



# **Ironworkers-IMPACT National Safety Call**



**August 24, 2022**

**Moderated by Pete Hayes, Red Cedar Steel**

**Special Training Requirements and Issues Pertaining  
to the Multiple Lift Rigging Procedure, Controlled  
Decking Zones, and Connector Procedures**



# Welcome and Introduction



**Eric Dean, General President  
Ironworkers International**



This National Safety Call will provide job site illustrations on requirements of OSHA Subpart R – Steel Erection 1926.761(c) - ***Special training programs*** that include:

1926.761(c)(1) - ***Multiple Lift Rigging Procedure (MLRP)***

1926.761(c)(2) ***Connector Procedures***

1926.761(c)(3) - ***Controlled Decking Zone Procedures***



# Brief History of these Standards

- They were written and adopted through The Negotiated Rulemaking Act with the Ironworkers and Contractors input to OSHA
- OSHA and other safety consultants do like or understand these standards and how they can be performed safely
- Some project safety personnel have excluded these standard practices from project contract documents – read contract safety requirements carefully
- Many issues stemming from these standards have resulted in costly job site delays from regulatory and project authorities due to misconceptions



# Multiple Lift Rigging Procedure “Special Training Program”



## 1926.761(c) *Special training programs*

**The employer shall provide special training to employees engaged in the following activities**

1926.761(c)(1) *Multiple lift rigging procedure*. The employer shall ensure that each employee who performs multiple lift rigging has been provided training in the following areas:

1926.761(c)(1)(i) The nature of the hazards associated with multiple lifts; and

1926.761(c)(1)(ii) The proper procedures and equipment to perform multiple lifts.



# Common Misconceptions Regarding the MLRP

- Some crane manufactures prohibit more than one load on the hook
- There is ONLY one rigging assembly allowed to comply with the MLRP standard
- Each structural member must be independently rigged to the load block
- Only certified riggers can perform the MLRP
- Only wire rope slings can be used and synthetic slings are prohibited
- The MLRP can be used to hoist bundles of rebar
- Workers must walk to the end of the beam before hoist a MLRP



