



Fall Protection

Susan Harwood Grant Training Program 2019

Introduction & Basic Requirements



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Learning Objectives

- Understand employee rights and employer responsibilities under the OSH Act
- Identify OSHA requirements for fall protection in the construction industry
- Recognize fall hazards in various types of construction activities



Your Rights Under OSHA

- **You have the right to:**
 - A safe and healthful workplace
 - Know about hazardous chemicals
 - Information about injuries and illnesses in your workplace
 - Complain or request hazard correction from employer
 - Safety & Health Training
 - Hazard exposure and medical records
 - File a complaint with OSHA
 - Participate in an OSHA inspection
 - Be free from retaliation for exercising safety and health rights



Employer Responsibilities

- Provide a workplace free from recognized hazards and comply with OSHA standards
- Provide safety & health training required by OSHA standards
- Keep records of injuries and illnesses
- Provide medical exams when required by OSHA standards and provide workers access to their exposure and medical records
- Not discriminate against workers who exercise their rights under the Act (Section 11(c))
- Post OSHA citations and abatement verification notices
- Provide and pay for PPE



Complain or Request Corrections

- Workers may bring up safety and health concerns in the workplace to their employers without fear of discharge or discrimination, as long as the complaint is made in good faith.
- Workers may file a complaint with OSHA if they believe a violation of a safety or health standard, or an imminent danger situation, exists in the workplace.
- OSHA regulations protect workers who complain to their employer about unsafe or unhealthful conditions in the workplace.



Complain or Request Corrections (cont.)

- Workers may request that their name not be revealed to the employer.
- If a worker files a complaint, they have the right to find out OSHA's action on the complaint and request a review if an inspection is not made.
- More information on workers rights and filing complaints can be found on the OSHA website at www.osha.gov/as/opa/worker/complain.html
- NOTE: Often the best and fastest way to get a hazard corrected is to notify your supervisor or employer.



Protection from Workplace Retaliation

- Protection from workplace retaliation means an employer cannot take “adverse actions” against workers, such as:
 - Firing or laying off
 - Blacklisting
 - Demoting
 - Denying overtime or promotion
 - Disciplining
 - Denial of benefits
 - Failure to hire or rehire
 - Intimidation/harassment
 - Making threats
 - Reassignment affecting prospects
 - Reducing pay or hours



How to File a Safety and Health Complaint

- Workers may report a whistleblower claim within 30 days of the incident.
- Online
- Fax
- Mail
- Telephone
- In-person



Falls Can Occur From Anywhere





Fall Onset

- The ***Onset Phase*** of a fall is extremely brief - it covers the period of time from when you first encounter the hazard that gives rise to the fall and ends the instant you lose control over your stability.





The Fall

- Because the onset of a fall is so rapid, it is physically impossible for you to:
 - realize you are falling
 - select and begin a muscular response in time to prevent the fall
- In other words, your coordinated neuromuscular response time is too long.





Fall Issues

- When you fall from a height you free fall and your body quickly builds up speed due to the force of gravity.
- When you fall, the path of your body could be a straight vertical line or an arc.





The Stop of the Fall

- When you strike a surface below your body will absorb most of the kinetic energy.
- You can be seriously or fatally injured.





Falls

- **Falls** are the *leading cause of fatalities* (35% in 2016) in the construction industry.
- The cost of care for injuries related to falls is a financial burden for the entire construction industry

Source: Bureau of Labor Statistics (BLS)



Leading Causes of Construction Fatalities

FATALITIES	2011	2012	2013	2014	2015	2016
FALLS to LOWER LEVEL	255	279	291	345	350	370
STRUCK BY	73	79	84	73	90	93
ELECTROCUTIONS	69	66	71	74	81	82
CAUGHT IN/BETWEEN	48	55	56	39	67	72

Source: BLS CFOI Data



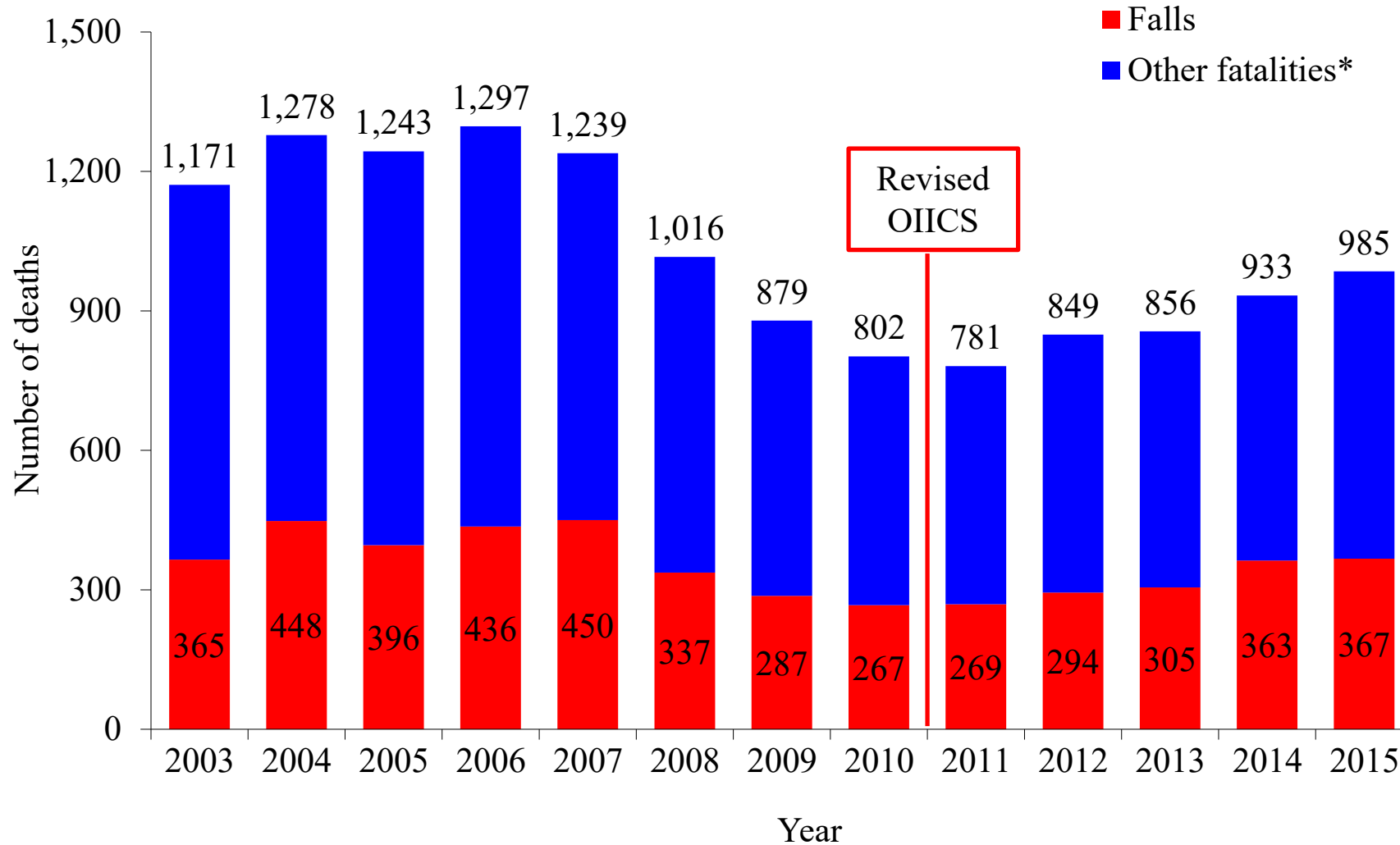
Fatal Falls- (CY 2015 & 2016)

