

1926.755-757

Subpart R Steel Erection

Steel Erection

.755 Column Anchorages

Steel Erection

.755 Column Anchorages

- All columns anchored by a minimum of 4 anchor bolts
- Each column anchor bolt assembly designed to resist a 300 lb. eccentric load located 18 inches from the column face in each direction at the top of the column
- Columns set on level finished floors, pre-grouted leveling plates, leveling nuts or shim packs



Posts

- Weighs 300 lbs or less
- Is loaded axially or is laterally restrained.
- Typically support stairways, wall framing, mezzanines, etc.



Stairway Post

These do not require 4 bolts

.755 Column Anchorages

- Unstable columns evaluated by a competent person and guyed or braced as necessary



Problem



.755 Column Anchorages

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



.755 Column Anchorages

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 for that column



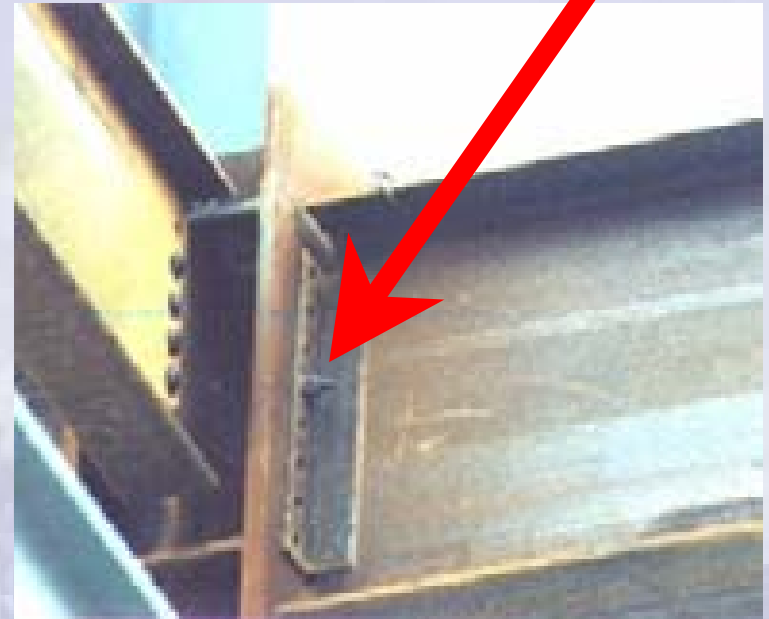


.756 Beams and Columns

Steel Erection

.756 Beams and Columns

- During the final placing of solid web structural members, the load shall not be released from the hoisting line until the member is secured with at least 2 bolts per connection, wrench tight



.756 Beams and Columns

- Diagonal bracing secured by at least one bolt per connection, wrench tight



.756 Beams and Columns

- A competent person shall determine if more than 2 bolts are required to ensure stability of a cantilevered member
 - *Some recommend the “50% rule”, at least 50% of bolts in a cantilevered connection made up prior to release.*