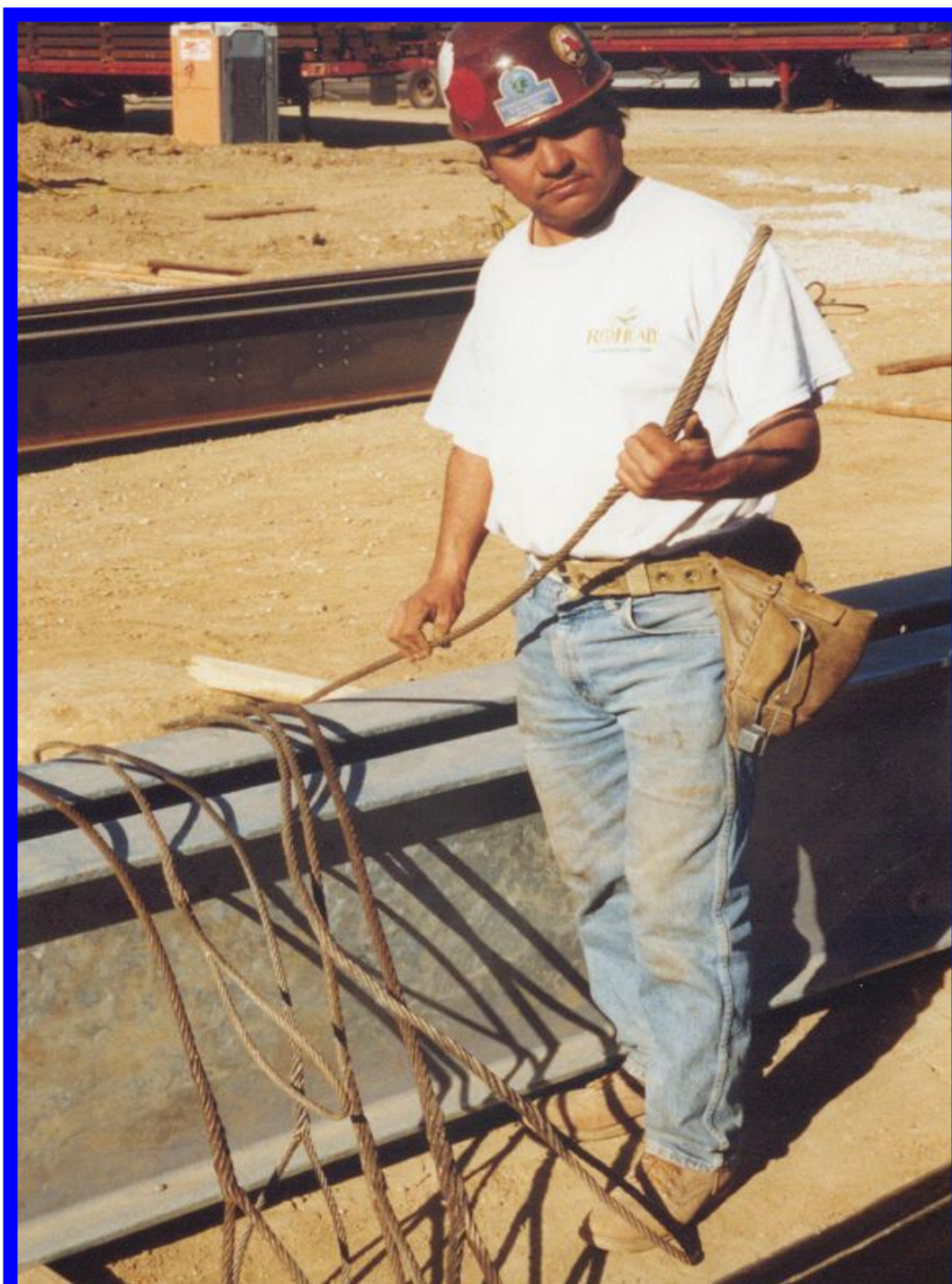


# Selection and Use of a Manufactured Rigging Assembly



# Rigging Assembly Components

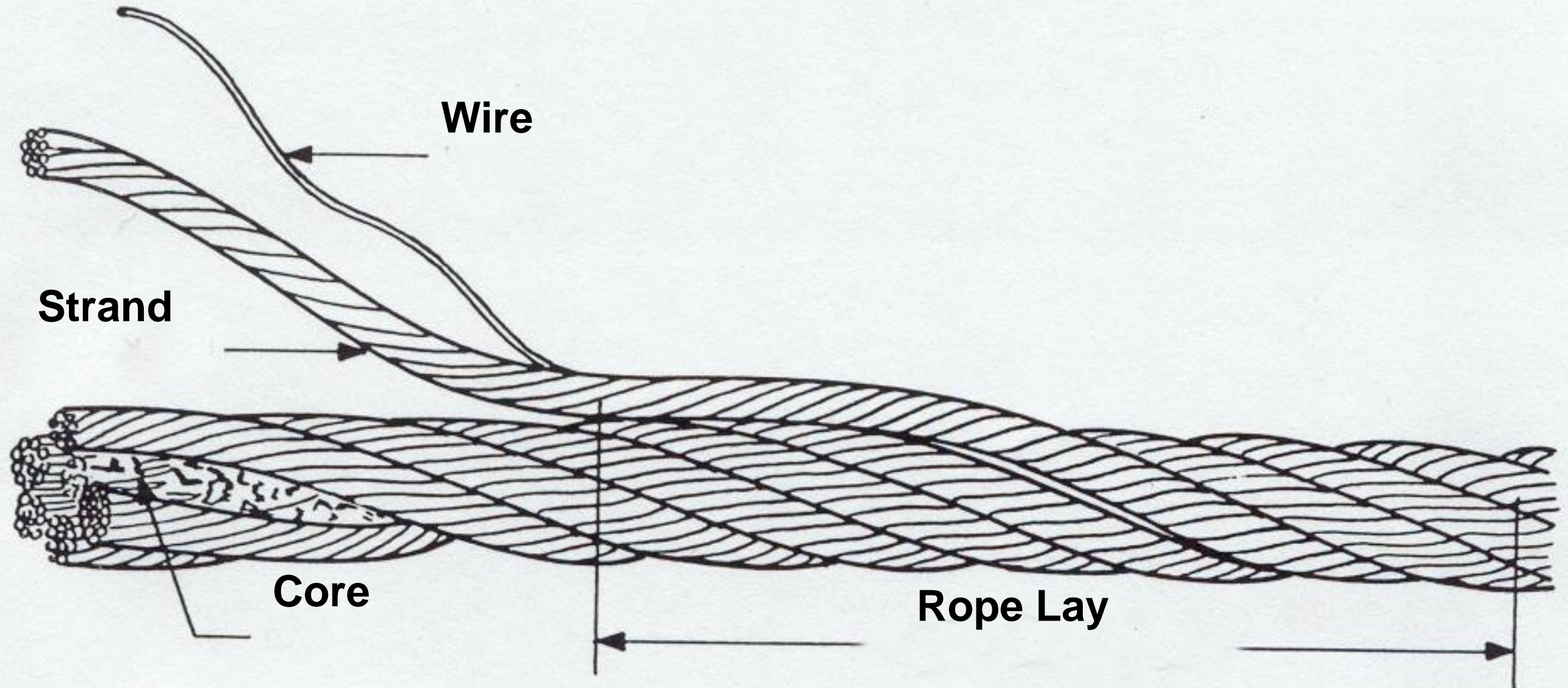
- **1926.753(e)(2)(ii)** “Components of the multiple lift rigging assembly shall be specifically designed and assembled with a maximum capacity for total assembly and for each individual attachment point. This capacity, certified by the manufacturer or a qualified rigger, shall be based on the manufacturer’s specifications with a 5 to 1 safety factor for all components).”
- **1926.753(c)(2)** “A qualified rigger shall inspect the rigging prior to each shift in accordance with 1926.251.”



## Use of Hoisting Slings

- A qualified rigger must inspect the wire rope slings prior to each shift in accordance with the applicable OSHA and ANSI Standards.
- Wire rope sling capacity must be certified by the manufacturer or a qualified rigger and must be based on the manufacturer's rated specifications with a 5 to 1 safety factor.
- The total load shall not exceed the rated capacity of the wire rope sling specified in the rigging rating charts.

