Fall Protection for General Industry and Construction

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4,585 workers were killed on the job in 2013 (3.3 per 100,000 full-time equivalent workers) – on average, 88 a week or more than 12 deaths every day. (This is the second lowest total since the fatal injury census was first conducted in 1992.)
Falls in Construction

FALLS ARE THE LEADING CAUSE OF DEATH IN CONSTRUCTION. In 2013, there were 291 fatal falls to a lower level out of 828 total fatalities in construction. These deaths are preventable.
Construction Fatal Four

- Falls
  - 302
  - 36.5%

- Electrocution
  - 71
  - 8.6%

- Struck-by
  - 84
  - 10.1%

- Caught By
  - 21
  - 2.5%
Subpart M – Fall Protection

Requirement and criteria for fall protection in construction.

Examples:

- Heights of 6 feet or more above lower levels
- Fall objects
- Falls from tripping
- Falling through holes
- Protection walking and working around equipment

Employers’ Responsibilities

- Assess the workplace to determine if walking or working surfaces have necessary strength and structural integrity to safely support workers.
- Determine the work surfaces will safely support work activity.
- Employer must determine whether fall protection is required.

29 CFR 1926.501 and 1926.502
Falls

The following hazards cause the most fall-related injuries:

• Unprotected Sides, Wall Openings, and Floor Holes
• Improper Scaffold Construction
• Unguarded Protruding Steel Rebars
• Misuse of Portable Ladders
Am I in Danger?

How do I avoid Hazards?

• Use at least one of the following whenever employees are exposed to a fall of 6 feet or more above a lower level:
  – Guardrail Systems, Safety Net Systems, Personal Fall Arrest Systems

• Cover or guard floor holes as soon as they are created during new construction.

• Existing structures, survey the site before working and continually audit as work continues. Guard or cover any openings or holes immediately.

• Construct all floor hole covers so they will effectively support two times the weight of employees, equipment, and materials that may be imposed on the cover at any one time.

Am I in Danger?

How Do I Avoid Hazards?

• Construct all scaffolds according to the manufacturer's instructions.
• Install guardrail systems along all open sides and ends of platforms.
• Use at least one of the following for scaffolds more than 10 feet above a lower level:
  – Guardrail Systems
  – Personal Fall Arrest Systems
• Provide safe access to scaffold platforms. [Scaffold Access]
• Do not climb cross-bracing as a means of access.
How Do I Avoid Hazards?

• Guard all protruding ends of steel rebar with rebar caps or wooden troughs, or
• Bend rebar so exposed ends are no longer upright.
• When employees are working at any height above exposed rebar, fall protection/prevention is the first line of defense against impalement.
How Do I Avoid Hazards?

• Position portable ladders so the side rails extend at least 3 feet above the landing.
• Secure side rails at the top to a rigid support and use a grab device when 3 foot extension is not possible.
• Make sure that the weight on the ladder will not cause it to slip off its support.
• Before each use inspect ladders for cracked or broken parts such as rungs, steps, side rails, feet and locking components.
• Do not apply more weight on the ladder than it is designed to support. [Ladder Safety]
• Use only ladders that comply with OSHA design standards. [29 CFR 1926.1053(a)(1)]
Falls are among the most common causes of serious work-related injuries and deaths. Employers must take measures in their workplaces to prevent employees from falling off overhead platforms, elevated work stations or into holes in the floor and walls.
Prevent Employees From Being Injured from Falls

- Guard every floor hole into which a worker can accidentally walk by use of a railing and toeboard or a floor hole cover.
- Provide a guardrail and toeboard around every open-sided platform, floor or runway that is 4 feet or higher off the ground or next level.
Prevent Employees From Being Injured from Falls

• Regardless of height, if a worker can fall into or onto dangerous machines or equipment (such as a vat of acid or a conveyor belt), employers must provide guardrails and toeboards to prevent workers from falling and getting injured.

• Other means of fall protection that may be required on certain jobs include safety harness and line, safety nets, stair railings and handrails.
OSHA Required Employers

• Provide working conditions that are free of known dangers.
• Keep floors in work areas in a clean and sanitary condition.
• Select and provide required personal protective equipment at no cost to workers.
• Train workers about job hazards in a language that they can understand.
Hazards Include:

- Falls from great heights
- Hazards associated with hoisting
- Inclement weather
- Falling objects
- Equipment failure
- Structural collapse

Risk of Fatal Injury 25 to 30 times higher than average worker.