.756 Beams and Columns

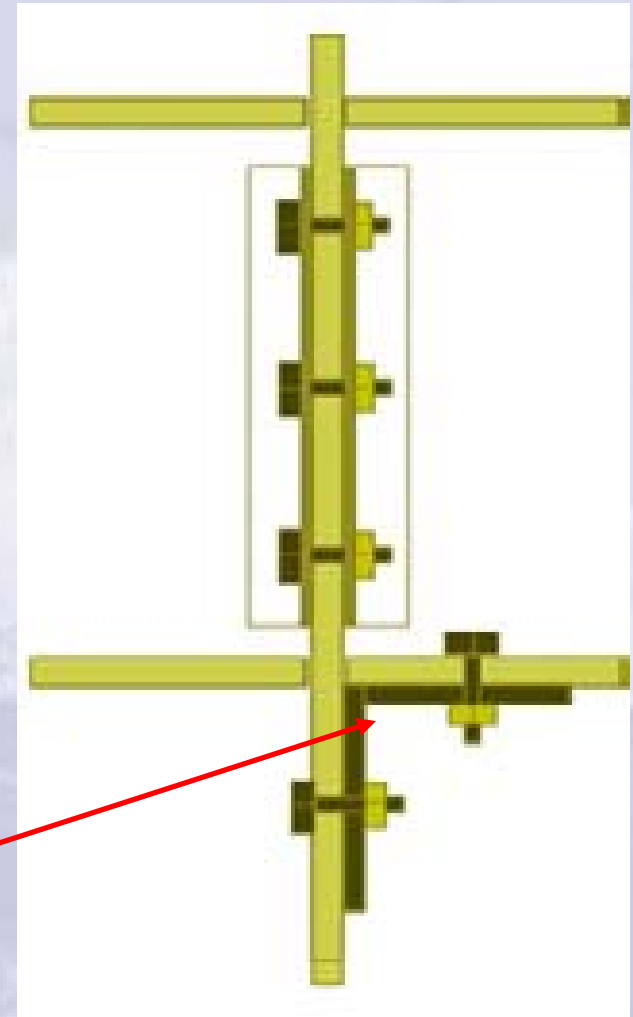
- Double connections at columns and/or at beam webs over a column shall have at least one bolt remain connected to the first member unless a seat is provided



.756 Beams and Columns

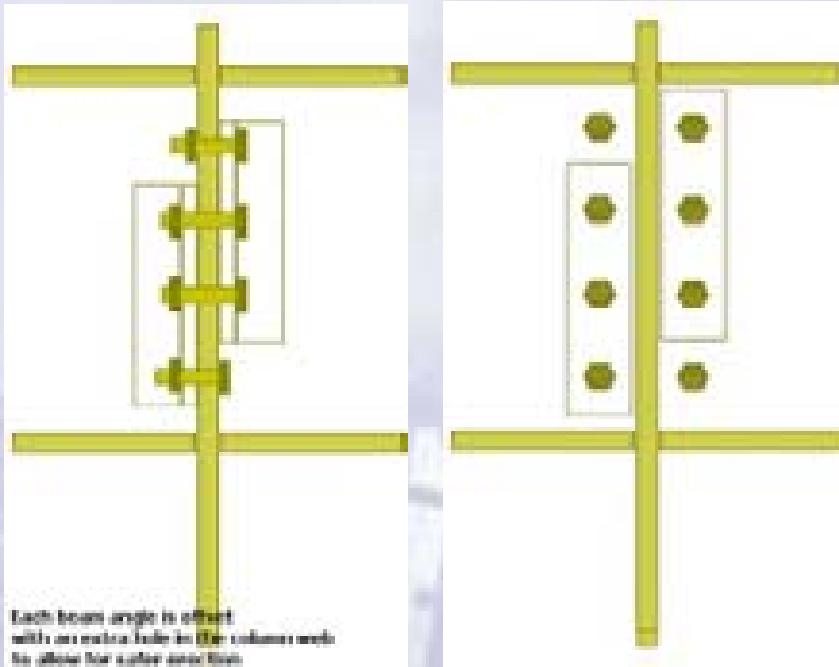
- Double connections at columns and/or at beam webs over a column shall have at least one bolt remain connected to the first member unless a seat is provided