# Elements of Wire Rope



# Use of Synthetic Sling Inspection and Removal



## Married Slings and Hook design



## Married Sling Eyes and Hook Design

- One of the rigging assemblies used for hoisting multiple lifts is designed and manufactured with sections of “married” sling eyes and standard eye hooks.
- Slings and hooks must be designed with a 5 to 1 safety factor and certified by the manufacture or qualified rigger.



## Married Sling Eyes and Hook Design

- A 5 ton eye hook with a 5 to 1 safety factor is placed in the top sling by the manufacture.
- As the structural member is being hoisted, the Ironworkers “clear-up the hooks” to prevent the beams from snagging and overturning during the hoist.



## Using the Detachable Bull-tail Design

- The Ironworkers in the illustration show the proper technique and safe practice of working together to clear up hooks to avoid serious material handling accidents.
- The Ironworkers hooking-on can easily attach or remove sling sections to accommodate the number of beams being hoisted.

## Independent Sling and Hooks



## Independent Sling and Hook Design

- Another common rigging assembly used for performing multiple lifts is designed with independent lines for each structural member being hoisted.
- This method requires each sling and hook section to extend from the top main hoist hook to each structural member hoisted. In many cases the individual slings are connected together with a manufactured master link.





## Training and Safe Practices on Rigging Procedures

1926.761(c)(1)(i) The nature of the hazards associated with multiple lifts; and

1926.761(c)(1)(ii) The proper procedures and equipment to perform multiple lifts.



## Preplanning Routes For Suspended Loads

- **1926.753(d)(1)** “Routes for suspended loads shall be preplanned to ensure that no employee is required to work directly below a suspended load, except for:
- **1926.753(d)(1)(i)** “Employees engaged in the initial connection of steel.”
- **1926.753(d)(1)(i)** “Employee necessary for the hooking and unhooking of the load.”

# Hoisting A Maximum Of Five Members

- **1926.753(e)(1)(ii)** “A maximum of five (5) members is hoisted per lift.”



Maintain 7 Feet Between Members



## Maintaining 7 Feet Clearance Between Members

- The qualified rigger must ensure that members are rigged at least seven feet (7') apart to provide sufficient headroom for the connectors.
- The multiple lift rigging assembly be rigged at least seven feet (7') apart whenever this procedure is used.

Rigging with sufficient clearance



## Rigging with Sufficient Clearance for Connectors

- **Connectors must be protected from striking hazards of overhead loads during the connecting process.**
- **Connectors must be protected from striking hazards of overhead loads during the connecting process.**

