Steel Erection - An Overview

The Occupational Safety and Health Administration (OSHA) revised the construction industry safety standards, which regulate steel erection. The final rule enhances protections provided to workers engaged in steel erection and updates the general provisions that address steel erection. The final rule sets performance-oriented criteria, where possible, to protect employees from steel erection related hazards such as working under loads; hoisting, landing and placing decking; column stability; double connections; hoisting, landing and placing steel joists; and falls to lower levels. To effectuate this, the final rule contains requirements for hoisting and rigging, structural steel assembly, beam and column connections, joist erection, systems-engineered metal building erection, fall protection and training.

DATES: Effective dates. This standard is effective on July 18, 2001.

Key provisions of the revised steel erection standard

Examples of structures where steel erection may occur include but are not limited to the following: Single and multi-story buildings; systems-engineered metal buildings; lift slab/tilt-up structures; energy exploration structures; energy production, transfer and storage structures and facilities; auditoriums; malls; amphitheaters; stadiums; power plants; mills; chemical process structures; bridges; trestles; overpasses; underpasses; viaducts; aqueducts; aerospace facilities and structures; radar and communication structures; light towers; signage; billboards; scoreboards; conveyor systems; conveyor supports and related framing; stairways; stair towers; fire escapes; draft curtains; fire containment structures; monorails; aerialways; catwalks; curtain walls; window walls; store fronts; elevator fronts; entrances; skylights; metal roofs; industrial structures; hi-bay structures; rail, marine and other transportation structures; sound barriers; water process and water containment structures; air and cable supported structures; space frames; geodesic domes; canopies; racks and rack support structures and frames; platforms; walkways; balconies; atriums; penthouses; car dumpers; stackers/reclaimers; cranes and crane ways; bins; hoppers; ovens; furnaces; stacks; amusement park structures and rides; and artistic and monumental structures.

Steel erection activities include: hoisting, laying out, placing, connecting, welding, burning, guy ing, bracing, bolting, plumbing and rigging structural steel, steel joists and metal buildings; installing metal decking, curtain walls, window walls, siding systems, miscellaneous metals, ornamental iron and similar materials; and moving point-to-point while performing these activities.

The duties of controlling contractors under this subpart include, but are not limited to, the duties specified in:

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§1926.752(a)-Approval to begin steel erection.
§1926.752(c)-Site layout.
§1926.755(b)(2)-Repair replacement or modification of anchor rods.
§1926.759(b)-Protection from falling objects other than materials being hoisted.
§1926.760(e)-Custody of fall protection.

Site Layout and Construction Sequence
• Requires certification of proper curing of concrete in footings, piers, etc. for steel columns.
• Requires controlling contractor to provide erector with a safe site layout including preplanning routes for hoisting loads.
• Preplanning of overhead hoisting operations.

Site-Specific Erection Plan
• Requires preplanning of key erection elements, including coordination with controlling contractor before erection begins, in certain circumstances.

Where employers elect, due to conditions specific to the site, to develop alternate means and methods that provide employee protection in accordance with §1926.753(c) (5), §1926.757(a)(4) or §1926.757(e)(4), a site-specific erection plan shall be developed by a qualified person and be available at the work site. Guidelines for establishing a site-specific erection plan are contained in Appendix A to this subpart.

Hoisting and Rigging
• Provides additional crane safety for steel erection. Note: All the provisions of §1926.550 apply to hoisting and rigging with the exception of §1926.550(g)(2).
• Minimizes employee exposure to overhead loads through preplanning and work practice requirements.
• Prescribes proper procedure for multiple lifts (christmas-treeing).

Structural Steel Assembly
• Provides safer walking/working surfaces by eliminating tripping hazards and minimizes slips through new slip resistance requirements.
• Provides specific work practices regarding safely landing deck bundles and promoting the prompt protection from fall hazards in interior openings.

Column Anchorage
• Requires 4 anchor bolts per column along with other column stability requirements.
• Requires procedures for adequacy of anchor bolts that have been modified in the field.

Beams and Columns
• Eliminates extremely dangerous collapse hazards associated with making double connections at columns.
• During the final placing of solid web structural members, the load must not be released from the hoisting line until the members are secured with at least two bolts per connection.

Open Web Steel Joists
• Requirements minimizing collapse of lightweight steel joists by addressing need for erection bridging and method of attachment.
• Requirements for bridging terminus anchors with illustrations and drawings in a nonmandatory appendix.
• New requirements to minimize collapse in placing loads on steel joists.
• Hoisting cables must not be released until the seat at each end of the steel joist is field-bolted.

Systems-Engineered Metal Buildings
• Requirements to minimize collapse in the erection of these specialized structures, which account for a major portion of steel erection in this country.
• Rigid frames shall have 50 percent of their bolts or the number of bolts specified by the manufacturer (whichever is greater) installed and tightened on both sides of the web adjacent to each flange before the hoisting equipment is released.

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There are a large number of small-specialized steel erectors who exclusively perform systems-engineered metal building erection. In light of these considerations and in an effort to facilitate compliance with this subpart, SENRAC developed a separate section for systems-engineered metal buildings. OSHA proposed a separate section and continues this approach in the final rule.

This section sets forth requirements to erect systems-engineered metal buildings safely. Systems-engineered metal buildings are defined in the definition section of this proposal. Systems-engineered metal buildings include structures ranging from small sheds to larger structures such as warehouses, gymsnasiums, churches, airplane hangers and arenas.

**Falling Object Protection**
- Performance provisions that address hazards of falling objects in steel erection.

**Fall Protection**
- Controlled decking zone (CDZ) provisions to prevent decking fatalities.
- Deckers in a CDZ and connectors must be protected at heights greater than two stories or 30 feet. Connectors between 15 and 30 feet must wear fall arrest or restraint equipment and be able to be tied off or be provided another means of fall protection.
- Requires fall protection for all others engaged in steel erection at heights greater than 15 feet.

**Training**
- Requires qualified person to train exposed workers in fall protection.
- Requires qualified person to train exposed workers engaged in special, high risk activities including those involved in multiple-lift rigging procedures, connector procedures, and those working in controlled decking zones.

**Employee Training**

The steel erection rule does have specific training requirements for all employees exposed to fall hazards, those involved in multiple lift rigging procedures, connectors, and those that work in controlled decking zones.

The training requirements are found at: 29 CFR 1926.761 — Training.

The training requirements for the steel erection rule supplement the requirements of §1926.21 regarding the hazards addressed in this subpart.

**Training Tips**

In this 5-minute training, concentrate on what is going on at your jobsite. Stick to what is relevant to your employees. What will impact them today? For example, if you are going to have, by necessity, certain employees working under loads, then you need to go over the requirements in 1926.753(d)—Working under loads.

**Where To Go For More Information**

29 CFR 1926, Subpart R—Steel erection.

29 CFR 1926, Subpart M—Fall protection.