Beam seat



.756 Beams and Columns

- Offset connections are encouraged



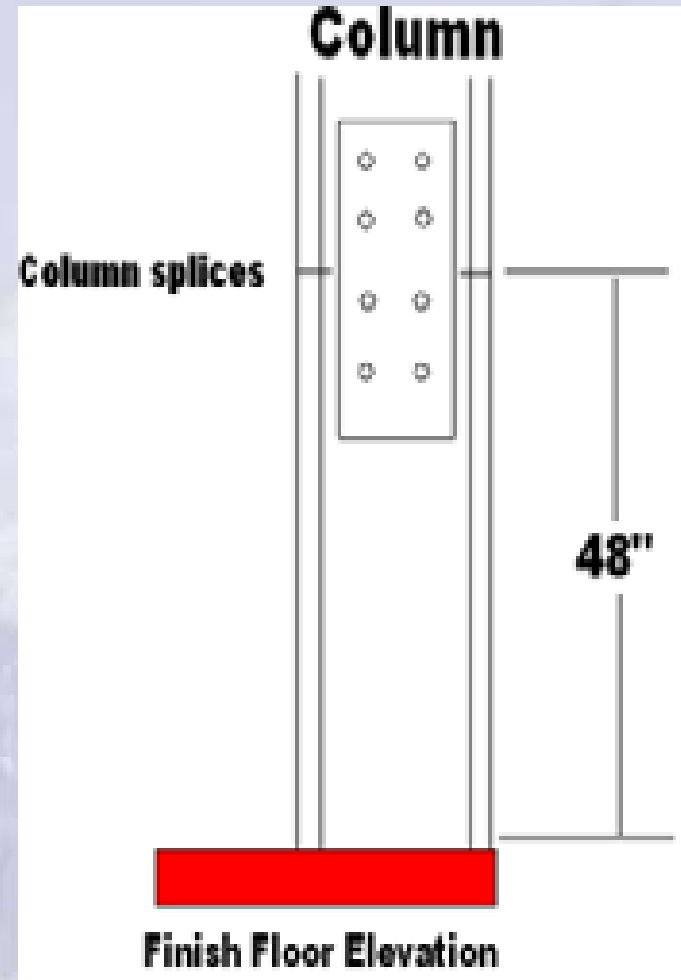
.756 Beams and Columns

- Each column splice shall be designed to resist a 300 lb. load applied eccentrically 18 in. from the column face at the top of the column in each direction



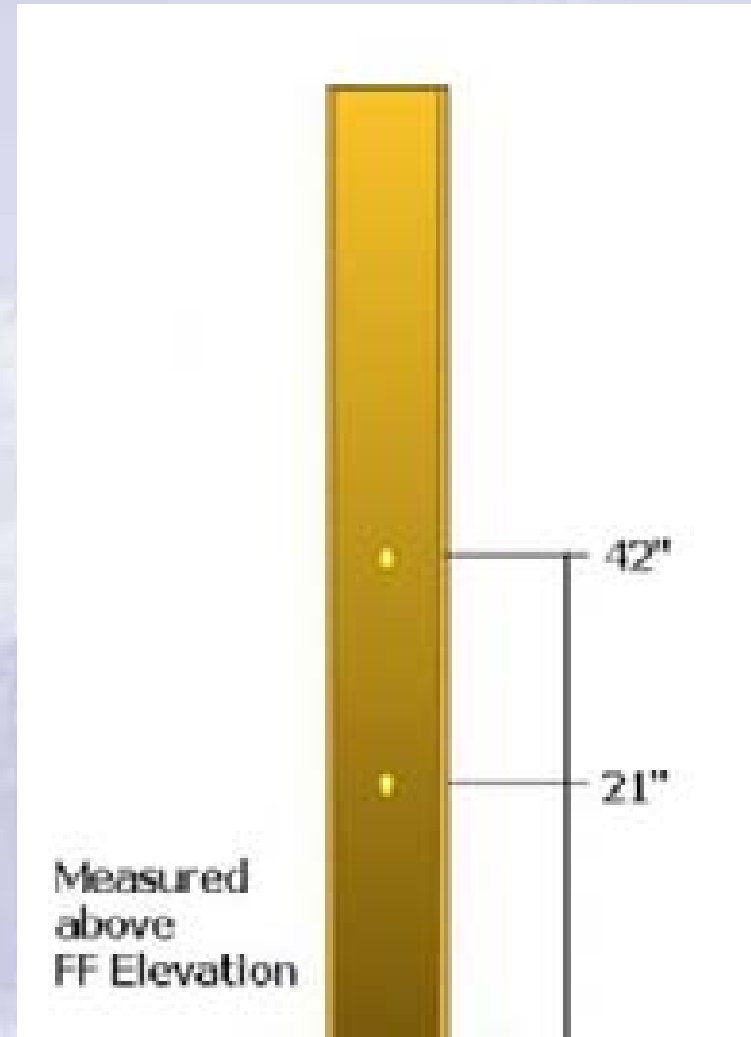
.756 Beams and Columns

- Perimeter columns shall extend a minimum of 48 in. above the finished floor to allow installation of perimeter safety cables



