	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
			Revision Date:	Jan 1, 2017
			Revision No.	1
Steel Erection Policy				
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 1 of 19

Introduction

OSHA was joined by representatives of all areas of construction including general contractors, steel erectors, fabricators, steel manufacturers, organized labor, and safety professionals who specialize in steel erection. The end product of this cooperative endeavor is a standard that is “user friendly” meaning that the text of the standard is simple to understand and to implement in the field. For these reasons, we are able to incorporate most of the language of the standard as Company policy. For further simplification, certain areas of the standard have been condensed and/or re-arranged while at the same time, relaying the spirit and intent of the original language. This policy meets and exceeds the requirements of the new steel erection standard.

Scope

For purposes of this policy, “steel erection” activities include construction, alteration, and/or repair of single and multi-story buildings, bridges, and other structures where steel erection occurs. The requirements of this policy apply to employers engaged in steel erection unless otherwise specified. The actual list of items considered to fall under steel erection and those related activities that constitute steel erection activities are quite lengthy. Rather than print the entire list in this policy, the actual OSHA standard should be referred to for specific questions.

Definitions

Anchored bridging means that the steel joist bridging is connected to a bridging terminus point.

Bolted diagonal bridging means diagonal bridging that is bolted to a steel joist or joists.

Bridging clip means a device that is attached to the steel joist to allow the bolting of the bridging to the steel joist.

Bridging terminus point means a wall, a beam, tandem joists (with all bridging installed and a horizontal truss in the plane of the top chord) or other element at an end or intermediate point(s) of a line of bridging that provides an anchor point for the steel joist bridging.

Choker means a wire rope or synthetic fiber rigging assembly that is used to attach a load to a hoisting device.

Cold forming means the process of using press brakes, rolls, or other methods to shape steel into desired cross sections at room temperature.


Column means a load-carrying vertical member that is part of the primary skeletal framing system. Columns do not include posts.

Competent person means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Connector means an employee who, working with hoisting equipment, is placing and connecting structural members and/or components.

Constructability means the ability to erect structural steel members in accordance with subpart R without having to alter the over- all structural design.

Construction load (for joist erection) means any load other than the weight of the employee(s), the joists and the bridging bundle.

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
Steel Erection Policy			Revision Date:	Jan 1, 2017
			Revision No.	1
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 2 of 19

Controlled Decking Zone (GDZ) ~~means an area in which certain work (for example, initial installation and placement of metal decking) may take place without the use of guardrail systems, personal fall arrest systems, fall restraint systems, or safety net systems and where access to the zone is controlled.~~ *This is NOT allowed by our Company.*

Controlled load lowering means lowering a load by means of a mechanical hoist drum device that allows a hoisted load to be lowered with maximum control using the gear train or hydraulic components of the hoist mechanism. Controlled load lowering requires the use of the hoist drive motor, rather than the load hoist brake, to lower the load.

Controlling contractor means a prime contractor, general contractor, construction manager or any other legal entity which has the overall responsibility for the construction of the project -- its planning, quality and completion.

Critical lift means a lift that (1) exceeds 75 percent of the rated capacity of the crane or derrick, or (2) requires the use of more than one crane or derrick.

Decking hole means a gap or void more than 2 inches in its least dimension and less than 12 inches in its greatest dimension in a floor, roof or other walking/working surface. Pre-engineered holes in cellular decking (for wires, cables, etc.) are not included in this definition.

Derrick floor means an elevated floor of a building or structure that has been designated to receive hoisted pieces of steel prior to final placement.

Double connection means an attachment method where the connection point is intended for two pieces of steel which share common bolts on either side of a central piece.

Double connection seat means a structural attachment that, during the installation of a double connection, supports the first member while the second member is connected.

Erection bridging means the bolted diagonal bridging that is required to be installed prior to releasing the hoisting cables from the steel joists.


Fall restraint system means a fall protection system that prevents the user from falling any distance. The system is comprised of either a body belt or body harness, along with an anchorage, connectors and other necessary equipment. The other components typically include a lanyard, and may also include a lifeline and other devices.

Final interior perimeter means the perimeter of a large permanent open space within a building such as an atrium or courtyard. This does not include openings for stairways, elevator shafts, etc.

Girt (in systems-engineered metal buildings) means a "Z" or "C" shaped member formed from sheet steel spanning between primary framing and supporting wall material.

Headache ball (Overhaul ball) means a weighted hook that is used to attach loads to the hoist load line of the crane.

Hoisting equipment means commercially manufactured lifting equipment designed to lift and position a load of known weight to a location at some known elevation and horizontal distance from the equipment's center of rotation. "Hoisting equipment" includes but is not limited to cranes, derricks, tower cranes, barge-mounted derricks or cranes, gin poles and gantry hoist systems. A "come-a-long" (a mechanical device, usually consisting of a chain or cable attached at each end, that is used to facilitate movement of materials through leverage) is not considered "hoisting equipment."