FY 2014 – 12 Fatalities
### INCIDENT SUMMARY

- **Incident type:** Fall
- **Weather conditions/Time of day:** Clear, warm, 70°F
- **Type of operation:** Telecommunications tower construction
- **Size of work crew:** 4
- **Worksite inspection conducted:** Yes
- **Competent safety monitoring on site:** Yes
- **Safety and health program in effect:** Yes
- **Training and education for workers:** Inadequate
- **Occupation of deceased worker:** Tower climber
- **Age/Sex of deceased worker:** 55/M
- **Time on job:** Over 10 years
- **Time at task:** 3 days
- **Time employed/classification (FT/PT/Temporary):** Not Available
- **Language spoken:** Not Available
- **Union/Non-Union:** Not Available

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**Figure 1:** Components (parts) of a ladder safety device [fall protection equipment]. (Illustrates correct navel O-ring to safety sleeve connection for this specific device.)

A worker was climbing down a 400-foot telecommunications tower when he lost his footing. The ladder safety device or system (consisting of the carabiner, carrier rail, safety sleeve and body harness) he used failed to arrest his fall. The safety sleeve did not activate correctly to stop the worker’s fall, the chest D-ring ripped out of the body harness, and he plunged 90 feet to his death.
Likely Causes of Incident

- The worker did not receive proper training on the ladder safety device he used.
- The pawl of the sleeve was defective. The defect prevented the device from activating properly to stop a fall within 2 feet (.61 meters) of its occurrence (29 CFR 1926.1053(a)(22)(iii)). This was identified in a safety notice issued after the incident and as a result of OSHA’s investigation.
- The weight of the worker, his tools and equipment was more than the 310-pound rating of the body harness.
- The safety sleeve was connected to the harness at the chest D-ring instead of to the navel D-ring as specified by the manufacturer of the ladder safety device.
- The body harness was not a component of the manufacturer’s ladder safety device.
ACCIDENT SUMMARY

- Accident Type: Fall
- Weather Conditions: Sunny
- Type of Operation: Construction
- Size of Work Crew: 3
- Union or Non-Union: Non-Union
- Worksite inspections conducted: No
- Competent safety monitoring on-site: No
- Safety and Health Program in effect: Yes (but inadequate)
- Training and education for employees: No fall protection training
- Craft of employees: Roofer
- Age/Sex: 27/Male
- Experience at this type of work: 1 day
- Time on project: about 1 hour
The three workers arrived at the work site around 10:00 am. The workers then accessed the roof by means of a secured ladder to take up tar paper and prepare for the roofing job. They failed to install slide guards or use any other form of fall protection. The victim went onto the roof (6/12 pitch, and 17’ 7” from ground to eave) pulling his air hose and laying it out on the roof for his nail gun. During this process the victim lost his balance and fell onto the concrete patio below. The victim was transported via life flight to the local hospital and then was transported via life flight to a larger regional hospital where he later died from injuries sustained in the fall.
Accident Prevention Recommendations

1. Protect all employees who are engaged in residential style construction and working at elevation, by a guardrail system, personal fall arrest system, safety net system or slide guard system.

2. Ensure employees and subcontractors are properly trained on the use and operation of the previously mentioned systems, and are aware of hazardous conditions on the work site.

3. Make provisions prior to the commencement of the job to provide prompt medical attention in the event of an injury. Workers had no procedures and no method to contact emergency response personnel. It took 45 minutes from the time of the fall to emergency personnel arrived on the scene.

4. When no infirmary, clinic, hospital or physician is reasonably accessible in terms of time and distance, the employer shall ensure that an employee is trained in First-Aid and CPR to administer emergency attention in the event of an accident.

https://www.osha.gov/Region7/fallprotection/fatfact68.pdf
**INCIDENT PREVENTION**

- Ensure that workers who climb telecommunications towers to perform construction activities are protected from falls. For example, workers can use ladder safety devices meeting the criteria of 29 CFR 1926.1053(a)(22) or personal fall arrest systems (PFAS) meeting the criteria of 29 CFR 1926.502(d). A PFAS is used to arrest a worker in a fall from a working level. It consists of an anchorage, connectors, and a body harness, and may include a lanyard, a deceleration device, a lifeline, or a suitable combination thereof.

- Train workers to safely erect, use, maintain and disassemble the ladder safety device (29 CFR 1926.1060) or the PFAS (29 CFR 1926.503), before they begin working. Training should include how to identify hazards, inspect the equipment and cover all fall protection equipment needed for the job. For example, train employees on how to safely use positioning devices (29 CFR 1926.502(e)) when working on an elevated vertical surface.

- Never use defective equipment. Inspect ladder safety devices and PFAS (29 CFR 1926.502(d)(21)) for visible defects or damage, such as parts that are not working properly, wear, broken stitches or bad buckles—before each use, after any incident that could cause damage and as recommended by the manufacturer. Remove from service fall protection equipment activated during a fall and make sure that it is inspected by a competent person (29 CFR 1926.32(f)) and determined to be undamaged before using it again (29 CFR 1926.502(d)(19)). Inspect ladders for visible defects on a periodic basis, and after any incidents that could affect their use (29 CFR 1926.1053(b)(15)).