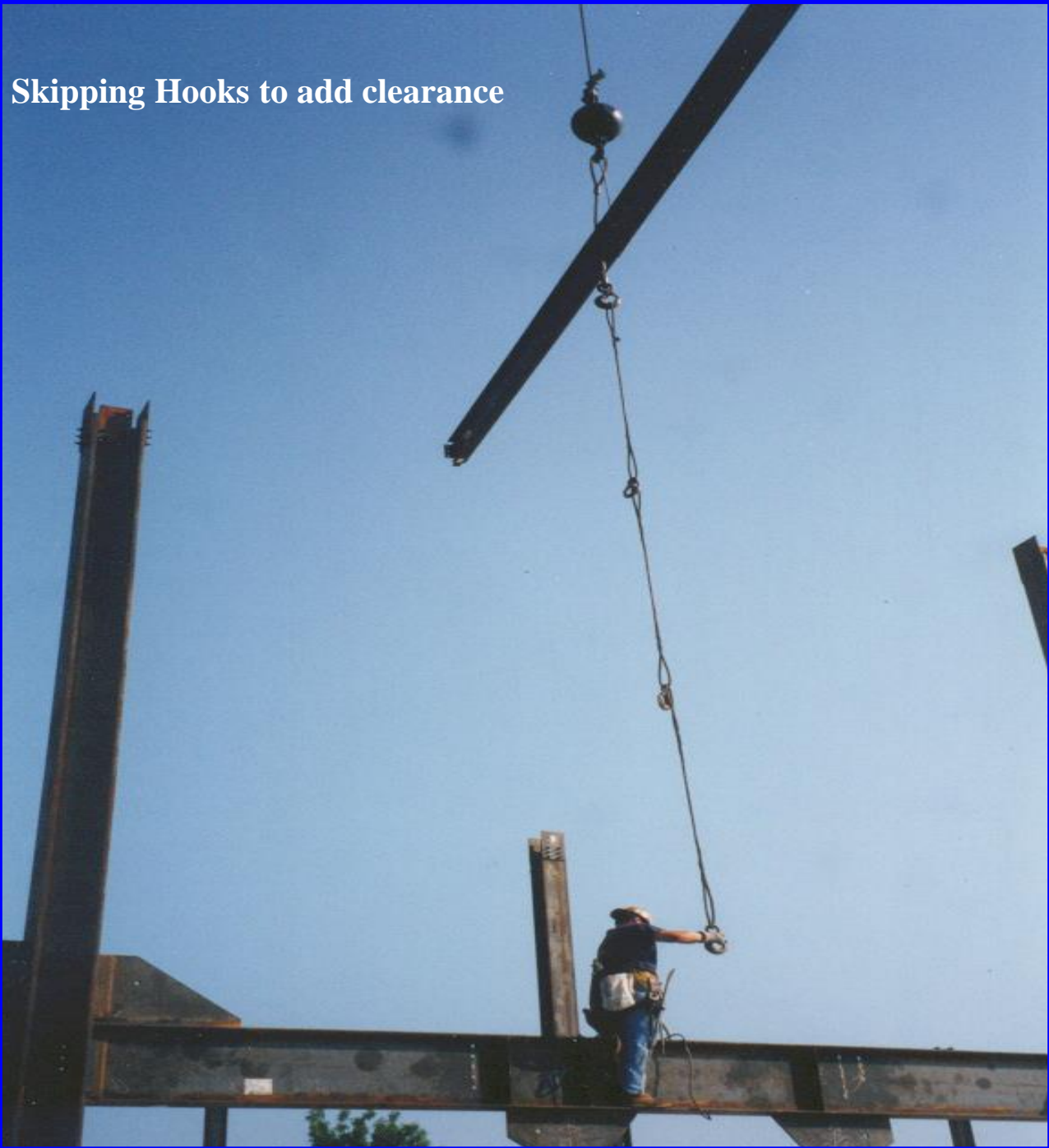
Insufficient Clearance for Connectors



## Insufficient Clearance for Connectors

- These members are rigged with approximately 5 feet between members.
- This does not provide safe clearance and handling during the hoisting process

Skipping Hooks to add clearance



## Skipping Hooks To Provide Additional Overhead Clearance

- In this illustration, the qualified riggers “skipped a hook” during the rigging process to allow additional space between members.
- In this erection sequence only two beams could be erected. By rigging the two members “high and low,” the top member cleared the top of columns while the bottom member was connected into final position.

## 1926.761(c) *Special training programs*

The employer shall provide special training to employees engaged in the following activities

**1926.761(c)(2) Connector procedures.** The employer shall ensure that each connector has been provided training in the following areas:

1926.761(c)(2)(i) The nature of the hazards associated with connecting; and

1926.761(c)(2)(ii) The establishment, access, proper connecting techniques and work practices