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
			Revision Date:	Jan 1, 2017
			Revision No.	1
Steel Erection Policy				
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 3 of 19

Leading edge means the unprotected side and edge of a floor, roof, or formwork for a floor or other walking/working surface (such as deck) which changes location as additional floor, roof, decking or formwork sections are placed, formed or constructed.

Metal decking means a commercially manufactured, structural grade, cold rolled metal panel formed into a series of parallel ribs; for this subpart, this includes metal floor and roof decks, standing seam metal roofs, other metal roof systems and other products such as bar gratings, checker plate, expanded metal panels, and similar products. After installation and proper fastening, these decking materials serve a combination of functions including, but not limited to: a structural element designed in combination with the structure to resist, distribute and transfer loads, stiffen the structure and provide a diaphragm action; a walking/working surface; a form for concrete slabs; a support for roofing systems; and a finished floor or roof.

Multiple lift rigging means a rigging assembly manufactured by wire rope rigging suppliers that facilitates the attachment of up to five independent loads to the hoist rigging of a crane.

Opening means a gap or void 12 inches or more in its least dimension in a floor, roof or other walking/working surface. For the purposes of this subpart, skylights and smoke domes that do not meet the strength requirements of § 1926.754(e)(3) shall be regarded as openings.

Permanent floor means a structurally completed floor at any level or elevation (including slab on grade).

Personal fall arrest system means a system used to arrest an employee in a fall from a working level. A personal fall arrest system consists of an anchorage, connectors, a body harness and may include a lanyard, deceleration device, lifeline, or suitable combination of these. The use of a body belt for fall arrest is prohibited.

Positioning device system means a body belt or body harness rigged to allow an employee to be supported on an elevated, vertical surface, such as a wall or column and work with both hands free while leaning.

Post means a structural member with a longitudinal axis that is essentially vertical, that: (1) weighs 300 pounds or less and is axially loaded (a load presses down on the top end), or (2) is not axially loaded, but is laterally restrained by the above member. Posts typically support stair landings, wall framing, mezzanines and other substructures.


Project structural engineer of record means the registered, licensed professional responsible for the design of structural steel framing and whose seal appears on the structural contract documents.

Purlin (in systems-engineered metal buildings) means a "Z" or "C" shaped member formed from sheet steel spanning between primary framing and supporting roof material.

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

Safety deck attachment means an initial attachment that is used to secure an initially placed sheet of decking to keep proper alignment and bearing with structural support members.

Shear connector means headed steel studs, steel bars, steel lugs, and similar devices which are attached to a structural member for the purpose of achieving composite action with concrete.

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
			Revision Date:	Jan 1, 2017
			Revision No.	1
Steel Erection Policy				
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 4 of 19

Steel erection means the construction, alteration or repair of steel buildings, bridges and other structures, including the installation of metal decking and all planking used during the process of erection.

Steel joist means an open web, secondary load-carrying member of 144 feet (43.9 m) or less, designed by the manufacturer, used for the support of floors and roofs. This does not include structural steel trusses or cold-formed joists.

Steel joist girder means an open web, primary load-carrying member, designed by the manufacturer, used for the support of floors and roofs. This does not include structural steel trusses.

Steel truss means an open web member designed of structural steel components by the project structural engineer of record. For the purposes of this subpart, a steel truss is considered equivalent to a solid web structural member.

Structural steel means a steel member, or a member made of a substitute material (such as, but not limited to, fiberglass, aluminum or composite members). These members include, but are not limited to, steel joists, joist girders, purlins, columns, beams, trusses, splices, seats, metal decking, girts, and all bridging, and cold formed metal framing which is integrated with the structural steel framing of a building.

Systems-engineered metal building means a metal, field-assembled building system consisting of framing, roof and wall coverings. Typically, many of these components are cold-formed shapes. These individual parts are fabricated in one or more manufacturing facilities and shipped to the job site for assembly into the final structure. The engineering design of the system is normally the responsibility of the systems-engineered metal building manufacturer.

Tank means a container for holding gases, liquids or solids.


Unprotected sides and edges means any side or edge (except at entrances to points of access) of a walking/working surface, for example a, floor, roof, ramp or runway, where there is no wall or guardrail system at least 39 inches high.

Pre-Planning

In order to ensure that the steel erection phase of the construction project is safe and OSHA compliant, comprehensive pre-planning is required. It is imperative that all parties involved in the process including architect, engineer, contractor representatives, fabricators, erectors, and other subcontractors on the job are familiar with their responsibilities as they relate to the steel erection process.

It is important to understand that a site specific plan is not required on every steel erection job. Site specific plans are required in three instances: when a qualified rigger chooses to tie the latch back on the crane hook in order to set steel other than single joists or purlins; where the erector chooses to set bundles of deck and other construction loads on joists that are not completely bridged; and when the erector chooses to erect certain long span joists that are not being set in tandem.

OSHA has included a suggested list in their standard that can be used as a format for pre-construction meetings to ensure that all necessary items are addressed prior to beginning steel erection.