- Research the product’s safety history before purchase. Register the equipment with the manufacturer to receive safety notices and recalls. In this case, the manufacturer issued a safety notice after the incident, instructing users to tie off to a shock absorbing lanyard, in addition to using the ladder safety device.

- Do not exceed the manufacturer’s load rating for the ladder safety device and its components. Overloading the device can cause it to fail. Include the weight of the worker and any tools or equipment he or she may be carrying in the load calculation. Fixed ladder safety devices and related support systems used in the construction industry must be capable of withstanding a drop test consisting of an 18-inch drop of a 500-pound weight (29 CFR 1926.1053(a)(22)(ii)).

- Connect the safety sleeve to the correct D-ring on the body harness as specified by the manufacturer (Figure 1). This varies with different manufacturers (for example, navel or chest D-ring). Incorrectly connecting the parts can prevent the equipment from working properly and hinder movement up and down the ladder.

- Ensure that the individual components (Figure 1) of the ladder safety device can be used together (are compatible). Components that are not designed to work together can lead to serious injuries or death. Employers must provide the right fall protection equipment for the job (29 CFR 1926.1051(b); 29 CFR 1926.501).
Select a topic below to view information that will help you identify and control the hazards that commonly cause the most serious construction injuries.

- Electrical Incidents
- Falls
- Struck-by
- Trenching and Excavation

Standards Highlights
No employer who performs any part of a construction contract shall require any employee to work in surroundings or under conditions which are [29 CFR 1926.20(a)(1)]:

- Unsanitary, and/or
- Hazardous, and/or
- Dangerous to health or safety.

Construction Industry Web Page

OSHA QuickTakes

Assistant Secretary Mike to protect communication workers

Assistant Secretary Dr. David Michaels and OSHA are concerned about the high number of fatalities in the communication tower industry. The industry has experienced a significant increase in fatalities in recent years, leading to the introduction of new safety standards and guidelines.

OSHA is working to improve safety in the industry and is collaborating with various stakeholders to develop a comprehensive approach to addressing this issue.

OSHA Focuses on Protecting Cell Tower Employees after Increase in Worker Fatalities

WASHINGTON — In May 2014, a communications worker fell to his death from a cell tower in Texas. The incident raised concerns about worker safety in the industry.

OSHA has taken steps to address these concerns, including the development of new guidelines and the implementation of training programs to educate employees on safety procedures.

No More Falling Workers

OSHA has taken a number of measures to improve safety in the industry, including the development of new guidelines and the implementation of training programs. These efforts have resulted in a significant reduction in the number of fatalities in the industry.

OSHA is committed to ensuring the safety and health of workers in the communication tower industry, and is working to continue to improve safety standards and practices.

For more information, visit the OSHA QuickTakes blog post: [OSHA QuickTakes Blog Post](https://www.osha.gov/doc/topics/communicationtower/index.html#Compliance)

Assistant Secretary Dr. David Michaels

OSHA Safety and Health Director

[OSHA web page](https://www.osha.gov/doc/topics/communicationtower/index.html#Compliance)
Plan. Provide. Train

Three Simple Steps

1. Contractors and workers can **Plan** together, before every job, to work safely at heights.

2. Contractors must **Provide** the right equipment for working at heights, and workers need to use that equipment.

3. Contractors and workers need to be **Trained** to use the equipment and to work safely.
Falls are the leading cause of death:

- FY 2010 – 264
- FY 2011 – 260
- FY 2012 – 300
- FY 2013 – 302
Notre Dame – Scissor Lift Fatality

- Declan Sullivan
- 20 years old
- From a working class family in Chicago
- First in his family to go to college
- Job was to video tape Notre Dame football practice
Notre Dame – Scissor Lift Fatality

• 10/27/10
• Coach Kelly called for outdoor practice
• NWS had issued high wind warnings
• Largest front of severe winds storms to move through the area in 70 years
Notre Dame – Scissor Lift Fatality

- Declan arrived at practice, got into the lift and raised it almost 50’ in the air
- The wind was gusting 50 to 60 mph
- At 3:55pm he tweeted “Gusts up to 60 mph – well today will be fun at work – I guess I’ve lived long enough”
- At 4:06pm he followed up with: Holy @#$*# - Holy @#$*# this is terrifying”
- That was the last message posted
Suggested: Critical Safety Outcomes for Scissor Lifts

- Use lift only when appropriate and necessary
- Right type of lift for job is used
- Lift is in good condition
- Lift is set up properly
- Lift is operated properly
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best source of information on OSHA is on the web at
www.osha.gov
Or call 1-800-321-OSHA