- **Falls** – 350 out of 937 total deaths in construction in CY 2015 (37%)
- **Falls** – 370 out of 991 total deaths in construction in CY 2016 (35%)

BLS 2015 - 2016



Number of fatalities in construction, falls and other fatalities* 2003-2015



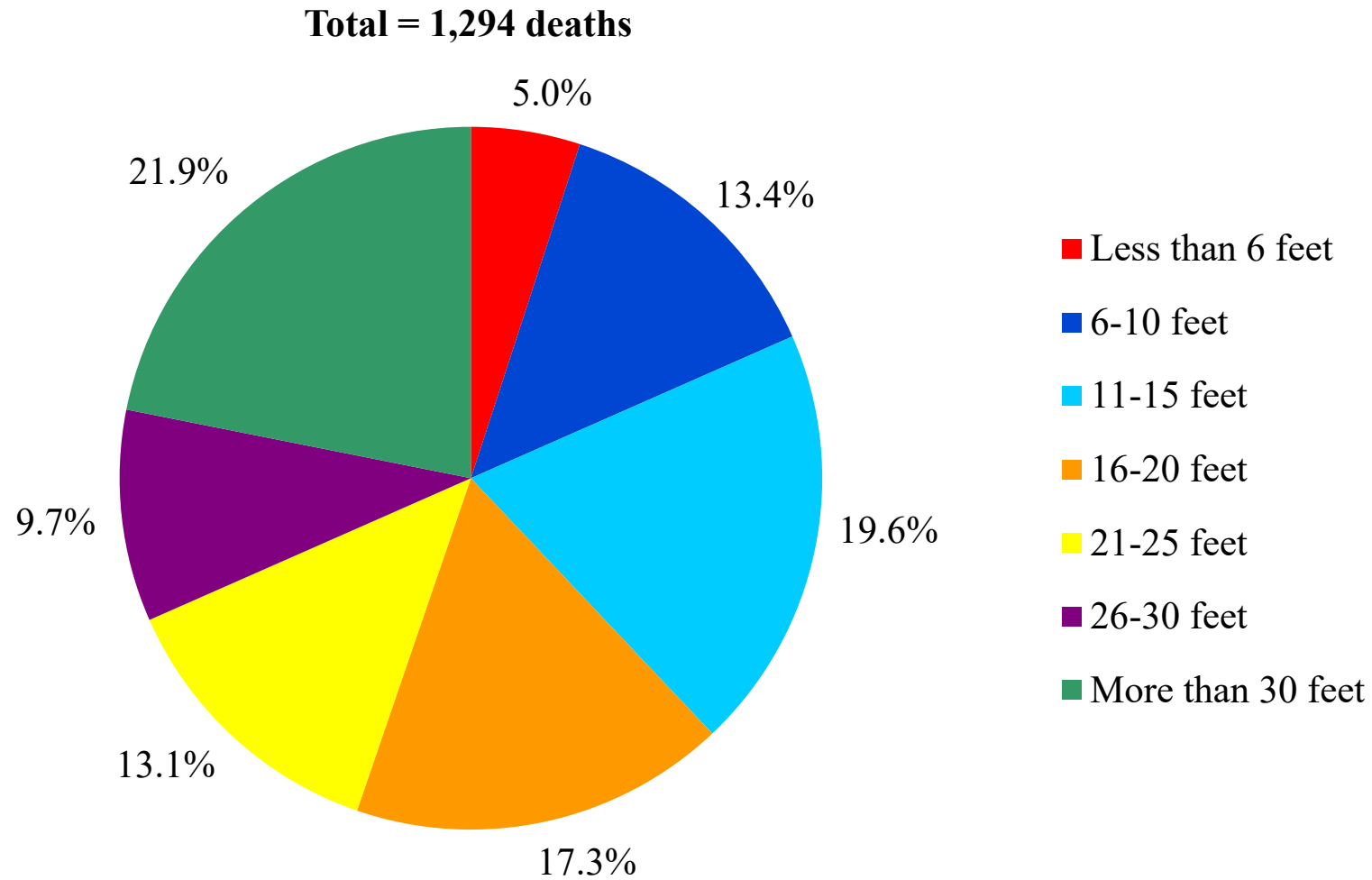
Note: In 2011, the CFOI switched to OIICS version 2.01 which categorizes slips, trips, and falls together. In previous years, slips and trips were categorized elsewhere.

* Other fatalities are fatalities from all causes except falls.

Source: U.S. Bureau of Labor Statistics, 2003-2015 Census of Fatal Occupational Injuries. Numbers were from the online CFOI database.



Fatal falls to a lower level in construction, by height of fall, sum of 2011-2015