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
Steel Erection Policy			Revision Date:	Jan 1, 2017
			Revision No.	1
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 5 of 19

Outline of Sample Plan for Steel Erection Activities

(1) The sequence of erection activity, developed in coordination with the controlling contractor that includes the following:

- (i) Material deliveries;
- (ii) Material staging and storage; and
- (iii) Coordination with other trades and construction activities.

(2) A description of the crane and derrick selection and placement procedures, including the following:

- (i) Site preparation;
- (ii) Path for overhead loads; and
- (iii) Critical lifts, including rigging supplies and equipment.

(3) A description of steel erection activities and procedures, including the following:

- (i) Stability considerations requiring temporary bracing and guying;
- (ii) Erection bridging terminus point;
- (iii) Anchor rod (anchor bolt) notifications regarding repair, replacement and modifications;
- (iv) Columns and beams (including joists and purlins);
- (v) Connections;
- (vi) Decking; and
- (vii) Ornamental and miscellaneous iron.

(4) A description of the fall protection procedures that will be used

(5) A description of the procedures that will be used to provide falling object protection

(6) A description of the special procedures required for hazardous non-routine tasks.

(7) A certification for each employee who has received training for performing steel erection operations

(8) A list of the qualified and competent persons.

(9) A description of the procedures that will be utilized in the event of rescue or emergency response.


(10) Other plan information.

- (a) Include the identification of the site and project; and
- (b) Signed and dated by the qualified person(s) responsible for its preparation and modification.

Controlling Contractor Duties

The duties of this Company under the steel erection standard include, but are not limited to those specified in Sections:

- 1926.752 (a) - Providing the erector written notification regarding concrete cure and anchor bolt modifications

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
Steel Erection Policy			Revision Date:	Jan 1, 2017
			Revision No.	1
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 6 of 19

- 1926.752(c) - Provide adequate access roads for equipment, loads, and laydown areas
- 1926.755(b)(2) - repair or replacement of anchor bolts
- 1926.759(b) - The controlling contractor shall bar other construction processes below steel erection unless overhead protection for the employees below is provided.
- 1926.760(e) - Custody of fall protection. Fall protection provided by the steel erector shall remain in the area where steel erection activity has been completed, to be used by other trades, only if the controlling contractor or its authorized representative has directed the steel erector to leave the fall protection in place; and has inspected and accepted control and responsibility of the fall protection prior to authorizing persons other than steel erectors to work in the area.

Other responsibilities that would apply to the controlling contractor under the multi-employer workplace policy, and elsewhere in this safety policy, still apply here. I.E. Inspections, enforcement, scheduling to minimize exposure, etc.

Site Layout, Site-specific Erection Plan and Construction Sequence

Approval to begin steel erection: Before authorizing the commencement of steel erection, the controlling contractor shall ensure that the steel erector is provided with the following written notifications:

The concrete in the footings, piers and walls and the mortar in the masonry piers and walls has attained, on the basis of an appropriate ASTM standard test method of field-cured samples, either 75 percent of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection.


Note: OSHA has recognized that there is no current ASTM standard for testing compressive strength of mortar. OSHA stated in a compliance directive draft dated January 28, 2003 that they will not enforce the requirements of the standard with respect to mortar until such time that an appropriate standard is developed for testing compressive strength. Until a standard is developed, it is recommended that contractors rely on cure times to estimate the strength of mortar.

Any repairs, replacements and modifications to the anchor bolts were conducted in accordance with the steel erection standard as follows:

Anchor bolts shall not be repaired, replaced or field-modified without the approval of the project structural engineer of record.

Prior to the erection of a column, the controlling contractor shall provide written notification to the steel erector if there has been any repair, replacement or modification of the anchor bolts of that column.

Commencement of steel erection: A steel erection contractor shall not erect steel unless it has received written notification that the concrete in the footings, piers and walls or the mortar in the masonry piers and walls has attained, on the basis of an appropriate ASTM standard test method of field-cured samples, either 75 percent of the intended minimum compressive design strength or sufficient strength to support the loads imposed during steel erection.

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
Steel Erection Policy			Revision Date:	Jan 1, 2017
			Revision No.	1
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 7 of 19

Site layout

The controlling contractor shall ensure that the following is provided and maintained:

Adequate access roads into and through the site for the safe delivery and movement of derricks, cranes, trucks, other necessary equipment, and the material to be erected and means and methods for pedestrian and vehicular control. Exception: this requirement does not apply to roads outside of the construction site.

A firm, properly graded, drained area, readily accessible to the work with adequate space for the safe storage of materials and the safe operation of the erector's equipment.

Pre-planning of overhead hoisting operations

All hoisting operations in steel erection shall be pre-planned to ensure that no unauthorized personnel are working under loads.


Site Specific Erection Plan

There are three conditions where the steel erector may elect to provide alternate means of protection for employees. Those three conditions are listed below. When electing to provide alternate means of protection, the steel erector must provide a site-specific erection plan that lists their alternative means of protection and show that this protection does indeed protect the worker(s) as much if not more than the standard requirement.

- Safety latches on hooks shall not be deactivated or made inoperable except:
- When a qualified rigger has determined that the hoisting and placing of purlins and single joists can be performed more safely by doing so (this can be done without a written plan); or
- When equivalent protection is provided in a written, site-specific erection plan.

