

FALL PROTECTION

Residential Construction

California Code of
Regulations
Title 8



Title 8 Regulations and Trigger Heights

- 1621 Guardrails (7 ½ feet)
- 1632 & 3241 Skylights and Skylight openings (0 feet)
- Article 24 (1669 -1671.2) Fall Protection (7 ½ or 15 feet)
 - 1669 General
 - 1670 Personal Fall Arrest/Restraint System
 - 1671 Safety Nets (allowed where fall is > 25 ft.)
 - 1671.1. Fall Protection Plan
 - 1671.2. Controlled Access Zones and Safety Monitoring Systems
- 1716.2 Residential Framing (0 or 15 feet)
- 1730-1731 Roofing (0, 15 feet or 20 feet)

§1621 Guardrails



§1621. Railings and Toeboards.

- (a) Unless otherwise protected, railings as set forth in Section 1620 shall be provided along all unprotected and open sides, edges and ends of all built-up scaffolds, runways, ramps, rolling scaffolds, elevated platforms, surfaces, wall openings, or other elevations 7 ½ feet or more above the ground, floor, or level underneath.
- EXCEPTIONS: certain scaffolds & some demolition

§ 1632 & § 3212 Skylights and Openings

- Fall protection required regardless of height of fall.
 - Opening: An aperture of 12 inches or more in the least horizontal dimension.



§1669-1670 Personal Fall Arrest, Restraint Systems



Article 24. Fall Protection

§1669. General.

- (a) When work is performed from thrustouts or similar locations, such as trusses, beams, purlins, or plates of 4-inch nominal width, or greater, at elevations exceeding **15 feet** above ground, water surface, or floor level below and where temporary guardrail protection is impracticable, employees shall be required to use approved personal fall protection system in accordance with Section 1670.
- (b) When requirements in subsection (a) are impractical, approved safety nets shall be used in accordance with Section 1671.

Article 24. Fall Protection Exception

§1669(c)

(c) When the work is of **short duration** (i.e., non-repetitive) and **limited exposure**

and the **hazards involved in rigging and installing the safety devices** required by this Article equals or **exceeds the hazards involved in the actual construction**, these provisions may be temporarily suspended,

provided **adequate risk control is recognized and maintained under immediate, competent supervision.**

1669(c) Occupational Safety and Health Appeals Board Decisions

- **Short duration/limited exposure =**
 - **Approximately 1 minute** (*Ruffco Construction*, Cal/OSHA App. No. 90-1006, Decision After Reconsideration (May 31, 1991).
 - **A single, three-minute exposure** (*McLean Steel Inc.*, Cal/OSHA App. No. 93-1851, Decision After Reconsideration (Aug. 26, 1997),
- **Not short duration:**
 - **“a few instances lasting 2-5 minutes each,”** 75 foot fall: (*Anning-Johnson Company*, Cal/OSHA App. No. 80- 517, Decision After Reconsideration (June 25, 1982).)

1669(c) Occupational Safety and Health Appeals Board Decisions

- The employer must provide factual evidence that fall protection is more hazardous to install than the work being performed. (*Bernards Bros. Inc.*, Cal/OSHA App. 78-700-701, Decision After Reconsideration (July 27, 1981) and *Petersen Builders, Inc.*, Cal/OSHA App. 91-057, Decision After Reconsideration (Jan. 24, 1992))
- The supervisor must pay particular attention to the worker in question and not be engaged in other tasks. (*McLean Steel Inc.*, Cal/OSHA App. No. 93-1851, Decision After Reconsideration (Aug. 26, 1997))

Article 24. §1670. Personal Fall Arrest Systems, Personal Fall Restraint Systems and Positioning Devices.

- (a) Approved personal fall arrest, personal fall restraint or positioning systems shall be worn by those employees whose work exposes them to falling in excess of 7 ½ feet from the perimeter of a structure, unprotected sides and edges, leading edges, through shaftways and openings, sloped roof surfaces steeper than 7:12, or other sloped surfaces steeper than 40 degrees not otherwise adequately protected under the provisions of these Orders...