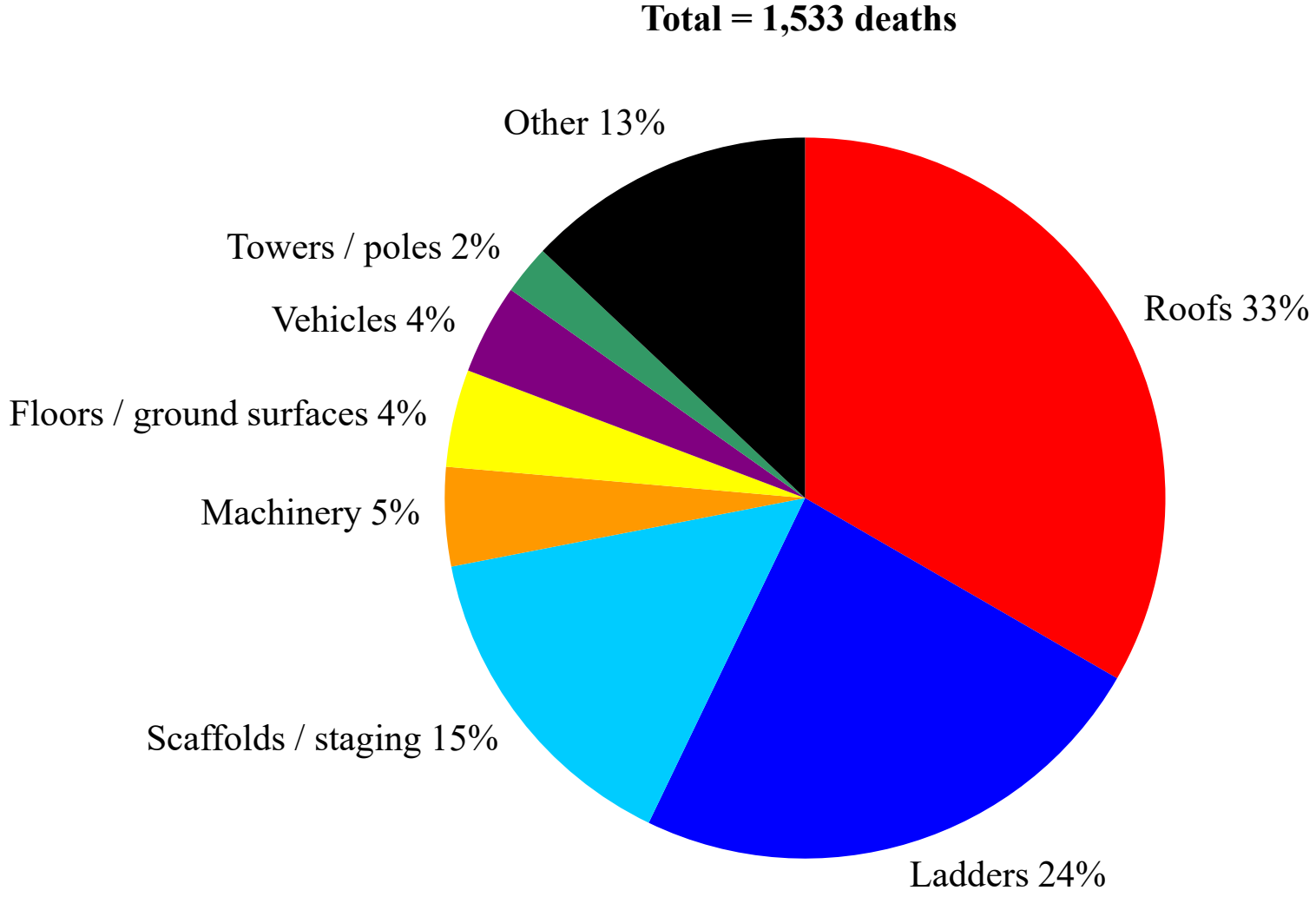


Note: Only falls to a lower level were included. There were 239 deaths without height information and therefore were excluded.

Source: Numbers were obtained from the BLS through special requests. The views expressed here do not necessarily reflect the views of the BLS.



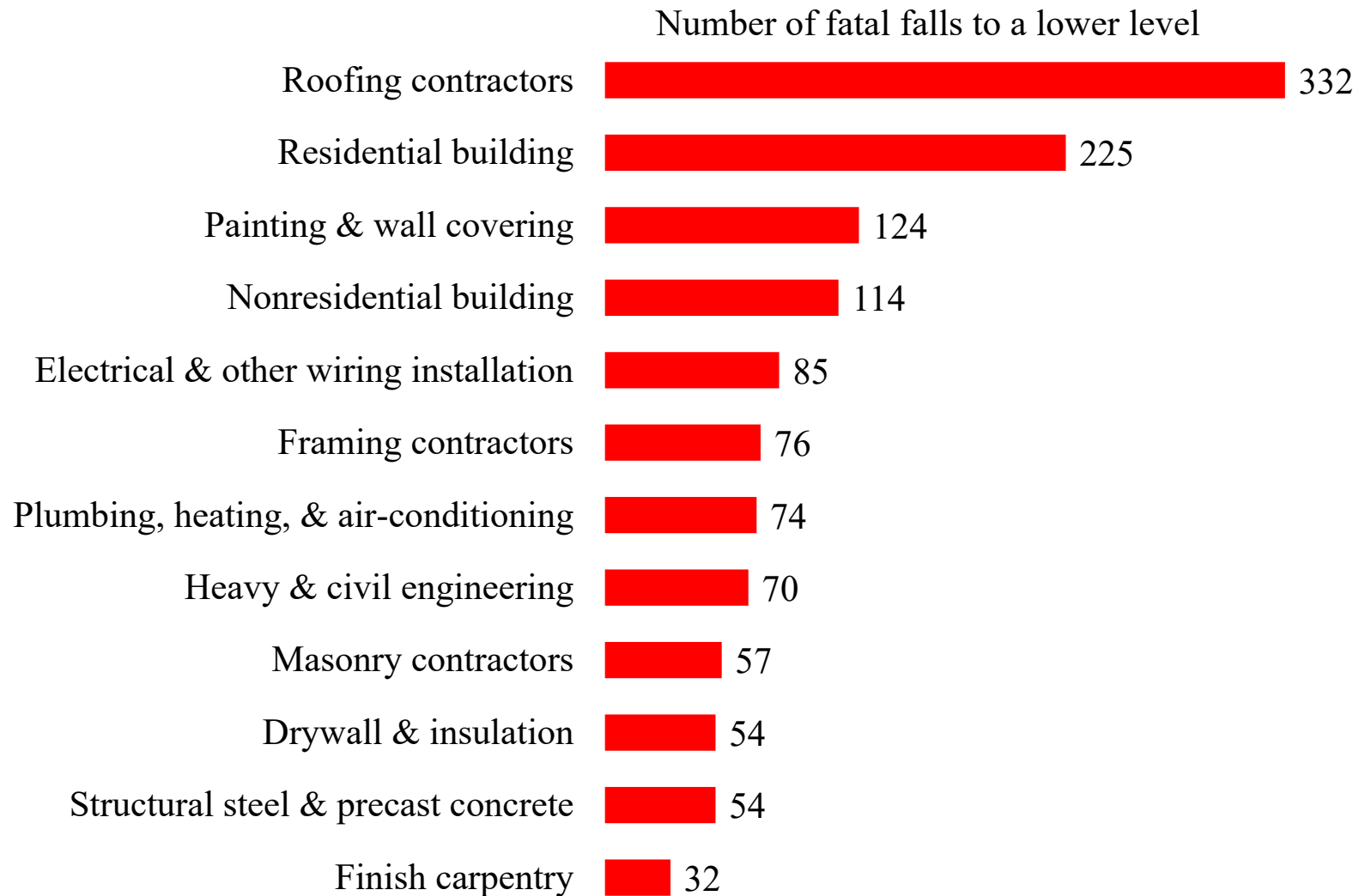
Fatal falls to a lower level in construction by primary source, sum of 2011-2015



Source: Numbers were obtained from the BLS through special requests. Calculations by the authors. The views expressed here do not necessarily reflect the views of the BLS.