- Where steel joists at or near columns span more than 60 feet, the joists shall be set in tandem with all bridging installed unless an alternative method of erection, which provides equivalent stability to the steel joist, is designed by a qualified person and is included in the site-specific erection plan.

- No bundle of decking may be placed on steel joists until all bridging has been installed and anchored and all joist bearing ends attached, unless all of the following conditions are met:
 - The employer has first determined from a qualified person and documented in a site-specific erection plan that the structure or portion of the structure is capable of supporting the load;
- The bundle of decking is placed on a minimum of three steel joists;
- The joists supporting the bundle of decking are attached at both ends;
- At least one row of bridging is installed and anchored;
- The total weight of the bundle of decking does not exceed 4,000 pounds; and
- Placement of the bundle of decking shall be in accordance with paragraph (e)(5) of this section as follows:
 - The edge of the construction load shall be placed within 1 foot of the bearing surface of the joist end.

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
Steel Erection Policy			Revision Date:	Jan 1, 2017
			Revision No.	1
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 8 of 19

When alternative methods outlined above are employed, a site-specific erection plan shall be developed by a qualified person and be available at the work site.

Hoisting and Rigging

All the provisions of the OSHA crane standard apply to hoisting and rigging with the exception of language allowing the use of suspended personnel platforms only as a last resort. This requirement does not apply to steel erection activities.

Pre-shift visual inspections of cranes

Cranes being used in steel erection activities shall be visually inspected prior to each shift by a competent person; the inspection shall include observation for deficiencies during operation. At a minimum this inspection shall include the following:


- (A) All control mechanisms for maladjustments;
- (B) Control and drive mechanism for excessive wear of components and contamination by lubricants, water or other foreign matter;
- (C) Safety devices, including but not limited to boom angle indicators, boom stops, boom kick out devices, anti-two block devices, and load moment indicators where required;
- (D) Air, hydraulic, and other pressurized lines for deterioration or leakage, particularly those which flex in normal operation;
- (E) Hooks and latches for deformation, chemical damage, cracks, or wear;
- (F) Wire rope reeving for compliance with hoisting equipment manufacturer's specifications;
- (G) Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, or moisture accumulation;
- (H) Hydraulic system for proper fluid level;
- (I) Tires for proper inflation and condition or tracks for condition;
- (J) Ground conditions around the hoisting equipment for proper support, including ground settling under and around outriggers, ground water accumulation, or similar conditions;
- (K) The hoisting equipment for level position; and
- (L) The hoisting equipment for level position after each move and setup.

If any deficiency is identified, an immediate determination shall be made by the competent person as to whether the deficiency constitutes a hazard.

If the deficiency is determined to constitute a hazard, the hoisting equipment shall be removed from service until the deficiency has been corrected.

The operator shall be responsible for those operations under the operator's direct control. Whenever there is any doubt as to safety, the operator shall have the authority to stop and refuse to handle loads until safety has been assured.

A qualified rigger (a rigger who is also a qualified person) shall inspect the rigging prior to each shift.

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
Steel Erection Policy			Revision Date:	Jan 1, 2017
			Revision No.	1
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 9 of 19

The headache ball, hook or load shall not be used to transport personnel except when used with a suspended personnel platform.

When cranes or derricks are used to hoist employees on a personnel platform, the activity must be carried out in compliance with OSHA's crane standard.

Safety latches on hooks shall not be deactivated or made inoperable except when a qualified rigger has determined that the hoisting and placing of purlins and single joists can be performed more safely by doing so or when equivalent protection is provided in a site-specific erection plan.

Working Under Loads


Routes for suspended loads shall be pre-planned to ensure that no employee is required to work directly below a suspended load except for employees engaged in the initial connection of the steel; or employees necessary for the hooking or unhooking of the load.

When working under suspended loads, materials being hoisted must be rigged to prevent unintentional displacement; hooks with self-closing safety latches or their equivalent shall be used to prevent components from slipping out of the hook; and all loads shall be rigged by a qualified rigger.

Multiple Lift Rigging Procedure (Christmas Treeing)

A multiple lift shall only be performed if the following criteria are met:

- (i) A multiple lift rigging assembly is used;
- (ii) A maximum of five members are hoisted per lift;
- (iii) Only beams and similar structural members are lifted; and
- (iv) All employees engaged in the multiple lift have been trained in the nature of the hazards associated with multiple lifts; and the proper procedures and equipment to perform multiple lifts.
- (v) No crane is permitted to be used for a multiple lift where such use is contrary to the manufacturer's specifications and limitations.
- (vi) Components of the multiple lift rigging assembly shall be specifically designed and assembled with a maximum capacity for total assembly and for each individual attachment point. This capacity, certified by the manufacturer or a qualified rigger, shall be based on the manufacturer's specifications with a 5 to 1 safety factor for all components.
- (vii) The total load shall not exceed the rated capacity of the hoisting equipment specified in the hoisting equipment load charts or the rigging capacity specified in the rigging rating chart.

