Material Inspection**

Steel erection materials shall be inspected prior to installation for damage during transportation, handling, and storage.

### **26.6 Pre-job Briefing and Planning Requirements**

### **26.6.1 Hoisting Planning**

The steel erector shall develop a site-specific hoisting plan which outlines hoist selection, site preparation, hoist placement, equipment inspections, hoisting of personnel, working under loads, and multiple lift rigging procedures.

### **26.6.2 Steel Erection Planning**

The steel erector shall conduct steel erection operations following the methods, steps, and requirements as outlined in OSHA 1926 Subpart R or develop a site-specific erection plan. The site-specific erection plan shall be developed by a qualified person and available at the work site. Preconstruction conferences and site visits shall be held to develop and review the site-specific erection plan. The site-specific erection plan shall include:

- a sequence of erection activity detailing delivery, staging, and storage of material and coordination with other construction activities;
- a site-specific hoisting plan which describes the crane and derrick selection and placement procedures detailing site preparation, path for overhead loads, rigging supplies/equipment, and critical lifts;
- a description of steel erection activities and procedures, including stability considerations requiring temporary bracing and guying, erection bridging terminus point, anchor rod (anchor bolt) notifications regarding repair, replacement and modifications, columns and beams (including joists and purlins), connections, decking, and ornamental and miscellaneous iron;
- the requirements for personal protective equipment (PPE) at the site;
- a description of the fall protection procedures used to comply with this section and OSHA 1926.760;
- a description of the procedures used to prevent and provide protection from falling objects to comply with OSHA 1926.759, *Falling Object Protection*;
- a description of the special procedures required for hazardous tasks not routinely conducted during steel erection projects;
- verification each employee completed training for performing steel erection operations required by OSHA 1926.761, *Training*, (e.g., fall hazard prevention and protection procedures, multiple lift rigging procedures, connector procedures, and controlled decking zone procedures);
- a list of qualified and competent persons;
- a description of procedures used in the event of rescue or emergency response;
- identification of the site and project; and
- the date(s) and signature(s) of the qualified person(s) responsible for the plan's preparation and modification.

### **26.7 Hazardous Environmental Conditions (Weather/Other)**

Steel erection operations shall be suspended if the hazards from wind, rain, lightning, hail, ice, heat exposure, or air quality cause an unsafe work environment.

### **26.8 PPE**

PPE shall be selected according to requirements of the job and must be documented in the JHA and, as required, the site-specific erection plan. PPE must meet the requirements of Section 8, *Personal Protective Equipment*.

## 26.9 Safe Practices

### 26.9.1 Concrete and Masonry Cure

Steel erection shall not start until written verification that concrete in the footings, piers, and walls and mortar in the masonry piers and walls has attained either 75 percent of the intended minimum compressive design strength or sufficient strength to support loads imposed during steel erection (based on requirements of the ASTM International, formerly American Society for Testing and Materials, standard test method of field-cured samples).

### 26.9.2 Anchor Rod Repairs

Steel erection shall not start until written verification that anchor rod (anchor bolt) repairs, replacements, or field modifications were completed with the approval of the project structural engineer of record.

### 26.9.3 Site Layout

**26.9.3.1 Control.** The steel erection site shall have established safe areas and methods to control the access of people and vehicles.

**26.9.3.2 Access Roads.** The steel erection site shall have access roads into and through for the safe delivery and movement of derricks, cranes, trucks, other necessary equipment and materials.

**26.9.3.3 Storage and Work Area.** The steel erection site shall have a firm, graded, and drained area for storage of materials and operation of equipment.

### 26.9.4 Hoisting

Cranes used for steel erection operations shall be inspected prior to each shift. Routes for suspended loads shall be pre-planned to ensure no employee is required to work directly below a suspended load; except employees engaged in the initial connection and/or necessary for hooking or unhooking the steel. Hoisted materials shall be rigged by a qualified rigger trained to use hooks with self-closing safety latches, or equivalent, to prevent unintentional displacement.