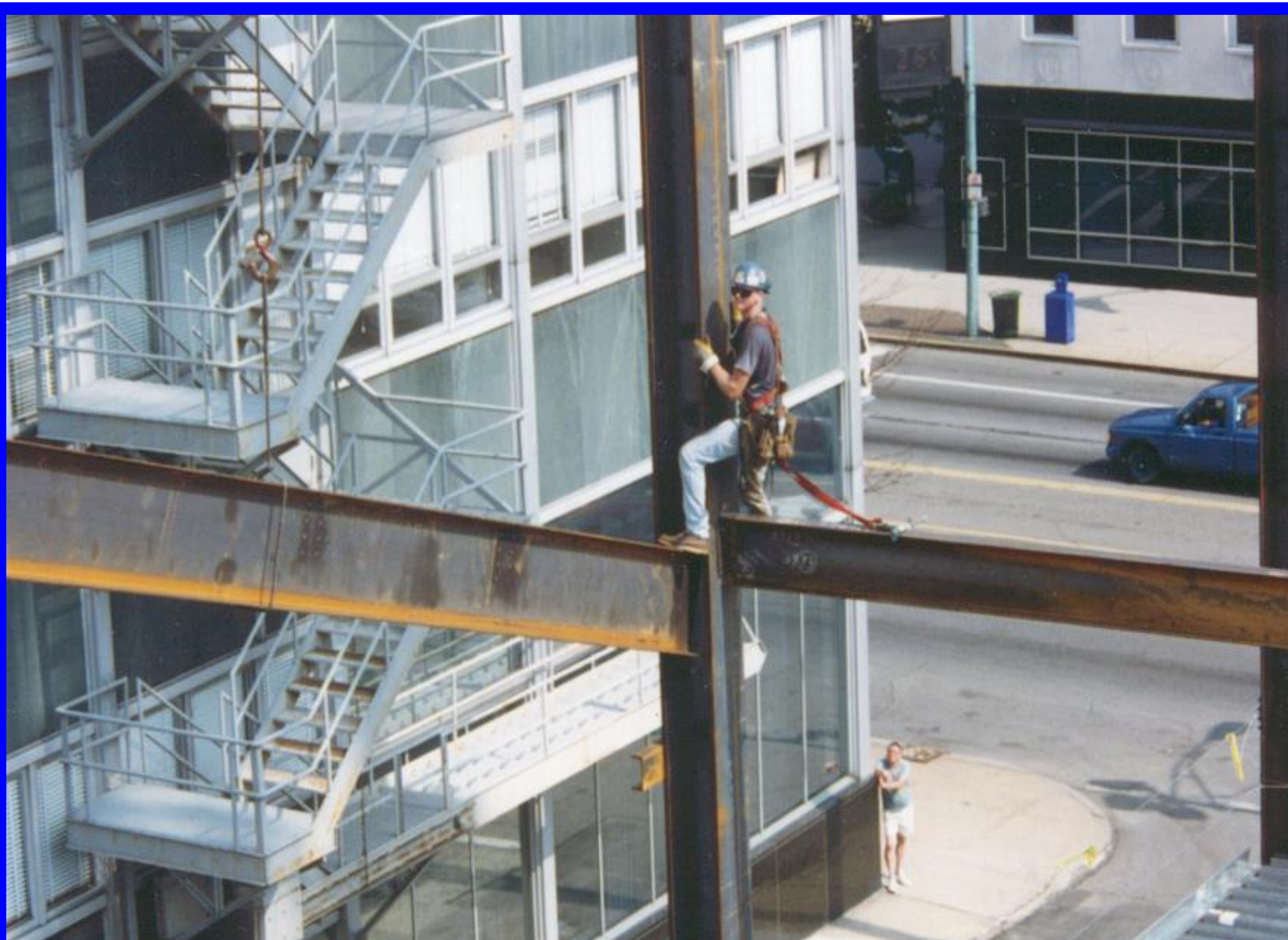


## **Verification of concrete strength & column anchorage**

**Prior to erecting columns, connectors should ensure that the steel erector has received written notification from the controlling contractor that the concrete in footings, piers, and footings is either 75% of design strength or sufficient enough to support loads during steel erection.**

**All columns shall be anchored by a minimum of 4 anchor bolts to provide added stability and prevent collapse hazards to connectors.**

# Fall Protection During Connecting



- **Between 15 & 30 feet connectors must be provided with and wear personal fall arrest system, and be able to tie-off.**

## Criteria for fall protection equipment

- When fall arrest systems and equipment are used during steel erection activities, they must be erected, used, and maintained in accordance with the *Standard*.
- These systems must be installed by a “*qualified person*”.



# Avoid walking top flange of free-Floating Beams

**Each connector shall be trained on the nature of the hazards associated with connecting.**

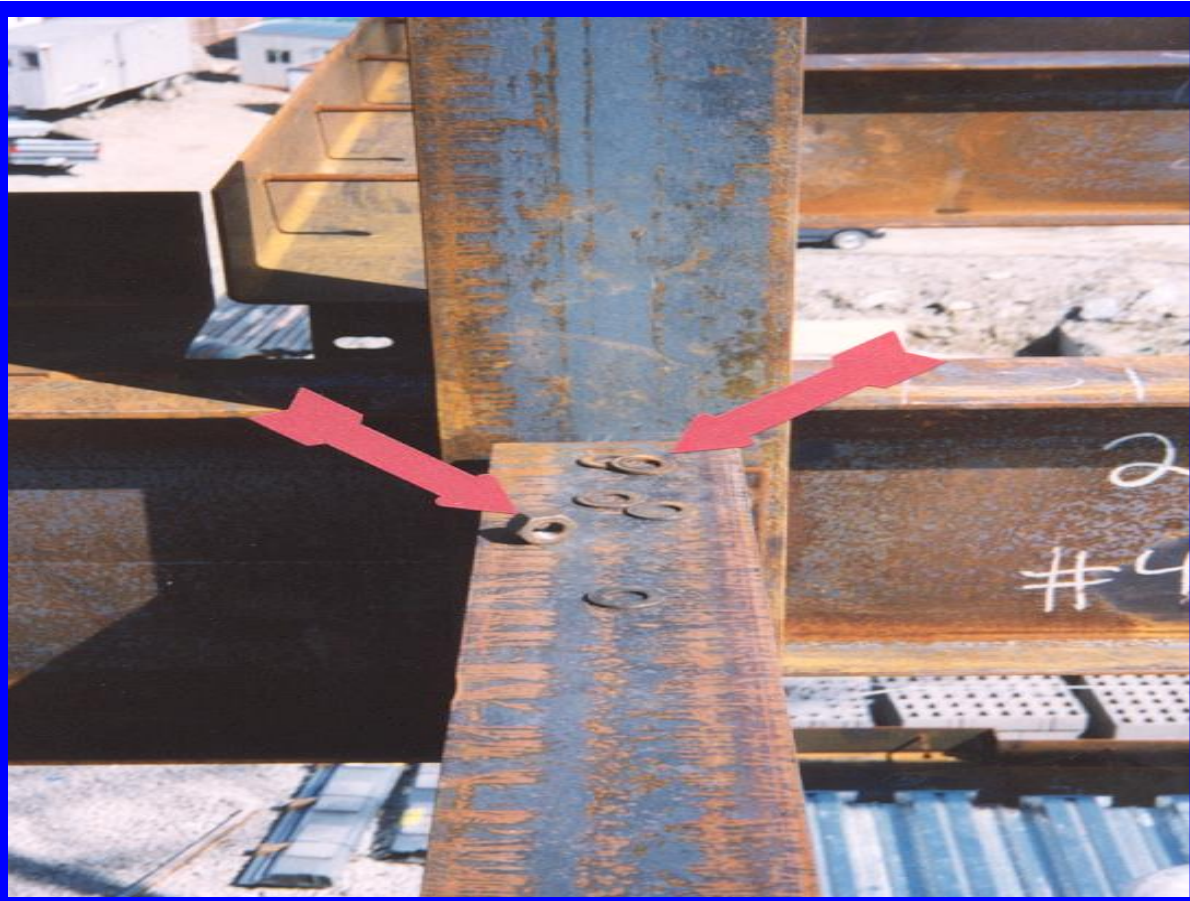


**After making the first end of a beam to column connection, connectors must avoid walking the top flange of “free-floating” beams to reach the other end.**