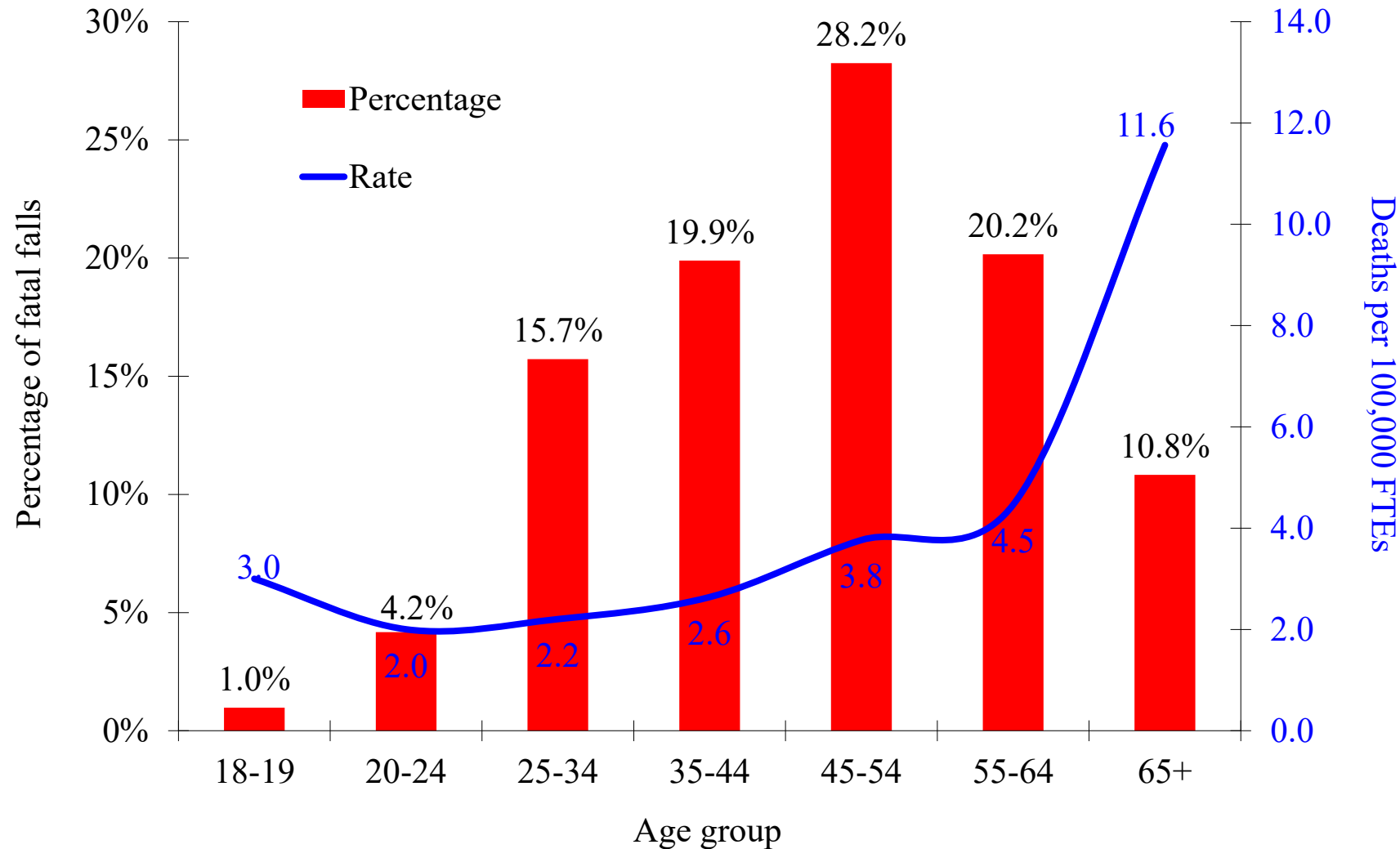


Number of fatal falls to a lower level, selected construction subsectors, sum of 2011-2015





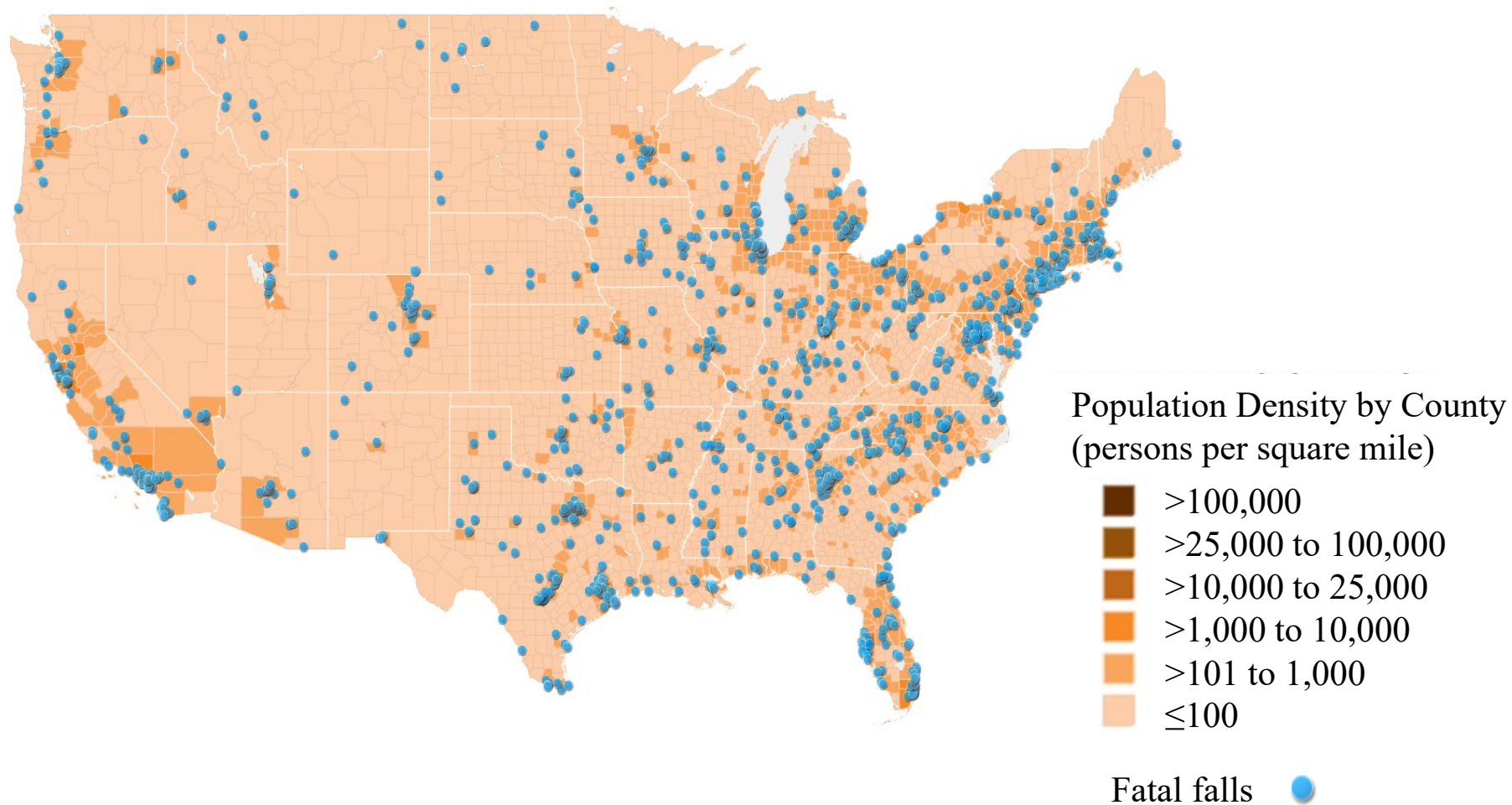
Percentage and rate of fatal falls to a lower level in construction, by age group, average of 2011-2015