Article 24. Fall Protection cont'd

§1671. Safety Nets



Only allowed if fall is 25 feet or more above the ground or level below

Only allowed if Fall arrest and fall restraint are not practical

Must meet ANSI A10.11-1989 requirements,

Article 24. Fall Protection cont'd

- **§1671.1. Fall Protection Plan**
- **§1671.2. Controlled Access Zones and Safety Monitoring Systems.**

§1716.2. Wood and Light Gage Steel Frame Construction, Residential/Light Commercial.

Covers: installation of floor joists, floor sheathing, layout and installation of walls, hanging and nailing of shear panels, setting and bracing roof trusses and rafters, installation of starter board, roof sheathing, and fascia board; installation of windows, siding and exterior trim.



§1716.2(e) Work on Top Plate, Joists and Roof Structure Framing



§1716.2 (e) Work on Top Plate, Joists and Roof Structure Framing

(1) When employees are walking/working on top plates, joists, rafters, trusses, beams or other similar structural members over **15 feet** above the surrounding grade or floor level below, fall protection shall be provided by scaffolding, guardrails, a personal fall protection system, or by other means prescribed by CSO Article 24, Fall Protection.

§1716.2(e)

Exception: When employees are walking/working on securely braced joists, rafters or roof trusses on center spacing not exceeding 24 inches, and more than 6 feet from an unprotected side or edge, they shall be considered protected from falls between the joists, rafters or roof trusses.



1716.2(f) Work on Floors and Other Walking/Working Surfaces

Guardrails or Fall protection required when employees are **15 feet** above the surrounding grade or floor level below