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
Steel Erection Policy			Revision Date:	Jan 1, 2017
			Revision No.	1
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 10 of 19

(viii) The multiple lift rigging assembly shall be rigged with members attached at their center of gravity and maintained reasonably level. They must be rigged from the top down and they must be rigged at least 7 feet apart.

(ix) The members on the multiple lift rigging assembly shall be set from the bottom up.

(x) Controlled load lowering shall be used whenever the load is over the connectors. Free falling loads is prohibited.

*SEE MLR PROCEDURE

Structural Steel Assembly

Structural stability must be maintained at all times during the erection process.

Multi-story Structures

The permanent floors shall be installed as the erection of structural members progresses, and there shall be not more than eight stories between the erection floor and the upper-most permanent floor, except where the structural integrity is maintained as a result of the design.

At no time shall there be more than four floors or 48 feet, whichever is less, of unfinished bolting or welding above the foundation or uppermost permanently secured floor, except where the structural integrity is maintained as a result of the design.

A fully planked or decked floor or nets shall be maintained within two stories or 30 feet, whichever is less, directly under any erection work being performed.

Walking/working surfaces

Shear connectors and other similar devices

Tripping hazards Shear connectors (such as headed steel studs, steel bars or steel lugs), reinforcing bars, deformed anchors or threaded studs shall not be attached to the top flanges of beams, joists or beam attachments so that they project vertically from or horizontally across the top flange of the member until after the metal decking, or other walking/working surface, has been installed.


Installation of shear connectors on composite floors, roofs and bridge decks When shear connectors are used in construction of composite floors, roofs and bridge decks, employees shall lay out and install the shear connectors after the metal decking has been installed, using the metal decking as a working platform.

Plumbing-up

When deemed necessary by a competent person, plumbing-up equipment shall be installed in conjunction with the steel erection process to ensure the stability of the structure.

When used, plumbing-up equipment shall be in place and properly installed before the structure is loaded with construction material such as loads of joists, bundles of decking or bundles of bridging.

Plumbing-up equipment shall be removed only with the approval of a competent person.

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
Steel Erection Policy			Revision Date:	Jan 1, 2017
			Revision No.	1
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 11 of 19

Metal Decking

Hoisting, landing and placing of metal decking bundles

Bundle packaging and strapping shall not be used for hoisting unless specifically designed for that purpose.

If loose items such as dunnage, flashing, or other materials are placed on the top of metal decking bundles to be hoisted, such items shall be secured to the bundles.

No bundle of decking may be placed on steel joists until all bridging has been installed and anchored and all joist bearing ends attached, unless all of the following conditions are met:

1. The employer has first determined from a qualified person and documented in a site-specific erection plan that the structure or portion of the structure is capable of supporting the load;
2. The bundle of decking is placed on a minimum of three steel joists;
3. The joists supporting the bundle of decking are attached at both ends;
4. At least one row of bridging is installed and anchored (connected to two terminus points);
5. The total weight of the bundle of decking does not exceed 4,000 pounds; and
6. The edge of the construction load (bundle of decking) shall be placed within 1 foot of the bearing surface of the joist end.

Metal decking bundles shall be landed on framing members so that enough support is provided to allow the bundles to be unbanded without dislodging the bundles from the supports.

At the end of the shift or when environmental or jobsite conditions require, metal decking shall be secured against displacement.

Roof and floor holes and openings


Framed metal deck openings shall have structural members turned down to allow continuous deck installation except where not allowed by structural design constraints or constructability.

Roof and floor holes and openings shall be decked over. Where large size, configuration or other structural design does not allow openings to be decked over (such as elevator shafts, stair wells, etc.) employees shall be protected by guardrail systems, safety net systems, personal fall arrest systems, positioning device systems or fall restraint systems.

Metal decking holes and openings shall not be cut until immediately prior to being permanently filled with the equipment or structure needed or intended to fulfill its specific use and which meets the strength requirement of a two times safety factor for any loads imposed on it.

Covering roof and floor openings

Covers for roof and floor openings shall be capable of supporting, without failure, twice the weight of the employees, equipment and materials that may be imposed on the cover at any one time.

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
			Revision Date:	Jan 1, 2017
			Revision No.	1
Steel Erection Policy				
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 12 of 19

All covers shall be secured when installed to prevent accidental displacement by the wind, equipment or employees.

All covers shall be painted with high-visibility paint or shall be marked with the word "HOLE" or "COVER" to provide warning of the hazard.

Smoke dome or skylight fixtures that have been installed, are not considered covers for the purpose of this section unless they meet the strength requirements to support twice the weight of employees, equipment and materials that may be imposed on the cover at any one time.

Decking gaps around columns

Wire mesh, exterior plywood, or equivalent, shall be installed around columns where planks or metal decking do not fit tightly. The materials used must be of sufficient strength to provide fall protection for personnel and prevent objects from falling through.

Installation of metal decking

Metal decking shall be laid tightly and immediately secured upon placement to prevent accidental movement or displacement.

During initial placement, metal decking panels shall be placed to ensure full support by structural members.