.756 Beams and Columns

- Holes or other devices should be provided by the fabricator, in or on the column, to permit the installation of perimeter safety cables as soon as possible



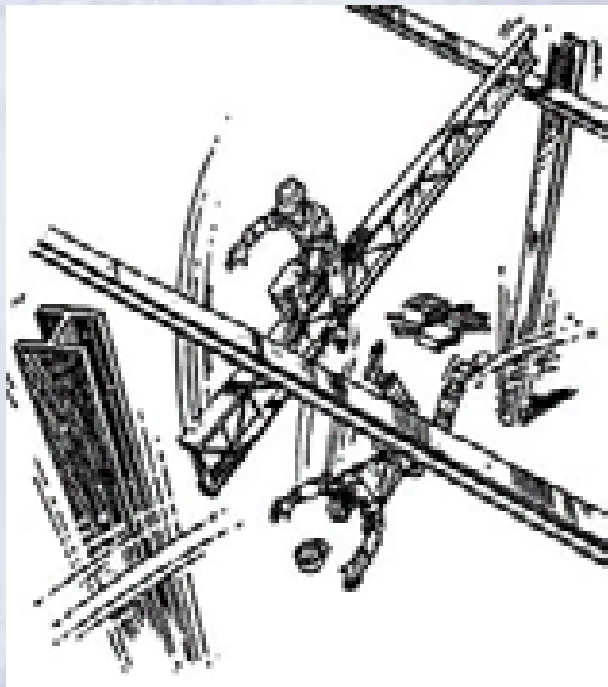
.756 Beams and Columns

- Perimeter safety cables shall be installed as soon as possible during the structural steel assembly of multi-story structures, and always before the next tier
- Perimeter safety cables shall consist of systems that comply with the requirements of 1926.760 (a)(2), which references Subpart M