Source: Numbers were obtained from the BLS through special requests. Numbers of FTEs were estimated using the Current Population Survey. Calculations by the authors.
The views expressed here do not necessarily reflect the views of the BLS.



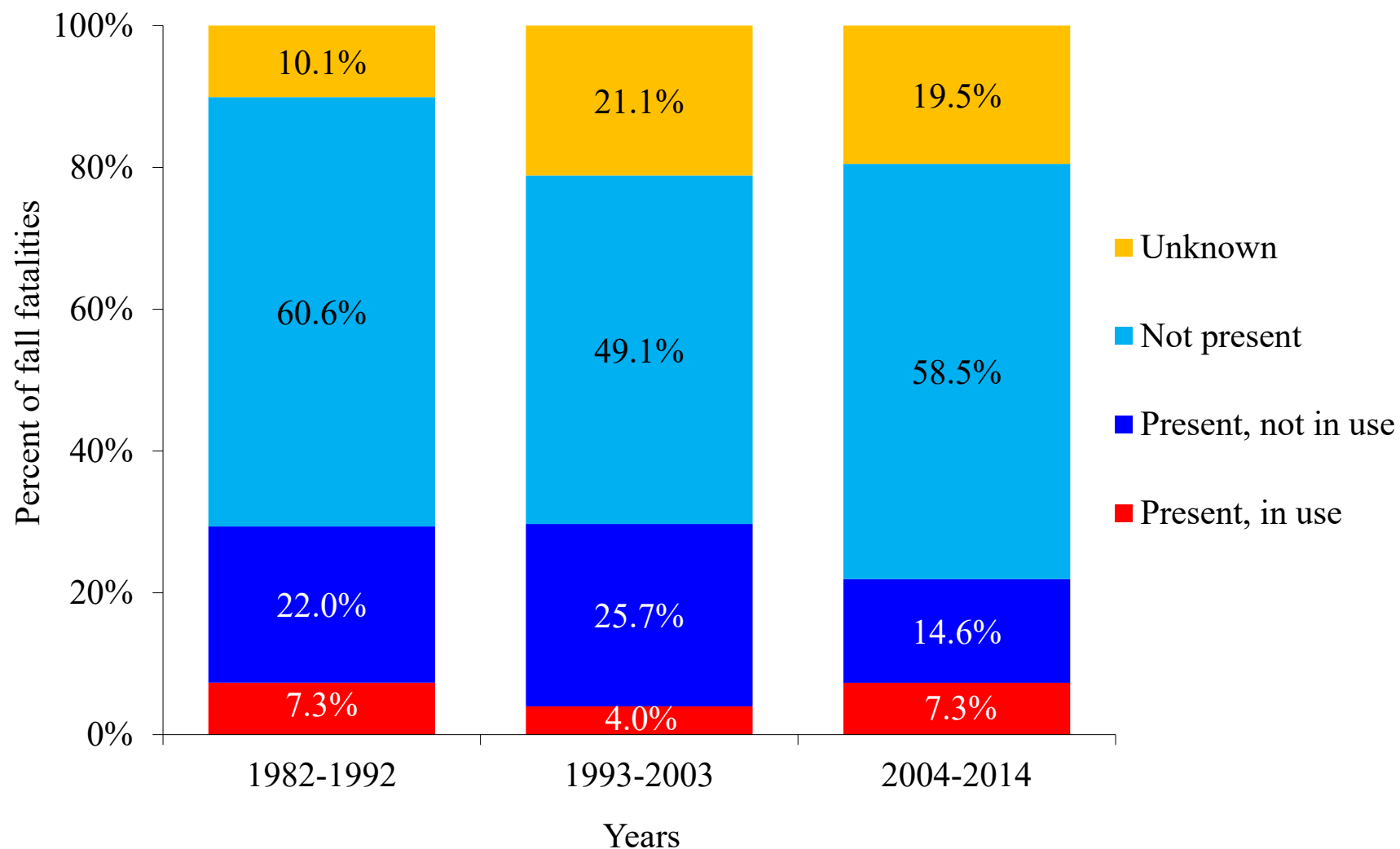
Fatal falls in construction shown on the CPWR construction fatality map, sum of 2011-2016, by county-level population density



Source: 1. CPWR Construction Fatality Map; Public fatality data from news reports and OSHA investigations.
2. Population density using Census 2010 geographies from ©2013 Esri.



NIOSH FACE reports, fatal falls in construction, by Personal Fall Arrest System (PFAS) status, 1982-2014





Falls are Regulated by Various OSHA Standards

- **Subpart L** – 1926.451-454 - Scaffolds
- **Subpart M** – 1926.501-503 - Fall Protection
- **Subpart R** – 1926.760 – Steel Fall Protection
- **Subpart Q** – 1926.701 - Concrete
- **Subpart X** – 1926.1052 – Stairways
- **Subpart X** – 1926.1053 – Ladders
- **Subpart CC** – 1926.14 23 - Cranes & Derricks



What Is Fall Protection?

- A series of reasonable steps taken to cause elimination or control of the injurious effects of an unintentional fall while accessing or working at height.



Fall Protection

- **Passive Fall Protection Systems**
 - guardrail systems
 - hole covers
 - warning lines
- **Active Fall Protection Systems**
 - fall restraint
 - fall arrest
 - safety nets



Philosophies of Fall Protection

Stop/Prevent The Fall



Do these stop/prevent the fall?