Derrick floors

A derrick floor shall be fully decked and/ or planked and the steel member connections completed to support the intended floor loading.

Temporary loads placed on a derrick floor shall be distributed over the underlying support members so as to prevent local overloading of the deck material.

Column Anchorage

General requirements for erection stability

All columns shall be anchored by a minimum of 4 anchor bolts.

Each column anchor bolt assembly, including the column-to-base plate weld and the column foundation, shall be designed to resist a minimum eccentric gravity load of 300 pounds located 18 inches from the extreme outer face of the column in each direction at the top of the column shaft.

Columns shall be set on level finished floors, pre-grouted leveling plates, leveling nuts, or shim packs which are adequate to transfer the construction loads.


All columns shall be evaluated by a competent person to determine whether guying or bracing is needed; if guying or bracing is needed, it shall be installed.

Repair, replacement or field modification of anchor bolts

Anchor bolts shall not be repaired, replaced or field-modified without the approval of the project structural engineer of record.

Prior to the erection of a column, the controlling contractor shall provide written notification to the steel erector if there has been any repair, replacement or modification of the anchor bolts of that column.

Beams and Columns

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
Steel Erection Policy			Revision Date:	Jan 1, 2017
			Revision No.	1
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 13 of 19

General

During the final placing of solid web structural members, the load shall not be released from the hoisting line until the members are secured with at least two bolts per connection, of the same size and strength as shown in the erection drawings, drawn up wrench-tight or the equivalent as specified by the project structural engineer of record. Diagonal bracing may be excepted from this requirement as outlined below.

A competent person shall determine if more than two bolts are necessary to ensure the stability of cantilevered members; if additional bolts are needed, they shall be installed.

Diagonal bracing

Solid web structural members used as diagonal bracing shall be secured by at least one bolt per connection drawn up wrench-tight or the equivalent as specified by the project structural engineer of record.

Double connections at columns and/or at beam webs over a column

When two structural members on opposite sides of a column web, or a beam web over a column, are connected sharing common connection holes, at least one bolt with its wrench-tight nut shall remain connected to the first member unless a shop-attached or field-attached seat or equivalent connection device is supplied with the member to secure the first member and prevent the column from being displaced

If a seat or equivalent device is used, the seat (or device) shall be designed to support the load during the double connection process. It shall be adequately bolted or welded to both a supporting member and the first member before the nuts on the shared bolts are removed to make the double connection.

Column splices

Each column splice shall be designed to resist a minimum eccentric gravity load of 300 pounds located 18 inches from the extreme outer face of the column in each direction at the top of the column shaft.

Perimeter columns

The perimeter columns extend a minimum of 48 inches above the finished floor to permit installation of perimeter safety cables prior to erection of the next tier, except where constructability does not allow.


The perimeter columns have holes or other devices in or attached to perimeter columns at 42-45 inches above the finished floor and the midpoint between the finished floor and the top cable to permit installation of perimeter safety cables except where constructability does not allow.

Perimeter safety cables. On multi-story structures, perimeter safety cables shall be installed at the final interior and exterior perimeters of the floors as soon as the metal decking has been installed.

Open Web Steel Joists

General

Except where Constructibility does not allow, where steel joists are used and columns are not framed in at least two directions with solid web structural steel members, a steel joist shall be

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
Steel Erection Policy			Revision Date:	Jan 1, 2017
			Revision No.	1
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 14 of 19

field-bolted at the column to provide lateral stability to the column during erection (these are commonly referred to as “OSHA joists”).

A vertical stabilizer plate shall be provided on each column for steel joists. The plate shall be a minimum of 6 inch by 6 inch and shall extend at least 3 inches below the bottom chord of the joist with a 13/16-inch hole to provide an attachment point for guying or plumbing cables.

The bottom chords of steel joists at columns shall be stabilized to prevent rotation during erection.

Hoisting cables shall not be released until the seat at each end of the steel joist is field-bolted, and each end of the bottom chord is restrained by the column stabilizer plate.

Where Constructibility does not allow a steel joist to be installed at the column an alternate means of stabilizing joists shall be installed on both sides near the column and shall provide adequate stability, be designed by a qualified person, be shop installed, and be included in the erection drawings.

Hoisting cables shall not be released until the seat at each end of the steel joist is field-bolted and the joist is stabilized.

Where steel joists at or near columns span 60 feet or less, the joist shall be designed with sufficient strength to allow one employee to release the hoisting cable without the need for erection bridging.

Where steel joists at or near columns span more than 60 feet, the joists shall be set in tandem with all bridging installed unless an alternative method of erection, which provides equivalent stability to the steel joist, is designed by a qualified person and is included in the site-specific erection plan.

A steel joist or steel joist girder shall not be placed on any support structure unless such structure is stabilized.

When steel joist(s) are landed on a structure, they shall be secured to prevent unintentional displacement prior to installation.

No modification that affects the strength of a steel joist or steel joist girder shall be made without the approval of the project structural engineer of record.