.757 Open Web Steel Joists

Steel Erection



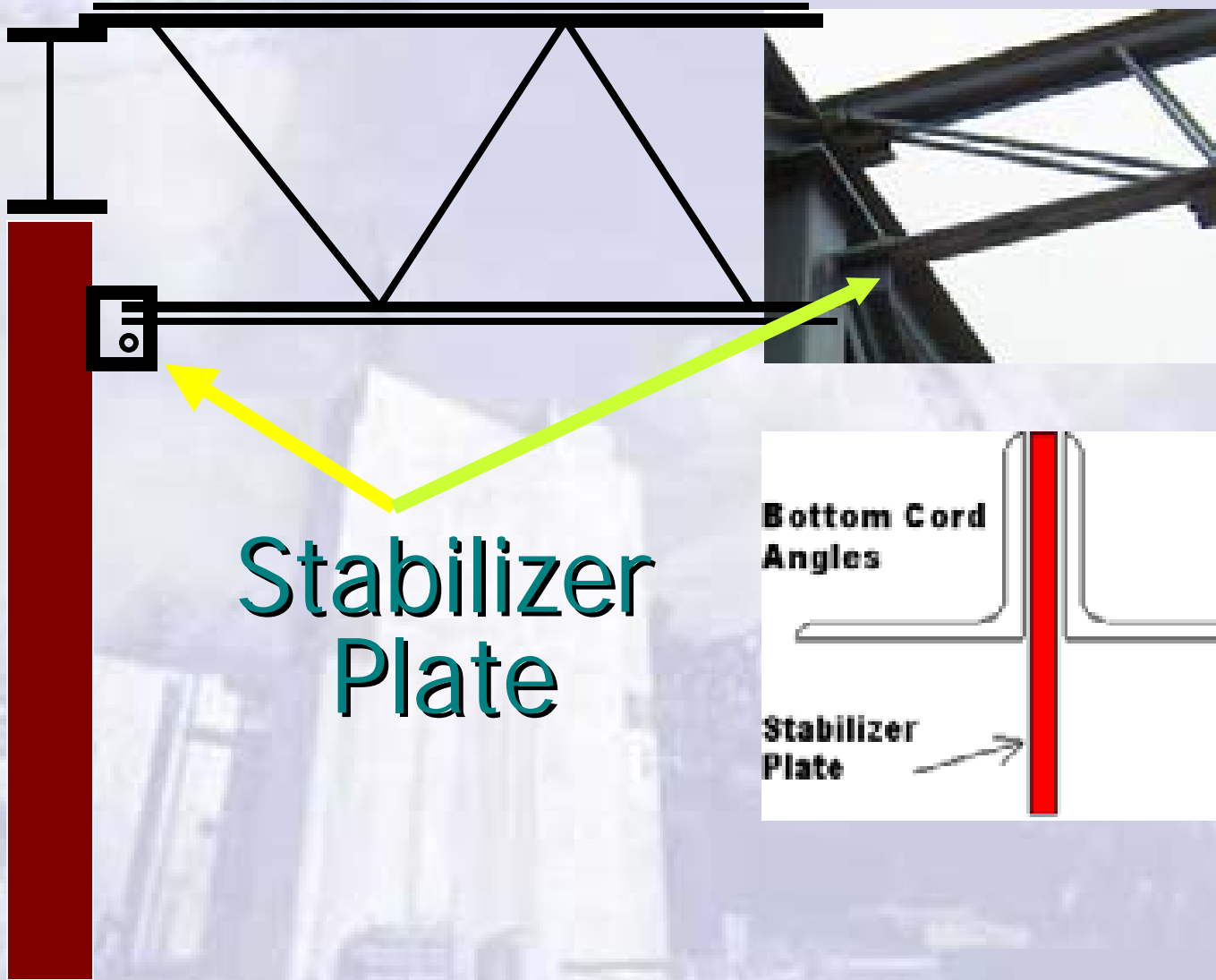
OSHA Fatal Fact

Five iron workers were distributing 90-foot-long open web bar joists on a building under construction. The bar joists were supported by vertical columns spaced 30 feet apart. The steel columns were not framed in at least two directions and the bar joists were not field bolted to the vertical columns to prevent collapse. The bar joists shifted, causing the vertical columns to lean. This caused entire section of columns and pen web bar joists to collapse. Two employees rode the iron down. One was fatally injured and one received serious injuries.

.757 Open Web Steel Joists

- Where steel joists are utilized and the columns are not framed in two directions, the steel joist shall be field-bolted at or near the column to provide lateral stability





.757 Open Web Steel Joists

- Where steel joists span 60 ft. or less, they must be strong enough to hold one person to release the hoisting line
- *Seek alternative methods!*