1716.2 (g) Work on Starter Board, Roof Sheathing and Fascia Board



Starter Board

Roof Sheathing

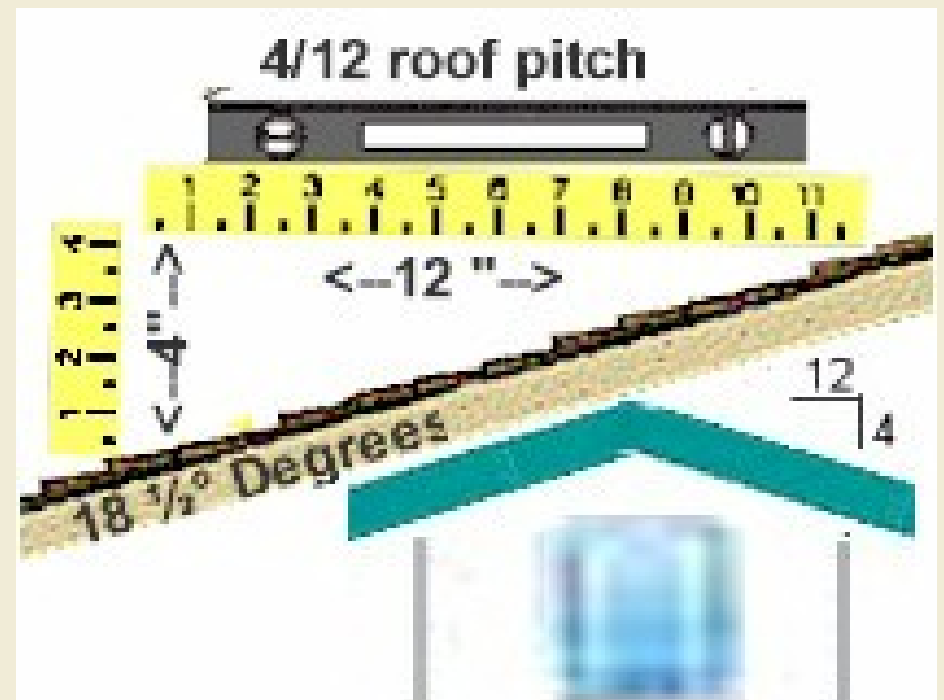
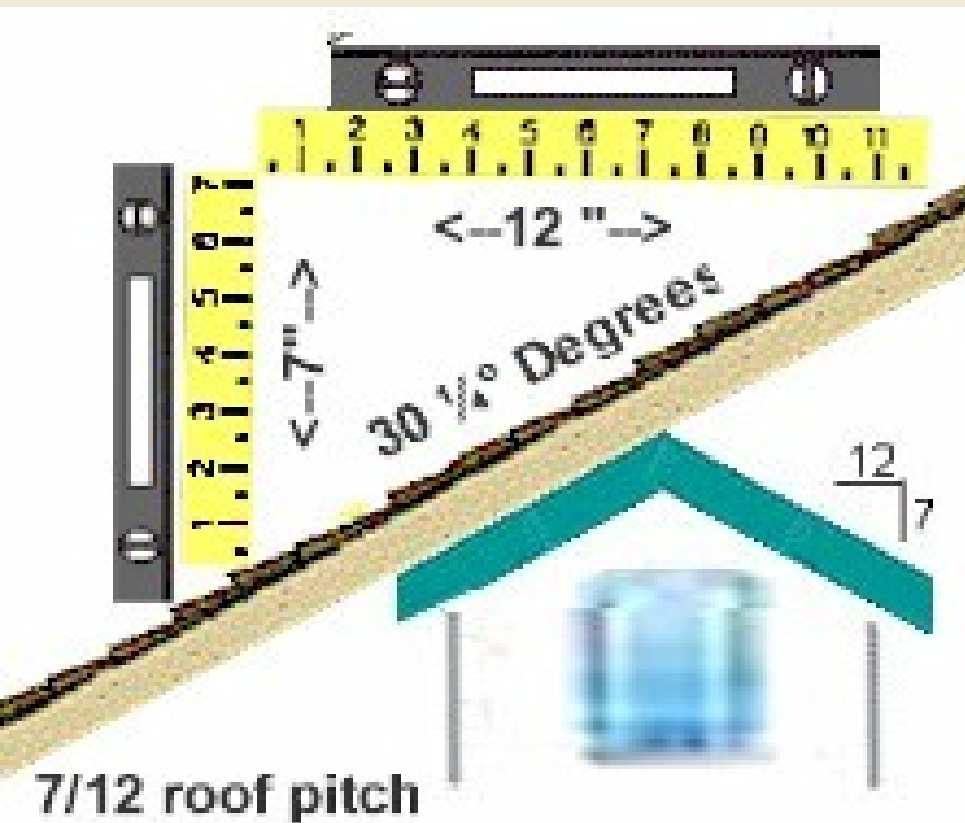
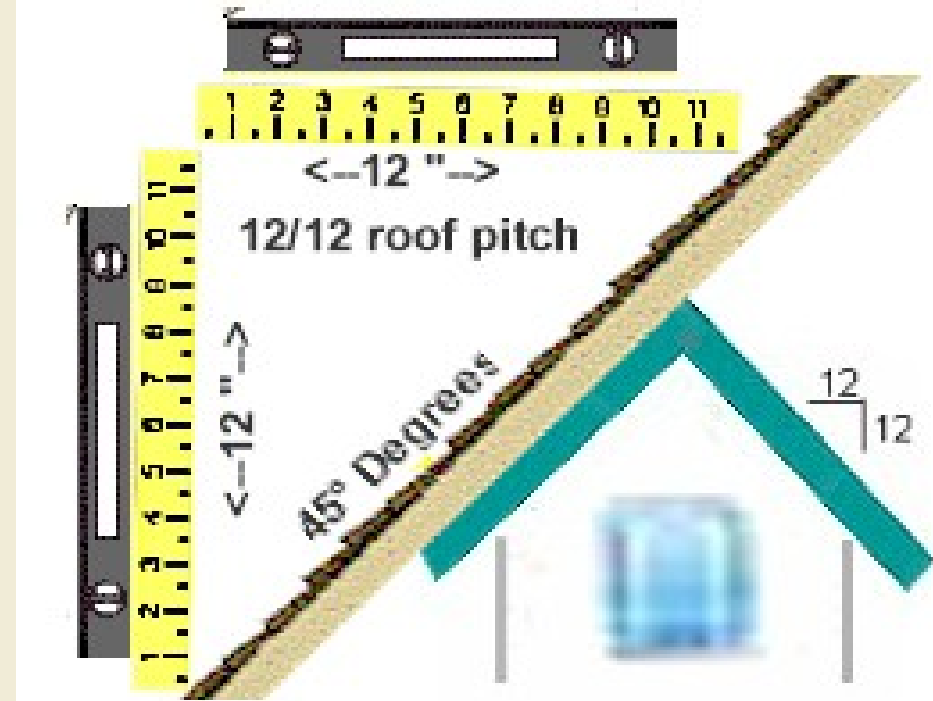