Field-bolted joists


Except for steel joists that have been pre-assembled into panels, connections of individual steel joists to steel structures in bays of 40 feet or more shall be fabricated to allow for field bolting during erection. These connections must be field-bolted unless Constructibility does not allow.

Steel joists and steel joist girders shall not be used as anchorage points for a fall arrest system unless written approval to do so is obtained from a qualified person.

A bridging terminus point shall be established before bridging is installed.

Attachment of steel joists and steel joist girders

Each end of "K" series steel joists shall be attached to the support structure with a minimum of two 1/8-inch fillet welds 1-inch-long or with two 1/2 inch bolts, or the equivalent.

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
Steel Erection Policy			Revision Date:	Jan 1, 2017
			Revision No.	1
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 15 of 19

Each end of "LH" and "DLH" series steel joists and steel joist girders shall be attached to the support structure with a minimum of two 1/4-inch fillet welds 2 inches long, or with two 3/4-inch bolts, or the equivalent.

Except for pre-assembled joist panels, each steel joist shall be attached to the support structure, at least at one end on both sides of the seat, immediately upon placement in the final erection position and before additional joists are placed.

Panels that have been pre-assembled from steel joists with bridging shall be attached to the structure at each corner before the hoisting cables are released.

Erection of steel joists

Both sides of the seat of one end of each steel joist that requires bridging under Tables A and B on the following pages shall be attached to the support structure before hoisting cables are released.

For joists over 60 feet, both ends of the joist shall be attached as outlined in the paragraphs titled "Field-bolted joists" and "Attachment of steel joists and steel joist girders" above, and the required amount of field bolted bridging outlined later in this section are installed before the hoisting cables are released.

On steel joists that do not require erection bridging under Tables A and B, only one employee shall be allowed on the joist until all bridging is installed and anchored. See 1926.757(c)(3),

Table A -- Erection Bridging for Short Span Joists

Table B -- Erection Bridging for Long Span Joists

Employees shall not be allowed on steel joists where the span of the steel joist is equal to or greater than the span shown in Tables A and B except in accordance with the requirements listed in the paragraph titled "Erection Bridging" below.

When permanent bridging terminus points cannot be used during erection, additional temporary bridging terminus points are required to provide stability.


Erection bridging

Where the span of the steel joist is equal to or greater than the span shown in Tables A and B and requires erection bridging, the following shall apply:

1. A row of bolted diagonal erection bridging shall be installed near the midspan of the steel joist;
2. Hoisting cables shall not be released until this bolted diagonal erection bridging is installed and anchored; and
3. No more than one employee shall be allowed on these spans until all other bridging is installed and anchored.

Where the span of the steel joist is over 60 feet through 100 feet, the following shall apply:

1. All rows of bridging shall be bolted diagonal bridging;
2. Two rows of bolted diagonal erection bridging shall be installed near the third points of the steel joist;

	Health and Safety Policy		Section No:	30
			Initial Issue Date:	1992
			Revision Date:	Jan 1, 2017
			Revision No.:	1
Steel Erection Policy				
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 16 of 19

3. Hoisting cables shall not be released until this bolted diagonal erection bridging is installed and anchored; and
4. No more than two employees shall be allowed on these spans until all other bridging is installed and anchored.

Where the span of the steel joist is over 100 feet through 144 feet, the following shall apply:

1. All rows of bridging shall be bolted diagonal bridging;
2. Hoisting cables shall not be released until all bridging is installed and anchored; and
3. No more than two employees shall be allowed on these spans until all bridging is installed and anchored.

For steel members spanning over 144 feet, the members must be completely bolted and/or welded as outlined by the structural engineer of record on the drawings, and all bridging must be attached.

Where any long span steel joist is a bottom chord bearing joist, a row of bolted diagonal bridging shall be provided near the support(s). This bridging shall be installed and anchored before the hoisting cables are released.


When bolted diagonal erection bridging is required by this section, the following shall apply:

1. The bridging shall be indicated on the erection drawing;
2. The erection drawing shall be the exclusive indicator of the proper placement of this bridging;
3. Shop-installed bridging clips, or functional equivalents, shall be used where the bridging bolts to the steel joists;
4. When two pieces of bridging are attached to the steel joist by a common bolt, the nut that secures the first piece of bridging shall not be removed from the bolt for the attachment of the second; and
5. Bridging attachments shall not protrude above the top chord of the steel joist.

Landing and placing loads

During the construction period, the employer placing a load on steel joists shall ensure that the load is distributed so as not to exceed the carrying capacity of any steel joist.

With the exception of deck bundle placement outlined below, no construction loads are allowed on the steel joists until all bridging is installed and anchored and all joist-bearing ends are

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
			Revision Date:	Jan 1, 2017
			Revision No.	1
Steel Erection Policy				
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 17 of 19

attached. This requirement does not include the amount of bridging necessary to install one row of bridging in preparation for construction loads.

The weight of a bundle of joist bridging shall not exceed a total of 1,000 pounds. A bundle of joist bridging shall be placed on a minimum of three steel joists that are secured at one end. The edge of the bridging bundle shall be positioned within 1 foot of the secured end.