### 26.9.5 Fall Protection

**26.9.5.1 Program.** Include each phase of steel erection and detail steps to protect, prevent, and eliminate, to the extent possible, an employee's exposure to falls.

- 26.9.5.2 Walking and Working Surface.** Personnel on a walking/working surface with an unprotected side or edge more than 15 feet above a lower level shall be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems, or fall restraint systems.
- 26.9.5.3 Connectors.** Connector operation personnel on a walking/working surface with an unprotected side or edge more than 2 stories, or 30 feet, above a lower level shall be protected from fall hazards by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems, or fall restraint systems. At heights over 15 and up to 30 feet above a lower level, connector operation personnel shall use a personal fall arrest system, positioning device system, or fall restraint system and wear equipment necessary to tie-off; or be provided with other means of protection from fall hazards in accordance with 26.9.5.2.
- 26.9.5.4 Controlled Decking Zone.** Personnel at the controlled deck zone leading edge more than 2 stories, or 30 feet, above a lower level shall be protected from fall hazards by personal fall arrest systems, positioning device systems, or fall restraint systems.
- 26.9.5.5 Multi-Story Structures.** After completion of metal decking, safety cables shall be installed at the final interior and exterior perimeters of each floor.
- 26.9.5.6 Steel Joist Restriction.** Steel joists and steel joist girders shall not be used as fall arrest system anchorage points unless written direction is obtained from a qualified person.
- 26.9.6 Permanent Flooring**
- 26.9.6.1 Installation.** Permanent floors shall be installed as steel erection progresses. No more than 8 stories shall be installed between the erection and uppermost permanent floors; except where the design maintains structural integrity.
- 26.9.6.2 Bolting and Welding.** No more than 4 floors, or 48 feet, of unfinished bolting or welding shall be erected above the foundation or uppermost permanently secured floor; except where the design maintains structural integrity.
- 26.9.7 Temporary Flooring**
- 26.9.7.1 Installation.** A fully planked, decked floor or safety nets shall be maintained within 2 stories, or 30 feet, directly under any steel erection work.

**26.9.7.2 Planking.** Planking or decking shall support the minimum working load of 50 pounds per square foot. Wood planking shall be a minimum of 2 inches thick, full dimension, undressed, solid lumber, or equivalent material (e.g., laminated boards). Planking shall be installed flush and secured to prevent movement.

**26.9.7.3 Safety Nets.** Scaffolding safety nets shall be installed when the distance above lower levels exceed 2 stories or 30 feet. The safety nets must clear the surface of structures below. Safety nets shall be manufactured and used in accordance with ASSE/ANSI A10.11, *Safety Requirements for Personnel Nets*.

### **26.9.8 Structural Steel Erections**

The hoisting, placing, connecting, and bracing of structural steel components shall follow methods, steps, and requirements outlined in OSHA 1926 Subpart R or the site-specific erection plan.

### **26.9.9 Bolting**

**26.9.9.1 Drift Pins.** Employees knocking out bolts and drift pins shall prevent materials from falling to lower levels.

**26.9.9.2 Impact Wrenches.** Impact wrenches shall have a locking device for retaining the socket.

**26.9.9.3 Containers.** When aloft, containers for storing and carrying bolts, drift pins, and rivets shall be secured against accidental displacement.

**26.9.9.4 Drilling and Reaming.** A team of two shall operate drilling and reaming machines unless the handle is firmly secured to resist the torque reaction should the reaming or drilling bit bind.

### **26.9.10 Riveting**

**26.9.10.1 Riveting Hammers.** The pneumatic riveting hammer shall have a safety wire installed on the snap and handle. The wire leaving the handle must be at least No. 9 (B&S gauge), and the wire on the snap must be at least annealed No. 14, or equivalent.

**26.9.10.2 Removing Rivets.** Employees knocking off or backing out rivet heads shall prevent materials from falling to lower levels.