1716.2 (g) Work on Starter Board, Roof Sheathing and Fascia Board

- Fall Protection required where height is greater than one story and 15 feet
- Fall Protection required regardless of height if roof is sloped greater than 12:12 (45 degrees).
- Fall Protection required regardless of height if roof is sloped between 7:12 (30 degrees) up to 12:12 but slide guards can be used instead of fall protection



Roof Pitches



1716.2 (g) Work on Starter Board, Roof Sheathing and Fascia Board

- No fall protection needed for working inside the gable end truss if braced to withstand a lateral force of 200 pounds
- Fall protection required outside the gable end truss regardless of height



EXCEPTION: Short duration/limited exposure; hazards involved in rigging and installing safety devices equal/exceed the hazards involved in the construction; work is performed by a qualified person.

1730 & 1731 Roofing Operations



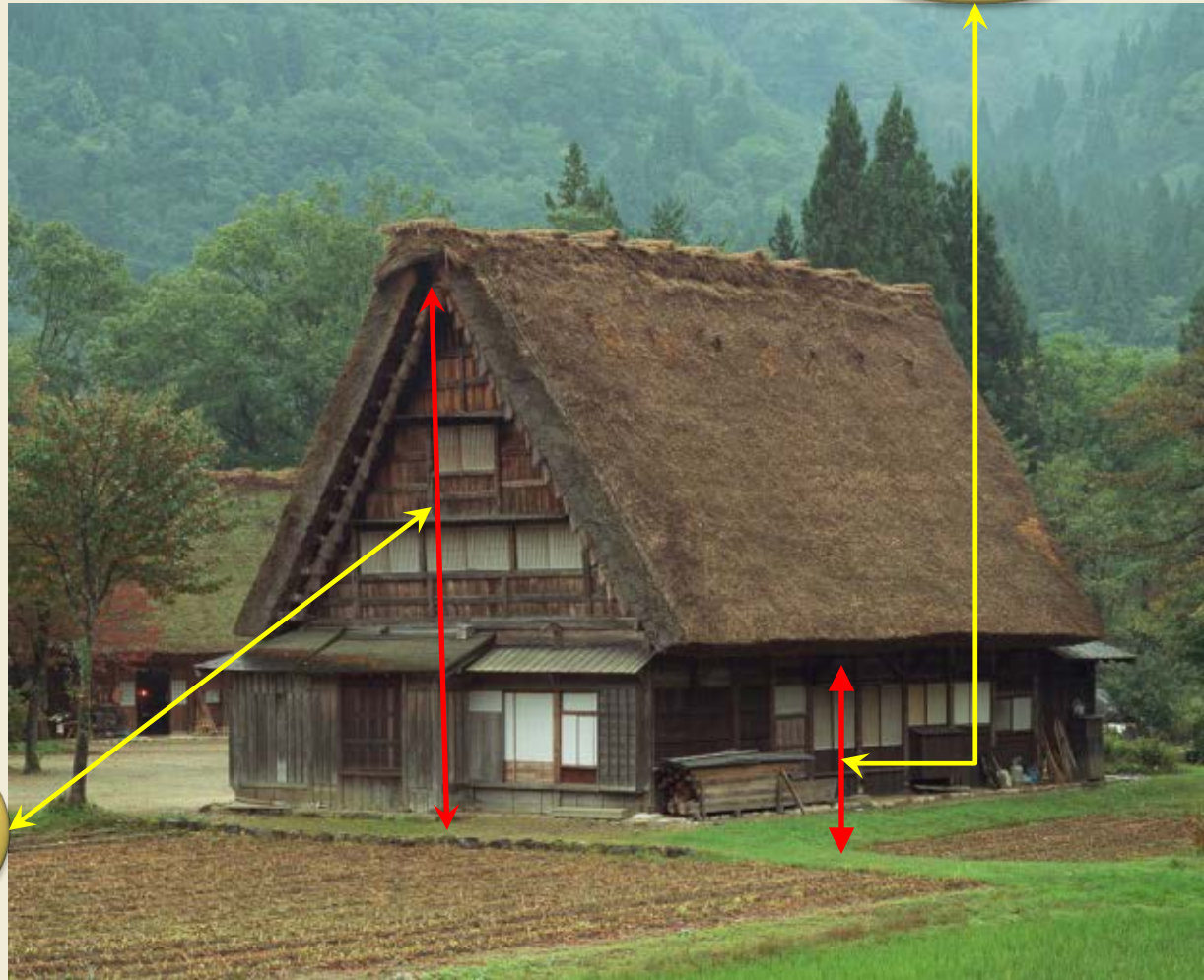
Employees engaged in the removal or application of roof coverings

Roof Height Measurement

The height is the vertical distance from the **lowest edge of the roof or eaves to the ground or level below**. Height from gable ends is not considered

Gable Height

Eave Height



Roof Height Measurement



Single-unit (Monolithic) roof coverings



Built-up roofing of asphalt or coal-tar pitch or like materials, and flat-seam metal roofing or like materials

§1730: Monolithic Roof Covering

Slopes 0:12 to 4:12

- Employees protected from falls of more than **20 feet** by:
 - Warning lines
 - Personal Fall Protection [1670]
 - Catch Platforms [1724(c)].
 - Scaffold Platforms [1724(d)].
 - Eave Barriers [1724(e)].
 - Guardrails (1620 & 1621).
 - Parapets at least 24 inches high

§1730: Monolithic Roof Covering Slopes > 4:12

- Employees protected from falls of more than **20 feet** by:
 - Personal Fall Protection [1670]
 - Catch Platforms [1724(c)].
 - Scaffold Platforms [1724(d)].
 - Eave Barriers [1724(e)].
 - Guardrails (1620 & 1621).
 - Parapets at least 24 inches high

§1730 Multiple-Unit Roof Coverings:

shingles, standing-seam
metal panels, shingle
metal roofing, wood
shakes, clay tile, concrete
tile, slate or like
materials.



§1730 Multiple-Unit Roof Coverings Slopes 0:12 to 5:12

- Employees protected from falls of more than **20 feet** by:
 - Roof jack system 1724(a)
 - 24 inch or higher parapet
 - Other method affording equivalent protection

§1730 Multiple-Unit Roof Coverings Slopes >5:12

- Employees protected from falls of more than **20 feet** by:
 - A parapet at least 24 inches high.
 - Personal Fall Protection [1670]
 - Catch Platforms [1724(c)]
 - Scaffold Platforms [Section 1724(d)]
 - Eave Barriers [Section 1724(e)]
 - Roof Jack Systems [Section 1724(a)] (Safety lines required in conjunction with roof jack systems on roofs steeper than 7:12)

Roof Jack (slide guard)

Board at least
2-inch by 6-inch



§1731. Roof Hazards - New Production-Residential Construction

Roofing work on new production-type residential construction with roof slopes 3:12 or greater



**Excluded from
§1731.**



§1731 does not apply to custom-built homes, re-roofing operations, roofing replacements or additions on existing residential dwelling units.