No bundle of decking may be placed on steel joists until all bridging has been installed and anchored and all joist bearing ends attached, unless all of the following conditions are met:

1. The employer has first determined from a qualified person and documented in a site-specific erection plan that the structure or portion of the structure is capable of supporting the load;
2. The bundle of decking is placed on a minimum of three steel joists;
3. The joists supporting the bundle of decking are attached at both ends;
4. At least one row of bridging is installed and anchored;
5. The total weight of the bundle of decking does not exceed 4,000 pounds; and

The edge of the construction load shall be placed within 1 foot of the bearing surface of the joist end. Where this is not possible because of end bearing requirements, the qualified person may elect to stagger bundles as necessary to ensure proper bearing of bundle ends as long as the structural integrity of the structure is maintained.

Systems-engineered Metal Buildings


All of the requirements of this policy apply to the erection of systems-engineered metal buildings except "Column anchorage" and "Open Web Steel Joists".

Each structural column shall be anchored by a minimum of four anchor bolts.

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.

Construction loads shall not be placed on any structural steel framework unless such framework is safely bolted, welded or otherwise adequately secured.

In girt and eave strut-to-frame connections, when girts or eave struts share common connection holes, at least one bolt with its wrench-tight nut shall remain connected to the first member

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
Steel Erection Policy			Revision Date:	Jan 1, 2017
			Revision No.	1
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 18 of 19

unless a manufacturer-supplied, field-attached seat or similar connection device is present to secure the first member so that the girt or eave strut is always secured against displacement.

Both ends of all steel joists or cold-formed joists shall be fully bolted and/or welded to the support structure before:

- (1) Releasing the hoisting cables;
- (2) Allowing an employee on the joists; or
- (3) Allowing any construction loads on the joists.

Purlins and girts shall not be used as an anchorage point for a fall arrest system unless written approval is obtained from a qualified person.

Purlins may only be used as a walking/working surface when installing safety systems, after all permanent bridging has been installed and fall protection is provided.

Construction loads may be placed only within a zone that is within 8 feet of the center-line of the primary support member.

Falling Object Protection

Securing loose items aloft

All materials, equipment, and tools, which are not in use while aloft, shall be secured against accidental displacement. Tool lanyards are recommended for applicable hand tools.

Protection from falling objects other than materials being hoisted

The controlling contractor shall bar other construction processes below steel erection unless overhead protection for the employees below is provided.

Fall Protection

General requirements

Each employee engaged in a steel erection activity who is on a walking/working surface with an unprotected side or edge more than 6 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.

Perimeter safety cables


On multi-story structures, perimeter safety cables shall be installed at the final interior and exterior perimeters of the floors as soon as the metal decking has been installed.

Criteria for fall protection equipment

Guardrail systems, perimeter safety cables, safety net systems, personal fall arrest systems and components, positioning device systems and their components shall conform to the criteria in OSHA Subpart M fall protection standard 1926.502.

Custody of fall protection

Fall protection provided by the steel erector shall remain in the area where steel erection activity has been completed, to be used by other trades, only if the controlling contractor or its authorized representative has directed the steel erector to leave the fall protection in place and

	Health and Safety Policy		Section No:	30
			Initial Issue Date	1992
Steel Erection Policy			Revision Date:	Jan 1, 2017
			Revision No.	1
Prepared by: MSC Safety Solutions	OSHA Standard	1926.750	Page:	Page 19 of 19

has inspected and accepted control and responsibility of the fall protection prior to authorizing persons other than steel erectors to work in the area.

The OSHA Subpart R, Steel Erection Standard provides exceptions for connectors and leading edge decking crews to work above the six foot threshold level for fall protection by allowing special training and alternative means and methods of providing fall protection. Using these alternative methods, workers may be exposed to fall hazards of up to thirty feet. This company strictly enforces fall protection above six feet. See the Fall Protection Policy.

Training

In addition to the general training requirements contained in the OSHA standards, the following training requirements apply to all workers involved in the steel erection process.

Training required by this section must be provided by a qualified person(s).

Fall hazard training

The employer (steel erector) shall provide a training program for all employees exposed to fall hazards. The program shall include training and instruction in the following areas:

- (1) The recognition and identification of fall hazards in the work area;
- (2) The use and operation of guardrail systems (including perimeter safety cable systems), personal fall arrest systems, positioning device systems, fall restraint systems, safety net systems, and other protection to be used;
- (3) The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used;
- (4) The procedures to be followed to prevent falls to lower levels and through or into holes and openings in walking/working surfaces and walls; and
- (5) The fall protection requirements of this subpart.

Special training programs

The steel erector must provide special training to employees engaged in the following activities.

Multiple lift rigging procedure

The employer shall ensure that each employee who performs multiple lift rigging has been provided training in the nature of the hazards associated with multiple lifts and the proper procedures and equipment to perform multiple lifts as outlined in the OSHA steel erection standard. *SEE MLR PROCEDURE

Connector procedures

The employer shall ensure that each connector has been provided training in the following areas the nature of the hazards associated with connecting with special emphasis on double connections and fall protection.