# Avoiding “Slip Hazards” From Tools and Bolts

**Each connector shall be trained on the nature of the hazards associated with connecting.**



**During the steel erection process it is important to remove any loose items such as nuts, bolts, washers, etc. from the top flanges of beams that would create “slipping hazards” to connectors and other ironworkers.**



# Double connections over a column

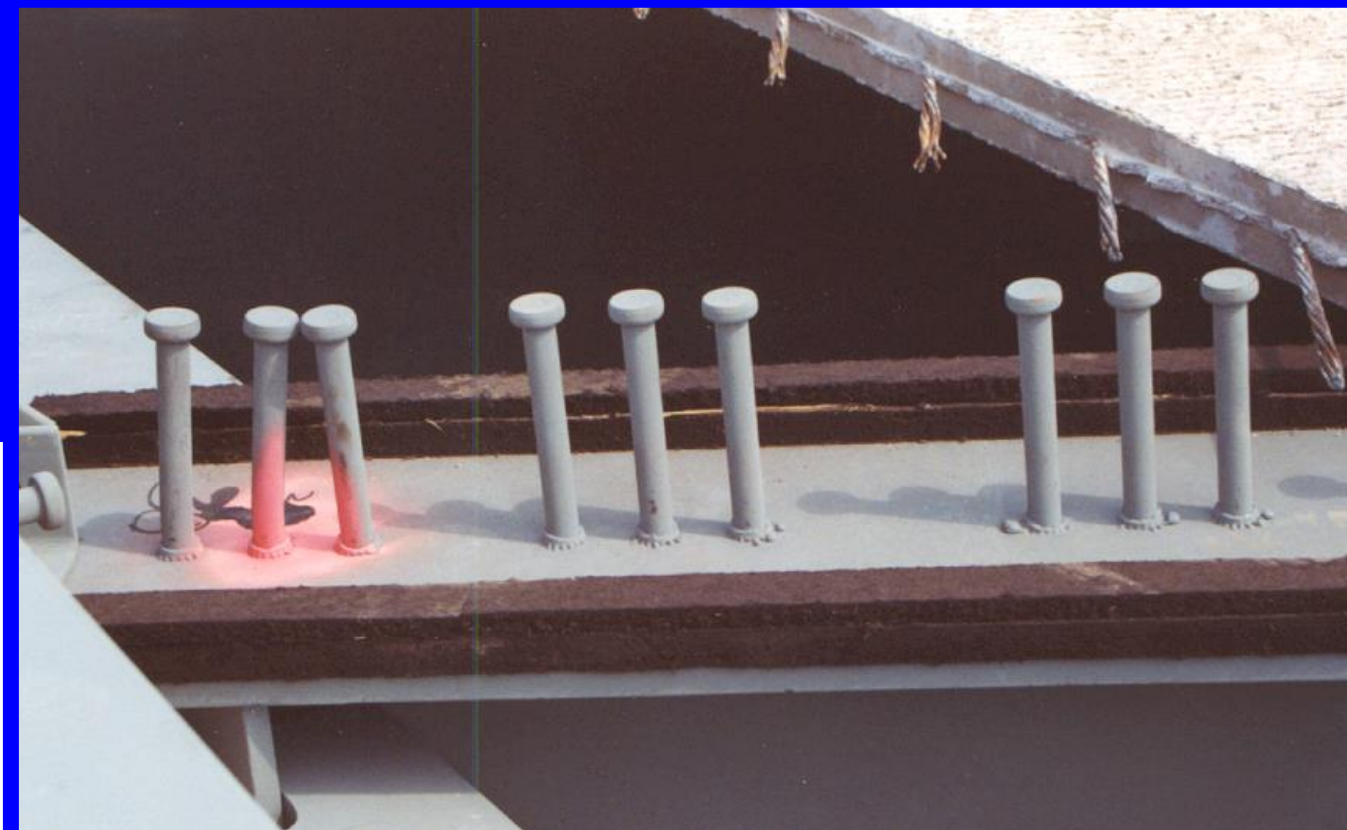
*Double connections over columns be provided with seat lugs or other devices to secure the connection at all times during initial connecting to prevent the potential of structural collapse.*



**Connectors must not erect members designed with double connections unless seat lugs or other staggered connections are provided.**