§1731 Roof Slopes 3:12 to 7:12

- Employees protected from falls of more than **15 feet** by:
 - Personal Fall Protection (§1670)
 - Catch Platforms [§ 1724(c)]
 - Scaffold Platforms [§ 1724(d)]
 - Eave Barriers [§ 1724(e)]
 - Guardrails (§1620, §1621)
 - Roof Jack Systems [§1724(a)]

§1731 Roof Slopes Steeper than 7:12

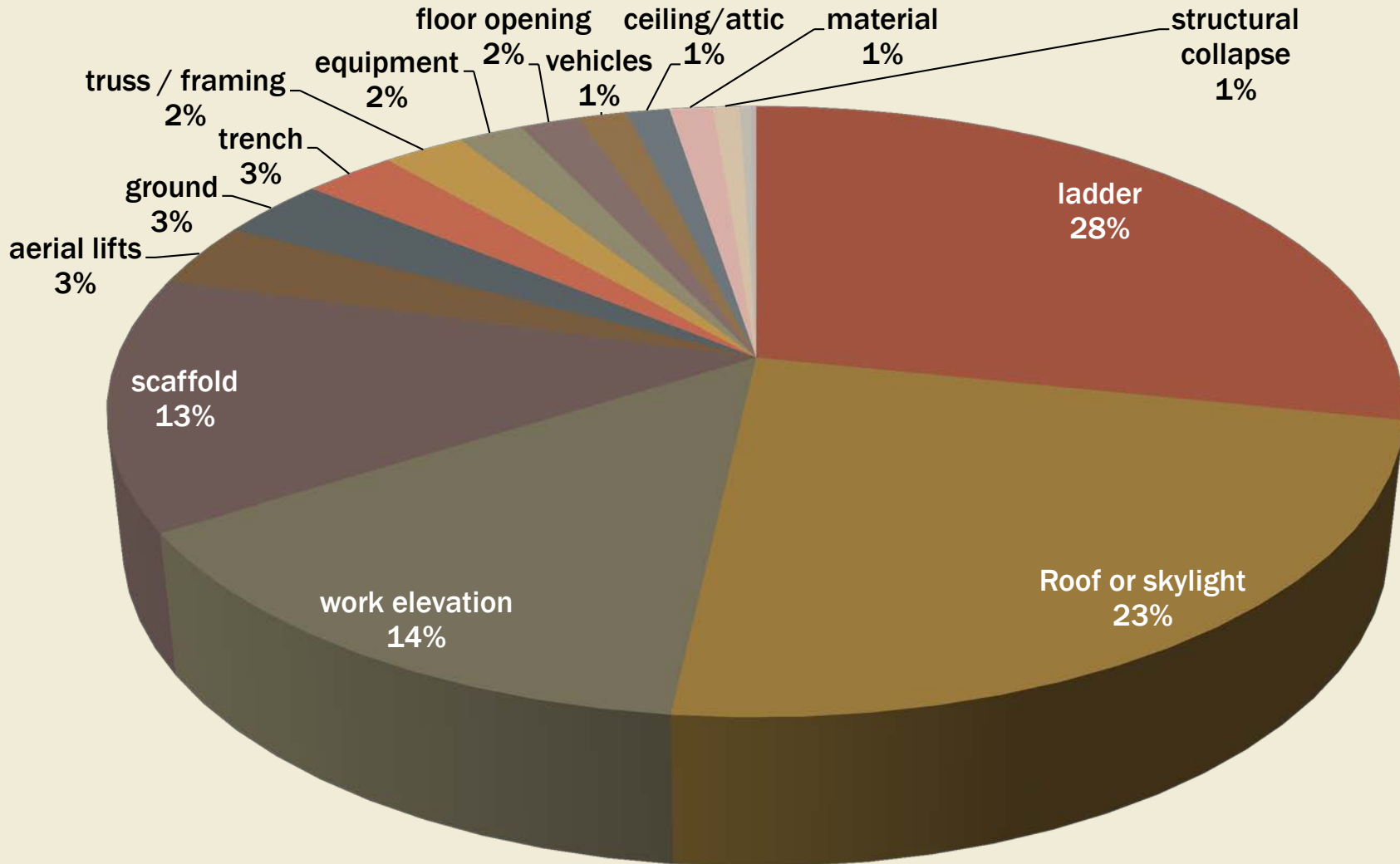
- Employees protected from falls regardless of height (> 0 feet)
 - Personal Fall Protection (§1670)
 - Catch Platforms [§ 1724(c)]
 - Scaffold Platforms [§ 1724(d)]
 - Guardrails (§1620, §1621)