Catch The Fall





Planning for Fall Protection

- Best practice dictates that fall protection becomes an integral part of the project planning process, from constructability, to systems installation, to use and maintenance
- A project cannot be truly safe unless fall protection is incorporated into every phase of the construction process
- Planning will keep workers safe and minimize liability for all parties involved



Controlling Fall Exposures

- Select fall protection systems appropriate for given situations.
- Use proper construction and installation of safety systems.
- Train workers in the proper selection, use, and maintenance of fall protection systems.
- Supervise employees to use safe work practices
- Evaluate the effectiveness of all steps



Competent Person

- 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 the authorization to take prompt corrective measures to eliminate them.



Qualified Person

- One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter



Unprotected Edges

- All unprotected sides and edges over 6 feet above lower levels must be protected from falling by the use of guardrail systems, safety net systems, or personal fall arrest systems.
- Distance is not considered a protection. Therefore distance from the edge cannot be a factor on whether proper fall protection is utilized.





Installation of Fall Protection Systems

- Fall protection in the form of restraint or fall arrest **must be utilized** during installation of guardrails, warning lines, hole covers, safety nets, etc. where ever it is feasible to do so.
- If it is not feasible or would create a greater hazard, very specific safety planning and training must be accomplished. Installation should then be done in a properly established Controlled Access Zone with the use of a Safety Monitor.
- A “first man up” principal may be required when setting initial fall arrest anchors. The recommendation described above should be followed.



Guardrail Requirements

- Guardrails must fully extend around the perimeter.
- They can be made of wood, cables, pipe or steel.
- Top Rails must be 39" – 45"
- Midrails must 21" +/- 3"





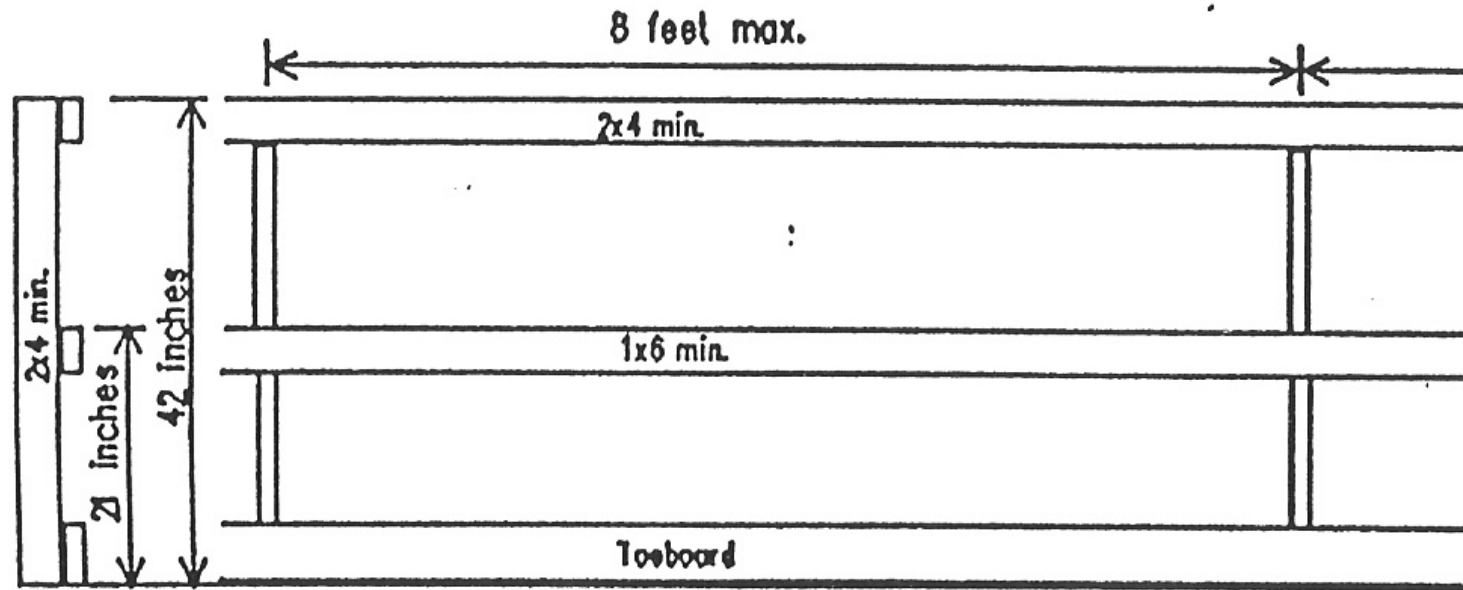
Guardrail Strength

- Guardrail systems shall be capable of withstanding, without failure, a force of at least 200 lbs. applied within 2 inches of the top edge, in any outward or downward direction, at any point along the top edge.
- Midrails shall withstand a force of 150 lbs.



Wood Guardrail Systems

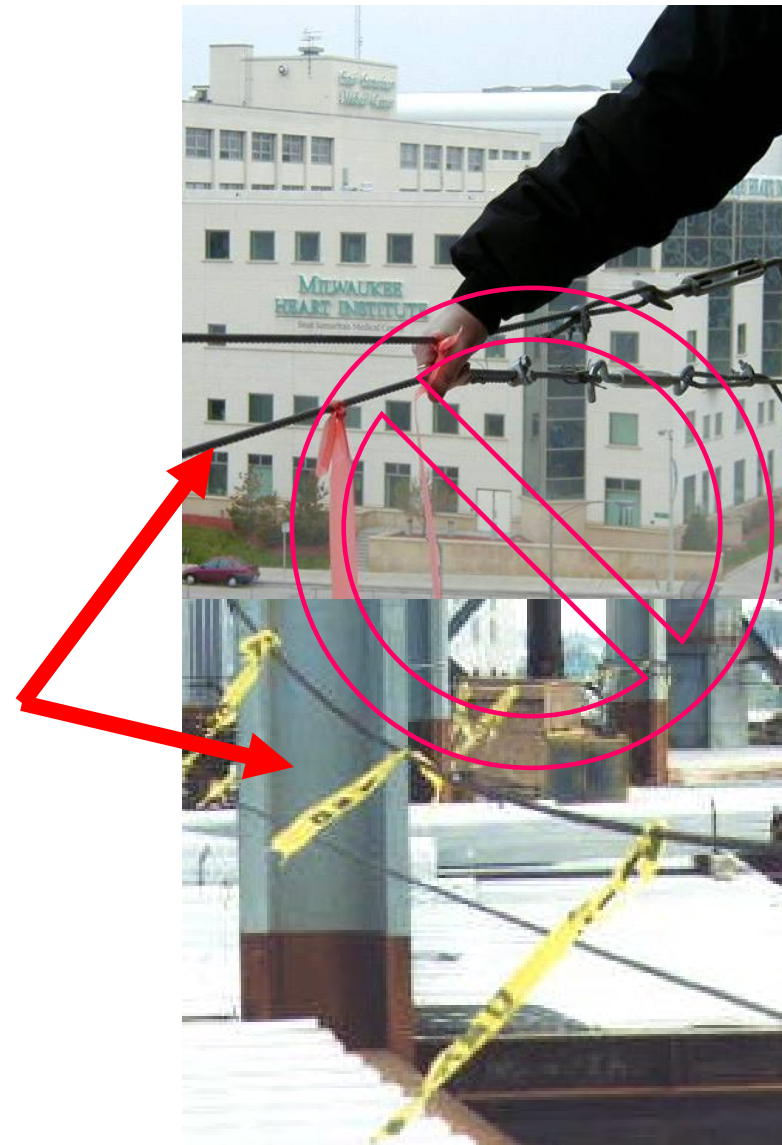
- 2" x 4" Top Rail @ 42" +/-3"
- 1" x 6" Midrail @ 21" (2" x 4" better)
- 2" x 4' Post spacing @ 8 ft. Max





