



1926.752-754

Subpart R Steel Erection

Steel Erection



.752 Site Layout, Erection Plan, Construction Sequence

Steel Erection

Written Authorization

- Approval to begin steel erection - *Before authorizing the start of steel erection, the controlling contractor must ensure that the steel erector is provided with the following **written** notifications:*

Written Notifications

- Concrete in footings, piers or walls must reach 75% of the intended minimum compressive strength or sufficient strength to support loads (as approved by the Engineer of Record)
- Repairs to anchor bolts must be in accordance with .755(b)

Testing Requirements

- All concrete and masonry testing must be done in accordance with American Society of Testing and Manufacturing (ASTM) standards

Written Notifications

- Commencement of Steel erection - *Steel erection contractor shall not erect steel unless* written notice that the concrete in the footings, piers and walls or mortar in the masonry piers has attained 75% of minimum compressive strength

Site Layout

The controlling contractor shall provide and maintain:

- Adequate access roads
- Firm, properly graded, drained area readily accessible with adequate space for safe storage of materials and equipment



Site Layout



Steel Erection

Site Layout

- Routes preplanned to ensure no employee required to work under a suspended load except:
 - Connectors
 - Employees responsible for hooking/unhooking the load



Erection Plan

- Site-Specific Erection Plan - Allowed as an “alternative” to some specific provisions:
 - 1926.753(c)(5) deactivating safety latches
 - 1926.757(a)(4) setting some steel joists
 - 1926.757(e)(4)(i) placing bundled decking
- shall be developed by a qualified person and be available
- *Due to changing scope from project to project, a plan may be good practice for ALL operations*

.753 Hoisting and Rigging

Steel Erection

It happens...



Steel Erection

Inspections

- Pre-shift visual inspection of cranes by a competent person





Main Inspection Points

- Control mechanisms
- Drive mechanism
- Safety devices
- Air & hydraulic lines
- Hooks & latches
- Wire rope reeving
- Electrical equipment
- Hydraulic fluid levels
- Tires
- Ground conditions
- Level of equipment
- Level of equipment after each move

Inspections

- 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



Inspections

- A qualified rigger shall inspect the rigging prior to each shift



Crane Supported Platforms

- Cranes may hoist employees with a personnel platform meeting the requirements of .550(g)
- For steel erection activities, the determination of “no other feasible means” is no longer required
 - *Still recommended, however*



No Riding the Ball!!!



Steel Erection

Hoisting Operations

- May deactivate safety latches on hooks for some purlin and joist hoisting if done under an erection plan.



This nylon sling could cut

Working Under Loads

- Routes preplanned to ensure no employee required to work under a suspended load except:
 - Connectors
 - Employees responsible for hooking/unhooking the load



Working Under Loads

- When working under suspended loads:
 - Routes shall be pre-planned
 - Materials shall be rigged to prevent unintentional displacement
 - Hooks shall have self-closing latches



Multiple Lift Rigging Procedure (Christmas Treeing)

- Multiple Lift Rigging procedure - can be used only with:
 - Maximum of 5 members
 - Only structural members
 - Properly trained employees
- Components shall be designed with a 5 to 1 safety factor



Multiple Lift Rigging Procedure (Christmas Treeing)

- Total load shall not exceed the rated capacity of the hoisting or rigging equipment
- Rigging assembly shall be rigged with the members attached at their center of gravity and maintained reasonably level; rigged from the top down; rigged at least 7 ft apart



Multiple Lift Rigging Procedure (Christmas Treeing)



.754 Structural Steel Assembly

Steel Erection

.754 Structural Steel Assembly

- Structural stability maintained at all times



.754 Structural Steel Assembly

- Permanent floors no more than 8 floors between the erection floor and the uppermost permanent floor
- No more than 4 floors or 48 ft. of unfinished bolting above the uppermost unfinished floor



.754 Structural Steel Assembly

- A fully planked or decked floor or nets within 2 floors or 30 ft.