Cal/OSHA Enforcement

Statistics for Construction Falls 2010-2012

| FALLS | 2010 | 2011 | 2012 | | Totals | Fatals | 2010 | 2011 | 2012 |
|-------------------------|-----------|-----------|-----------|--|------------|--------|----------|----------|----------|
| ladder | 54 | 60 | 63 | | 177 | | 1 | 2 | 1 |
| roof or skylight | 52 | 56 | 39 | | 147 | | 2 | 6 | 5 |
| work elevation | 14 | 29 | 46 | | 89 | | 1 | 6 | 2 |
| scaffold | 33 | 30 | 21 | | 84 | | 1 | 3 | 3 |
| aerial lifts | 10 | 7 | 4 | | 21 | | 2 | 0 | 0 |
| ground | 7 | 7 | 6 | | 20 | | 0 | 0 | 0 |
| trench | 5 | 8 | 4 | | 17 | | 1 | 0 | 0 |
| truss / framing | 7 | 5 | 3 | | 15 | | 0 | 0 | 0 |
| equipment | 5 | 1 | 6 | | 12 | | 0 | 0 | 0 |
| floor opening | 3 | 3 | 5 | | 11 | | 0 | 0 | 0 |
| vehicles | 2 | 4 | 3 | | 9 | | 0 | 0 | 0 |
| ceiling/attic | 4 | 1 | 3 | | 8 | | 0 | 0 | 0 |
| material | 4 | 4 | 0 | | 8 | | 0 | 0 | 0 |
| struc. collapse | 2 | 3 | 0 | | 5 | | 1 | 0 | 0 |
| pool | 1 | 0 | 1 | | 2 | | 0 | 0 | 0 |
| tree | 0 | 1 | 0 | | 1 | | 0 | 0 | 0 |
| totals | 203 | 219 | 204 | | 626 | Totals | 9 | 17 | 11 |