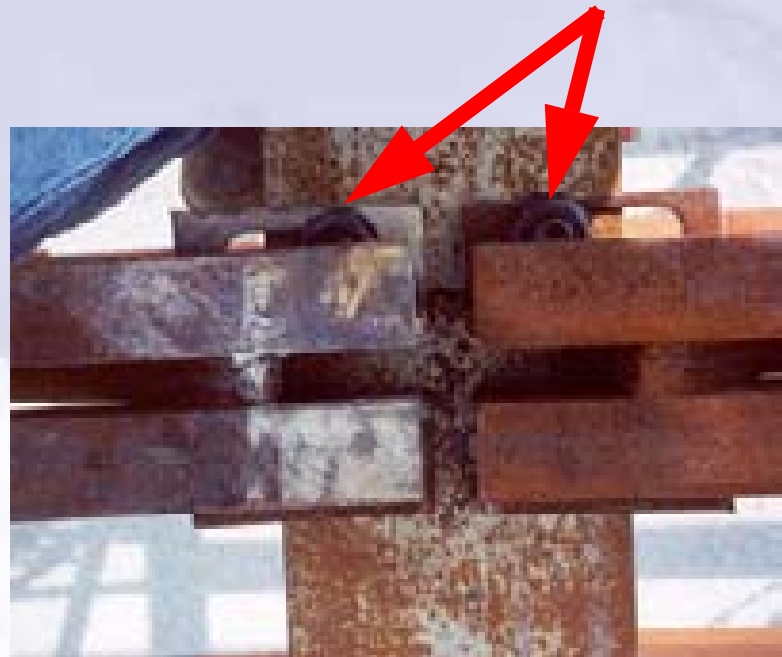
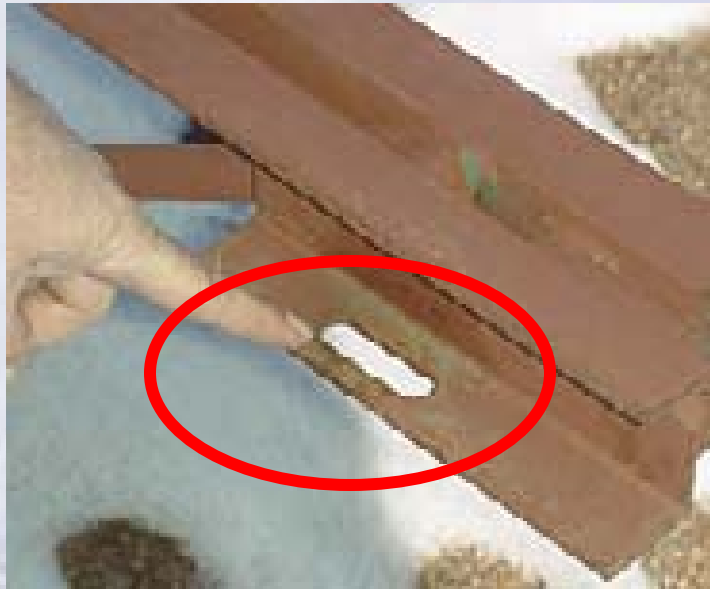
.757 Open Web Steel Joists

- When steel joists are landed on a structure, they shall be secured to prevent unintentional displacement prior to installation

Bolting of Joists

- All joists in bays over 40 feet long or wide must be field bolted during erection unless constructibility does not allow.
- Final attachment can be welds.

Bolting of Joists



Bar Joists in Masonry

- Structural welding when the joist is set may be desirable in this instance



Attachment of Steel Joists

- Each joist must be attached at least at one end on both sides of the seat immediately, and before the next joist is placed.

Panelizing of Joists



- An alternative is allowed for panelized bar joists, which must be attached at all four corners before hoisting lines are released.

Erection of Steel Joists

- Both sides of the seat on one end of a joist that requires bridging must be attached before hoisting lines are released. **(Applies to joists less than 60 ft.)**
- For joists over 60 feet long, both ends must be attached before hoisting lines are released.
- Employee access to joists is limited.

Erection Bridging

1926.757(d)(1)

- **Bracing for joists equal to or greater than the spans in Tables A & B but less than 60 ft:**
 - **The row of bridging nearest the mid-span of the steel joist shall be installed immediately.**
 - **Hoisting cables shall not be released until this bolted erection bridging is installed.**



Release of Hoisting Lines on Long Joists

- Joists that span 60 – 100 ft.
 - 2 rows of bridging installed at the third points ($1/3$ and $2/3$ of span)
- Joists that span 100 – 144 ft.
 - All bridging must be installed

Joist As Fall Anchorages

- One end of each steel joist shall be attached to the support structure before an employee is allowed on the steel joist.
- Joists cannot be used as fall arrest anchorages unless there is written approval by a qualified person.



Landing Bridging on Joists

- Bridging bundles must be less than 1,000 lbs and set across at least 3 secured joists.
- The edge of all loads must be within one foot of the end.

.757 Open Web Steel Joists

- No decking loads are allowed on steel joists until after the bridging is installed and anchored and all joist bearing ends are attached
- The exceptions to this are
 - If a qualified person will allow it, the load spans 3 joists, the joists are attached at both ends and at least one row of bridging is installed
 - The total weight of decking bundles is limited to 4000 lbs.
 - The edge of all loads must be within one foot of the end.

.757 Open Web Steel Joists

The bottom line – follow the joist erection process outlined in your joist drawings