Cable Guardrail Deflection

- The guardrail cable shall not deflect to a height less than 39 inches when a load is applied.
- They must be marked every 6'
- These cables are too loose.
- A worker falling into these cables could fall through as they separate.





Good Cable Guardrails

- These cable guardrails are well set.
- They are properly flagged.
- Cables have good post spacing.
- They will not sag more than 3"





Guardrail – Custody

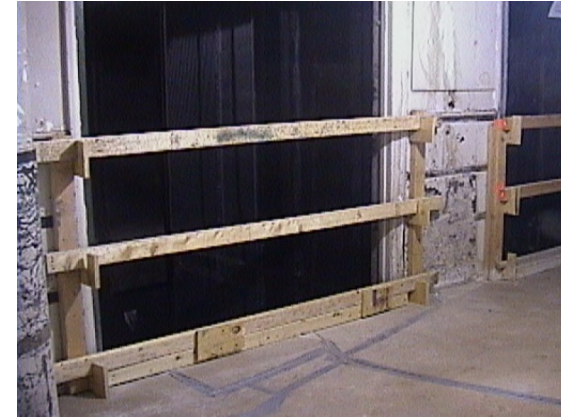
- Cable guardrails are normally provided by the steel erector.
- They should remain in place to be used by other trades.
- The controlling contractor must inspect and accept control and responsibility of the guard cable system





Guardrail Toe Boards

- Toe Boards or Screens required when there is work below or there is a potential for material to be blown or fall off the upper level.





Hoisting areas

- When guardrail gate systems are used at hoisting areas, PFAS must be used when gates are opened





Material Gates



**Lift out sections are OK.
But workers sometimes
do not replace them.**



**Use of sliding link fence
gates a better option.**



**Workers who remove or open
gates must be protected
through restraint or fall arrest**



Guardrails at Accesses & Holes

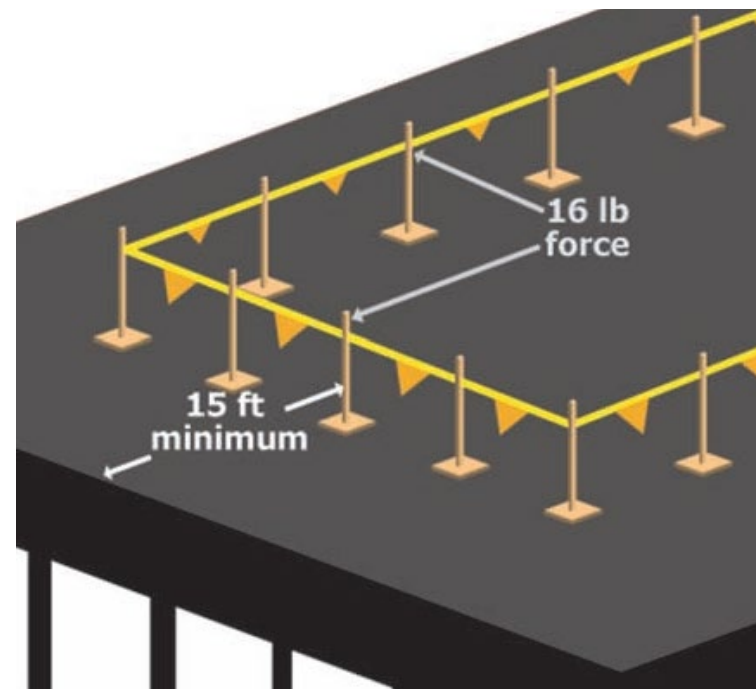
- When systems are used around access points, they shall be provided with a gate or be offset that a person cannot walk directly into the hole or to the edge.
- The employee must make a 90 degree turn to access the ladder.





Use of Warning Lines (Non-Roofing)

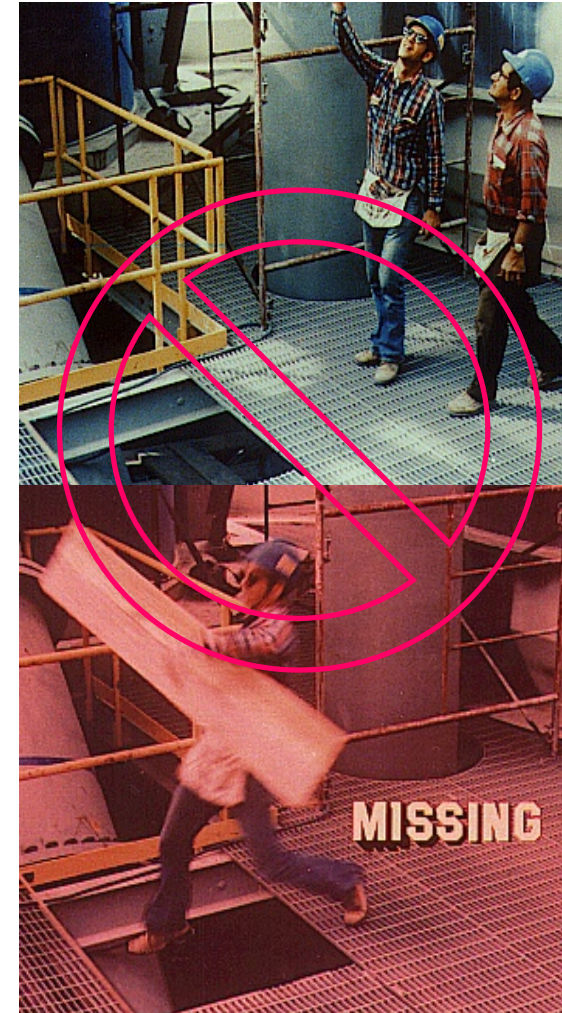
- Warning lines are allowed for roofing.
- OSHA has interpreted warning lines for all other work as Non-Conforming Guardrails
- They must be set back 15 feet.
- Anyone outside warning lines must have standard fall protections.