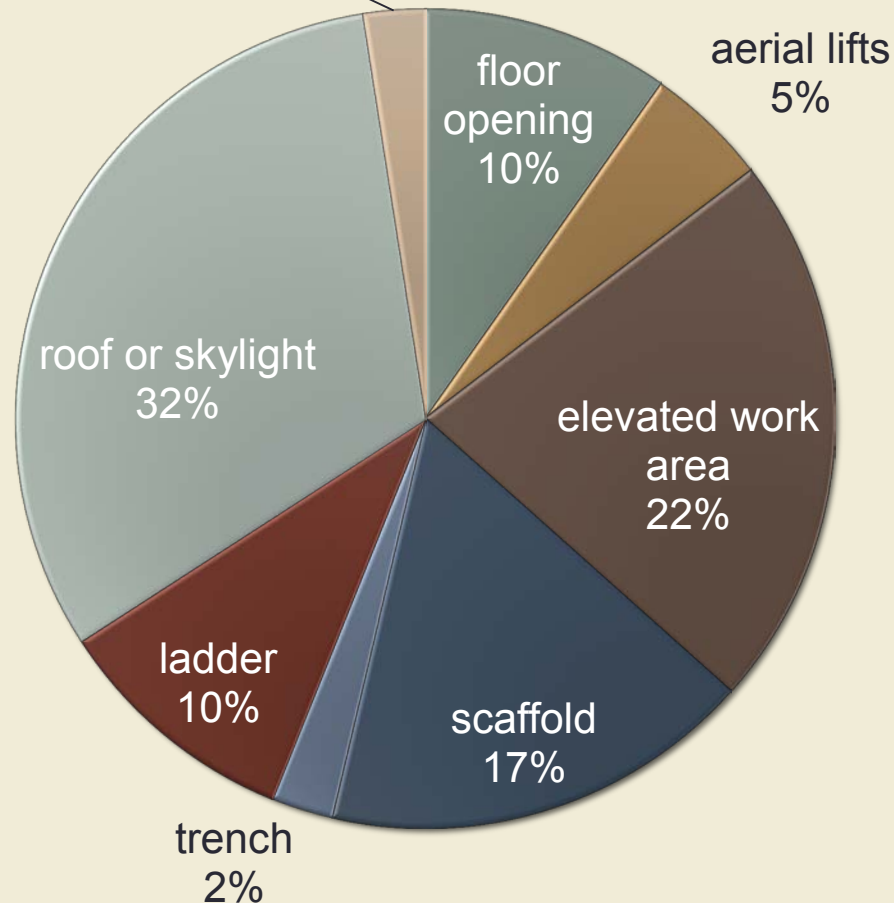
Falls from:



2010 - 2012 Deaths from Falls:

structural collapse
2%

Deaths from Falls



About 40% of fatalities in construction were from falls. Falls were the leading cause of fatalities in construction in California for 2010 – 2012

2013 - 2014 data

- The Census of Fatal Occupational Injuries data reflect a total of 334 fatal work injuries statewide in 2014, a decrease of 16% from the 396 workplace deaths in the final 2013 data.
- Deaths for Hispanic or Latino workers decreased 35% from 194 in 2013 to 127 in 2014.
- Preliminary data for the United States show an increase of 2% from 4,585 in 2013 to 4,769 in 2014.

Impact Velocity & Energy of a 200 pound person falling

| Fall Height (feet) | Velocity upon impact (mph) | Impact Energy (foot-pounds) |
|--------------------|----------------------------|-----------------------------|
| 6 | 13.4 | 1200 |
| 7.5 | 15.0 | 1500 |
| 15 | 21.2 | 3000 |
| 20 | 24.5 | 4000 |

Cal/OSHA Consultation & Outreach Efforts on Fall Protection

- From July 1, 2014 – July 1, 2015, Fall Protection was addressed at:
- 454 on-site consultation visits to individual employers
- 91 compliance assistance activities
- 18 Formal Trainings & Speeches



CAL
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Cal/OSHA Fall Protection Publications

- Fall Protection in Construction
https://www.dir.ca.gov/dosh/dosh_publications/Fall-Protection-in-Construction-fs.pdf
- Stopping Falls <http://www.dir.ca.gov/dosh/etools/08-010/P09-01001.pdf>
- Youth in Construction Fall Protection Etool
http://www.dir.ca.gov/dosh/etools/08-010/TE_FallProtection.htm
- Roofing Safety: Slips and Falls
http://www.dir.ca.gov/dosh/dosh_publications/RoofSlip.pdf
- Cal/OSHA Pocket Guide for the Construction Industry
http://www.dir.ca.gov/dosh/dosh_publications/ConstGuideOnline.pdf