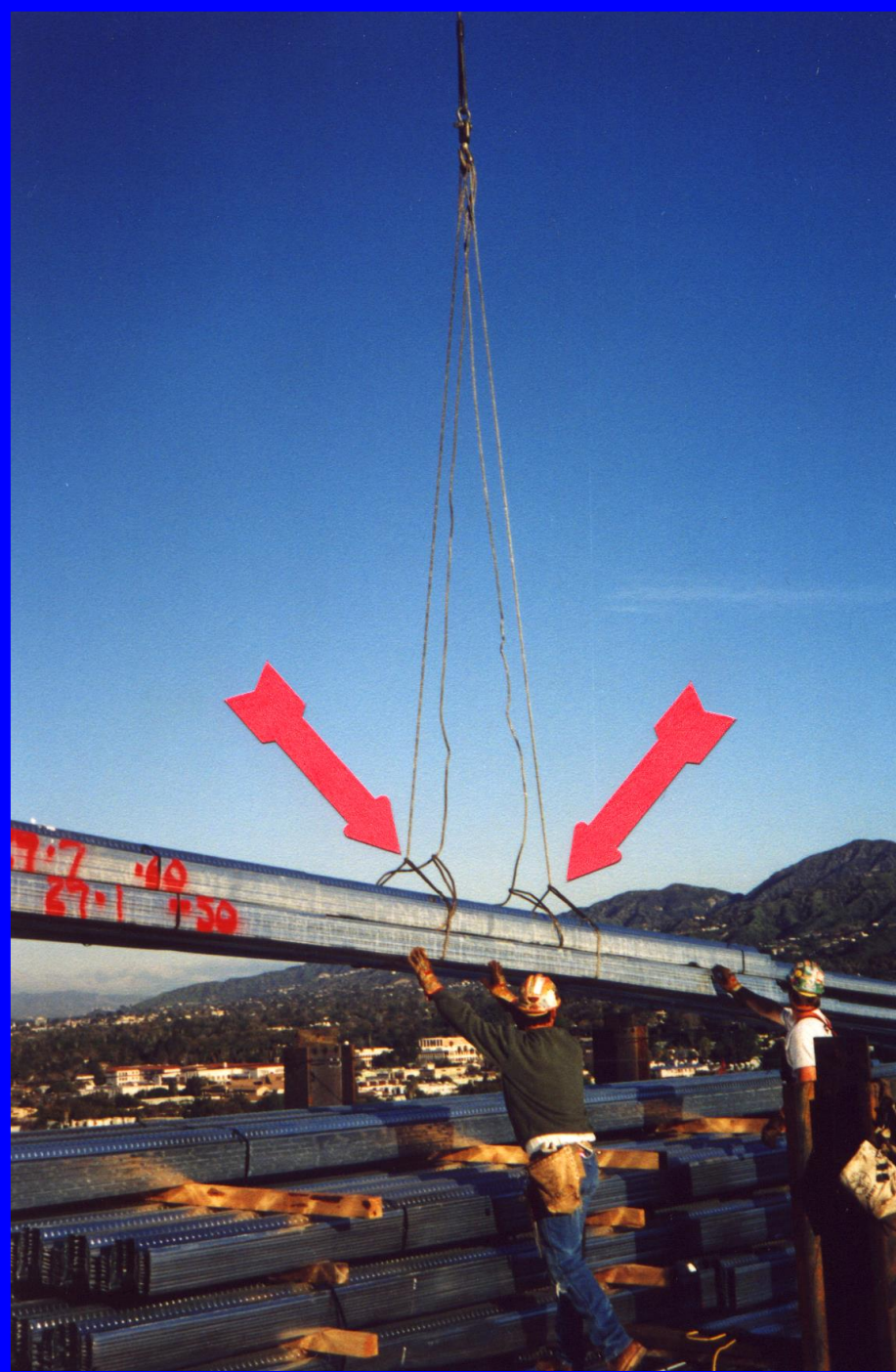
# Avoiding “tripping hazards” to Connectors

Shear connectors, 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.



Shear connectors that are fabricated on beams cannot “project vertically or horizontally” across the top flanges of beams so that they create a tripping hazard to workers.

# Controlled Decking Zones





# 1926.761(c) *Special training programs*

The employer shall provide special training to employees engaged in the following activities

**1926.761(c)(3) *Controlled Decking Zone Procedures.*** Where CDZs are being used, the employer shall assure that each employee has been provided training in the following areas:

1926.761(c)(3)(i) The nature of the hazards associated with work within a controlled decking zone; and

1926.761(c)(3)(ii) The establishment, access, proper installation techniques and work practices