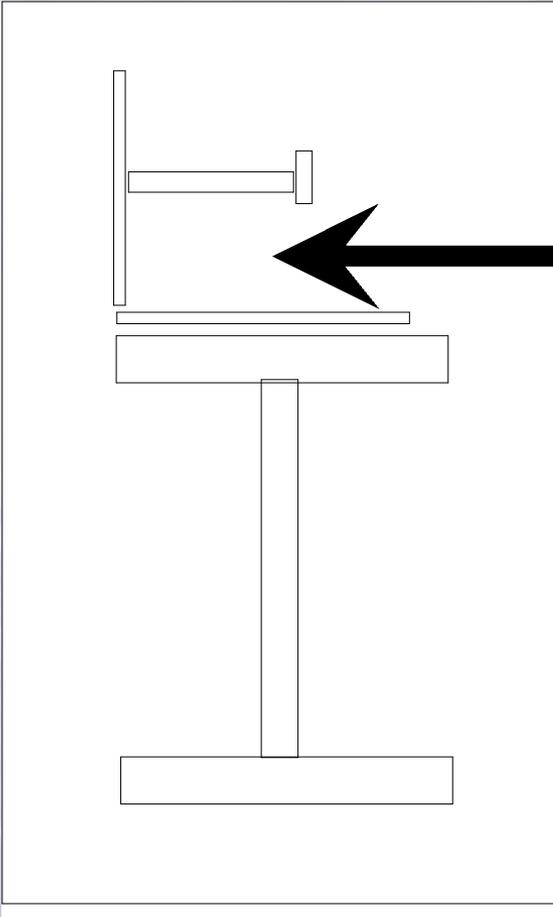
Walking/Working Surfaces

- Shear connectors
 - 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 decking has been installed*
 - shall not be laid out and installed until after the decking has been installed, using the deck as a work platform

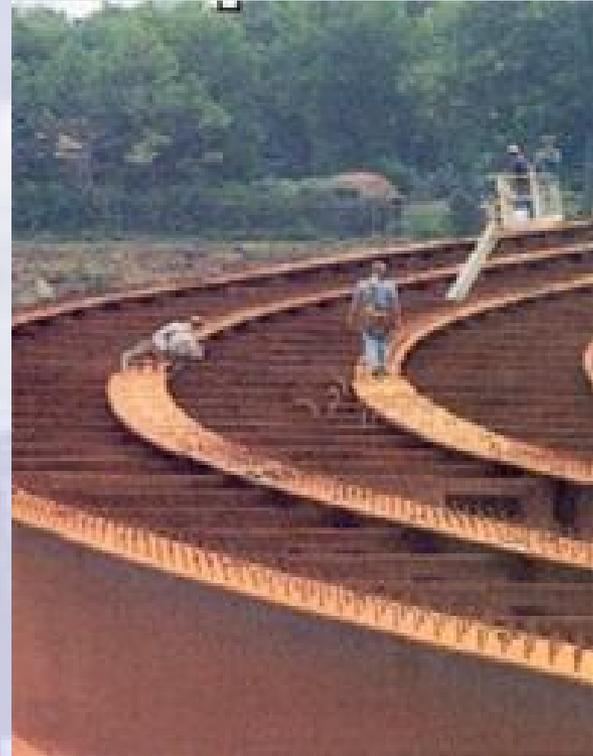


Walking/Working Surfaces

Perimeter
Beam with
Bent Plate



Shear
studs on
bridge
beams



Walking/Working Surfaces

- Skeletal Steel Construction –
 - Workers shall not be permitted to walk the top surface of any structural steel member which has been finish coated with paint or similar material, due to the potential for slip and fall hazards (unless the surface is no more slippery than the original steel finish – requires specific testing)
 - (five year moratorium)

Walking/Working Surfaces

- Decking –
 - Do not use strapping for hoisting
 - Loose items on top shall be secured
 - Land bundles on supports to allow unbanding
 - At the end of a shift (or when environmental conditions require), all decking must be secured



Walking/Working Surfaces

- Roof and Floor openings - Metal deck shall be installed as follows:
- Framed deck openings shall have structural members turned down to allow continuous deck installation
- Roof and floor openings shall be covered during the decking process



Walking/Working Surfaces

- Covers for roof and floor openings must support, without failure, twice the maximum intended load.
- All covers must be secured
- All covers marked with high visibility paint and the word HOLE or COVER
- Skylights must meet the same load requirements



Walking/Working Surfaces

- Holes and openings not cut until essential to the construction process, and immediately protected
- Space around columns protected



Walking/Working Surfaces

- Floor decking laid tightly and secured
- Derrick floors fully decked (derrick floors defined as completed floors where erection is being performed, along with storage areas on those floors)