### **26.9.11 Fire Protection**

- 26.9.11.1 Fire Protection.** Follow the requirements of Section 10, *Fire Prevention and Protection*, to develop a fire prevention plan, fire emergency action plan, and fire response plan for steel erection projects.
- 26.9.11.2 Welding and Cutting.** Follow the requirements of Section 10 and Section 17, *Hand Tools, Power Tools, Pressure Vessels, Compressors, and Welding*, to prevent sparks or fires.
- 26.9.11.3 Riveting.** Combustible materials shall be removed from around and below riveting operations. If combustible materials cannot be removed, riveting operations shall not start until a fire watch is provided and fire extinguishers or hoselines are readily available to extinguish fires.

## 26.10 Definitions

<b>Competent Person</b>	An employee capable of identifying existing and predictable hazards, unsanitary, hazardous, or dangerous working conditions, and has authorization to take prompt corrective measures to eliminate them.
<b>Connector</b>	An employee placing and connecting structural members and/or components.
<b>Hoisting Equipment</b>	Commercially manufactured lifting equipment designed to lift and position a load of known weight to a location at a known elevation and horizontal distance from the equipment's center of rotation. Includes, but is not limited to, cranes, derricks, tower cranes, barge-mounted derricks or cranes, gin poles, and gantry hoist systems.
<b>Multiple Lift Rigging</b>	A rigging assembly manufactured by wire rope rigging suppliers which facilitates the attachment of up to five independent loads to the hoist rigging of a crane.
<b>Qualified Person</b>	An employee with a recognized degree, certificate, or professional standing, or knowledge, training, and experience to solve or resolve problems relating to steel erection operations.
<b>Steel Erection</b>	The construction, alteration, or repair of steel buildings, bridges, and other structures, including the installation of metal decking and planking.
<b>Structural Steel</b>	A steel, or substitute material (e.g., fiberglass, aluminum, or composite), member. These members include, but are not limited to, steel joists, joist girders, purlins, columns, beams, trusses, splices, seats, metal decking, girts, and bridging; and cold formed metal framing integrated with the structural steel framing of a building.

## 26.11 References

- American Society of Safety Professionals/American National Standards Institute. American National Standard A10.11, Safety Requirements for Personnel Nets
- American Society of Safety Professionals/American National Standards Institute. American National Standard A10.13, Safety Requirements for Steel Erection
- Occupational Safety and Health Administration. 29 CFR 1926, Subpart R, Steel Erection. <https://www.osha.gov/laws-regs/regulations/standardnumber/1926>
- Occupational Safety and Health Administration. 29 CFR 1926.752, Site Layout, Site-Specific Erection Plan and Construction Sequence. <https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.752>
- Occupational Safety and Health Administration. 29 CFR 1926.753, Hoisting and Rigging. <https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.753>
- Occupational Safety and Health Administration. 29 CFR 1926.754, Structural Steel Assembly. <https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.754>
- Occupational Safety and Health Administration. 29 CFR 1926.756, Beams and Columns. <https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.756>
- Occupational Safety and Health Administration. 29 CFR 1926.759, Falling Object Protection. <https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.759>
- Occupational Safety and Health Administration. 29 CFR 1926.760, Fall Protection. <https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.760>
- Occupational Safety and Health Administration. 29 CFR 1926.761, Training. <https://www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.761>
- Reclamation Safety and Health Standards. Section 8, Personal Protective Equipment. <https://www.usbr.gov/safety/rshs/index.html>
- Reclamation Safety and Health Standards. Section 10, Fire Prevention and Protection. <https://www.usbr.gov/safety/rshs/index.html>
- Reclamation Safety and Health Standards. Section 16, Fall Protection. <https://www.usbr.gov/safety/rshs/index.html>
- Reclamation Safety and Health Standards. Section 17, Hand Tools, Power Tools, Pressure Vessels, Compressors, and Welding. <https://www.usbr.gov/safety/rshs/index.html>
- Reclamation Safety and Health Standards. Section 18, Slings and Rigging Hardware. <https://www.usbr.gov/safety/rshs/index.html>
- Reclamation Safety and Health Standards. Section 19, Hoisting and Pile Driving Equipment. <https://www.usbr.gov/safety/rshs/index.html>