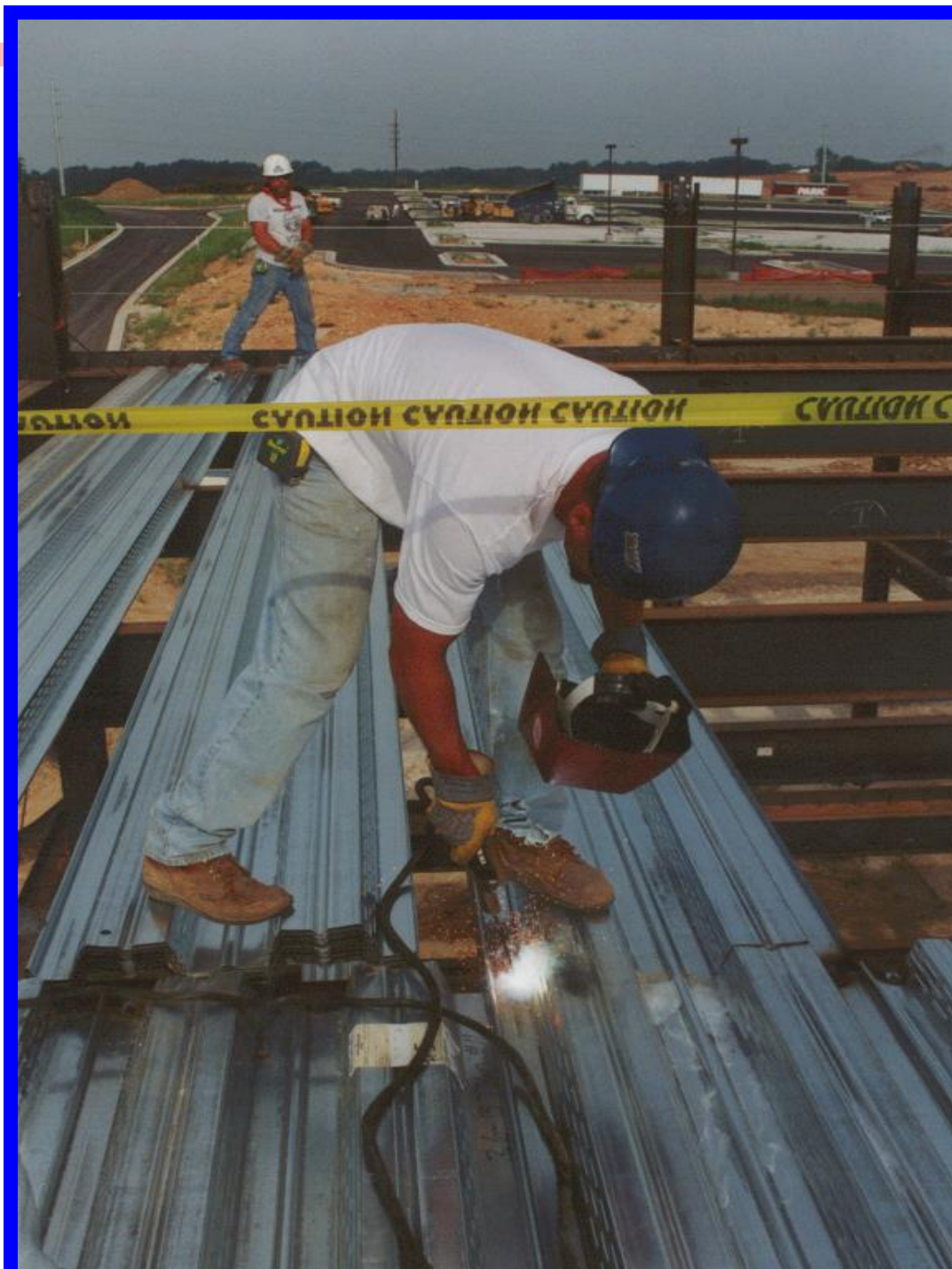


# Special Training Requirements for a CDZ

- **Where a CDZ is being used, the employer shall assure that each affected employee has been provided training.**

# Controlled Decking Zone (CDZ) Definition:

**A CDZ means an area established specifically for the initial placement and securing of metal decking where access to the area is restricted and work may take place without the use of a personal fall arrest system.**



## Limited access and area of a CDZ



- The CDZ shall be limited to that area where metal decking is initially being installed and forms the leading edge work.

# Competent Person

**The implementation of a CDZ shall be under the supervision of a competent person.**



## Fall Protection Requirements

- Each employee working at the leading edge in a controlled decking zone shall be protected from fall hazards of more than two stories or 30 feet, whichever is less, by the use of a personal fall protection system.



# Unauthorized Access to a CDZ

- Detail work such as installing flashing along interior floor opening is not allowed in a CDZ.



## Use of control lines in a CDZ



- The CDZ shall be defined by a control line or means that restricts access.
- Control lines shall erected not less than 6 feet from the unprotected leading edge.



## Boundaries of a Controlled Decking Zone



- The boundaries of a CDZ shall be designated and clearly marked. The CDZ shall not be more than 90 feet wide and 90 feet deep from any leading edge.

# Limits to Unsecured Deck Areas



- During the installation process, field adjustment of deck panels is necessary to properly align each sheet prior to tack welding. The area of decking without completed safety deck attachment shall not exceed 3000 square feet.

## Installation of safety deck attachments



- Safety deck attachments shall be performed in the CDZ from the leading edge back to the control line with at least 2 attachments for each panel.

Ensure Joists are  
Lap Spliced



## Avoiding “Sheet Slips” & Falls Through Decking

- **Serious decking accidents can occur if sheets are not tightly laid and lap splices interlocked to prevent the sheets from sliding open.**
- **Notice the gap between the sheets where the male and female ends of the sheet.**
- **Ironworkers rough laying decking must ensure that sheets are properly interlocked to prevent “sheet slips” and falls through the decking sheets.**



## Exterior Fall Hazards During Flashing Activities

- The use of a standard cable guardrail system along the perimeter should have been installed immediately after the floor decking was laid.
- This activity is not allowed to be performed within the controlled decking zone.

# Unprotected Floor Openings at Moment Connections



- Unprotected floor openings must be protected when the leading edge work stops.

# Adequate Floor Coverings



- A typical floor opening in a tiered building that was properly covered during the decking process.

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1926.761(c)(2) ***Connector Procedures***

1926.761(c)(3) - ***Controlled Decking Zone Procedures***





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