Holes

- Many workers fall through holes.
- All holes must be protected with guardrails, hole covers or other means.





Hole Fall

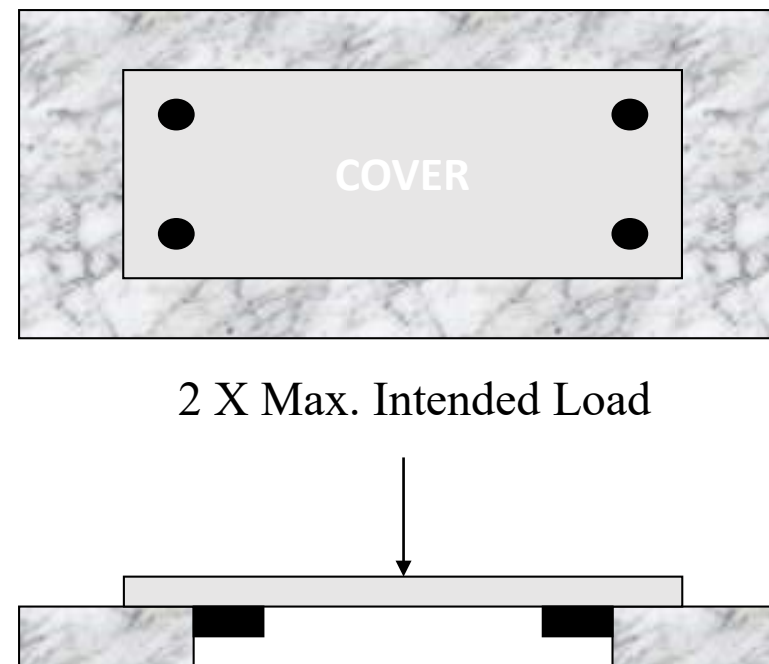


- Hole fall1.mpg



Cover Requirements

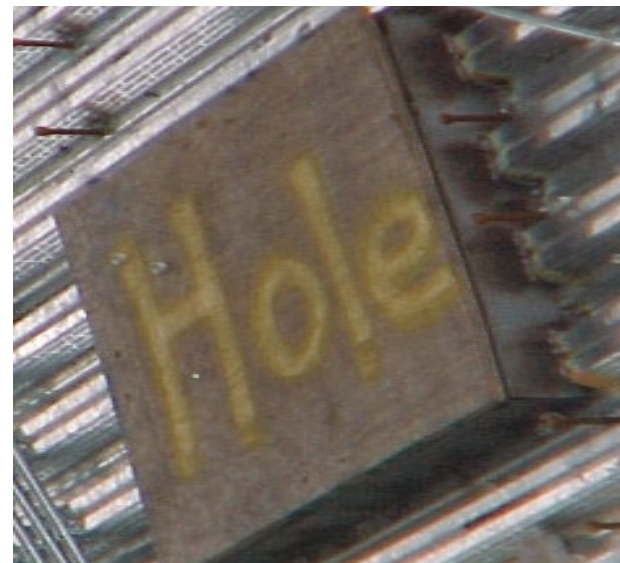
- All other covers shall be capable of supporting, without failure, at least twice the weight of employees, equipment, and materials that may be imposed on the cover at any one time.
- All covers shall be secured to prevent accidental displacement.





Cover Marking

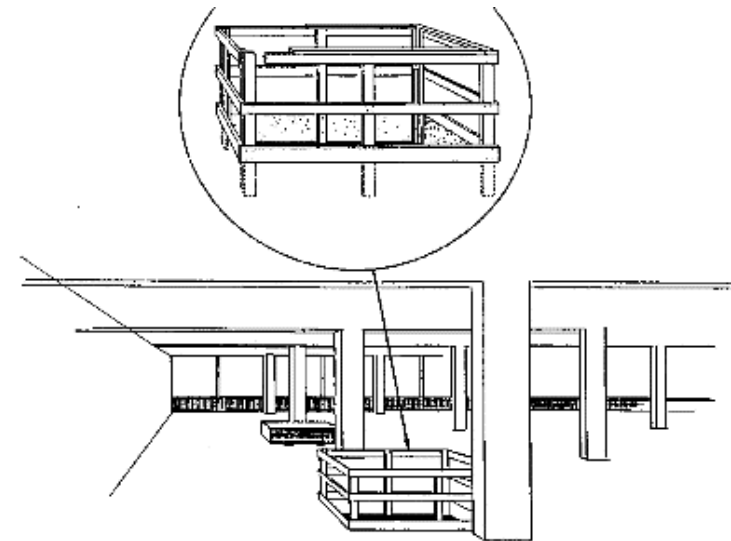
- All covers shall be marked with the word "**HOLE**" or "**COVER**" to provide warning of the hazard.
- Consider Non-English marking when Non-English speaking workers present





Guardrails Around Holes

- When guardrail systems are used at holes, they shall be erected on all unprotected sides or edges of the hole.



GUARDRAIL AROUND FLOOR OPENING





Working Above Protections

When employees work above guardrails, they must be protected from falling over the guardrails.





Extra Guardrails



- Additional guardrails are installed above the normal top rail to protect workers from falling.



Alternates Forms of Fall Protection

- Allowed for:
 - Leading Edge Work
 - Pre-Cast Concrete Erection
 - Residential Construction
- Site specific written fall plans are considered an alternative for these activities.



Fall Plans

- If the employer can demonstrate that it is infeasible or creates a greater hazard to use the required fall protection systems, the employer must instead develop and implement a written site specific fall protection plan in accordance with **29 CFR 1926.502(k)**.
 - OSHA does not consider "economic infeasibility" to be a basis for failing to provide conventional fall protection.
- **Note:** There is a presumption that it is feasible and will not create a greater hazard to implement at least one of the fall protection systems.



Fall Protection Plans

- Written by a qualified person
- Shall identify each location where conventional fall protection systems cannot be used and designate them Controlled Access Zones (CAZ) – 1926.502(k)(7).
- Implement a safety monitoring system in conformance with 1926.502(h) where no other alternative measure has been implemented – 1926.502(k)(8).
- Shall identify all workers designated to work in the CAZ – 1926.502(k)(9).
- Shall be reviewed and updated as appropriate if a fall, or near miss, occurs – 1926.502(k)(10).



Sample Fall Protection Plans

Sample fall plans for:

- Residential Construction and;
- Pre-Cast Concrete Erection

are provided in OSHA Standard Subpart M – Appendix E



Fall Protection Training

- There must be a training program that assures each employee has been trained.
- The employer shall verify that employees are trained by written documentation.
- Retraining is required when the employee does not have the understanding and skill required to safely perform fall protection activities.