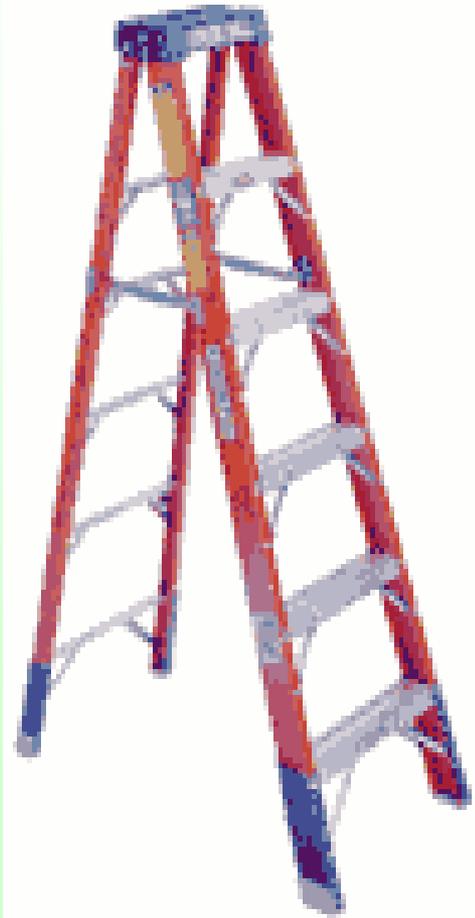
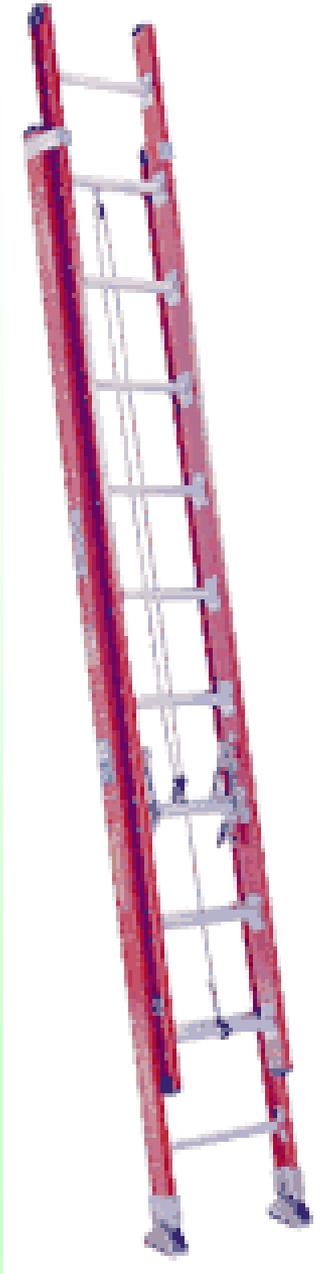


FALL PROTECTION



- **LADDERS**
- **ACCESSWAYS**

PORTABLE LADDERS

**Max. Height 20' Step
Ladder**

**For small hand tool use
only**

Must have non-slip feet

**Top step is not to be stood
on**

**Wood ladders not to be
painted**

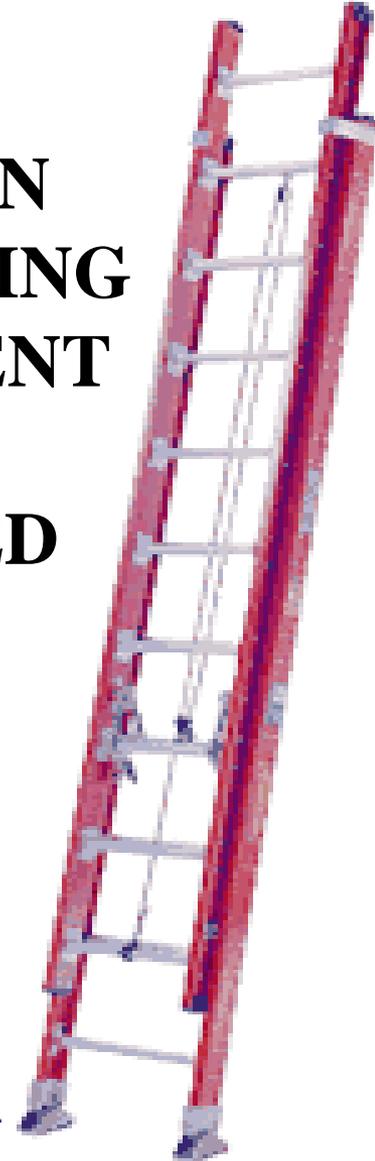
See COE Section 21.D



EXTENTION (Portable) LADDERS



- 1. EXTEND 3 FOOT PAST LANDING**
 - 2. MINIMUM RATION OF 1 TO 4 TO OBTAIN PROPER ANGEL OF LADDER TO BUILDING**
 - 3. MUST BE SECURED AGAINST MOVEMENT AT TOP, BOTTOM, AS REQUIRED**
 - 4. NOT MOVED/SHIFTED WHEN OCCUPIED**
 - 5. JOB MADE LADDERS OK**
- SEE PAGES 11-15 & COE**
21.A.03-06

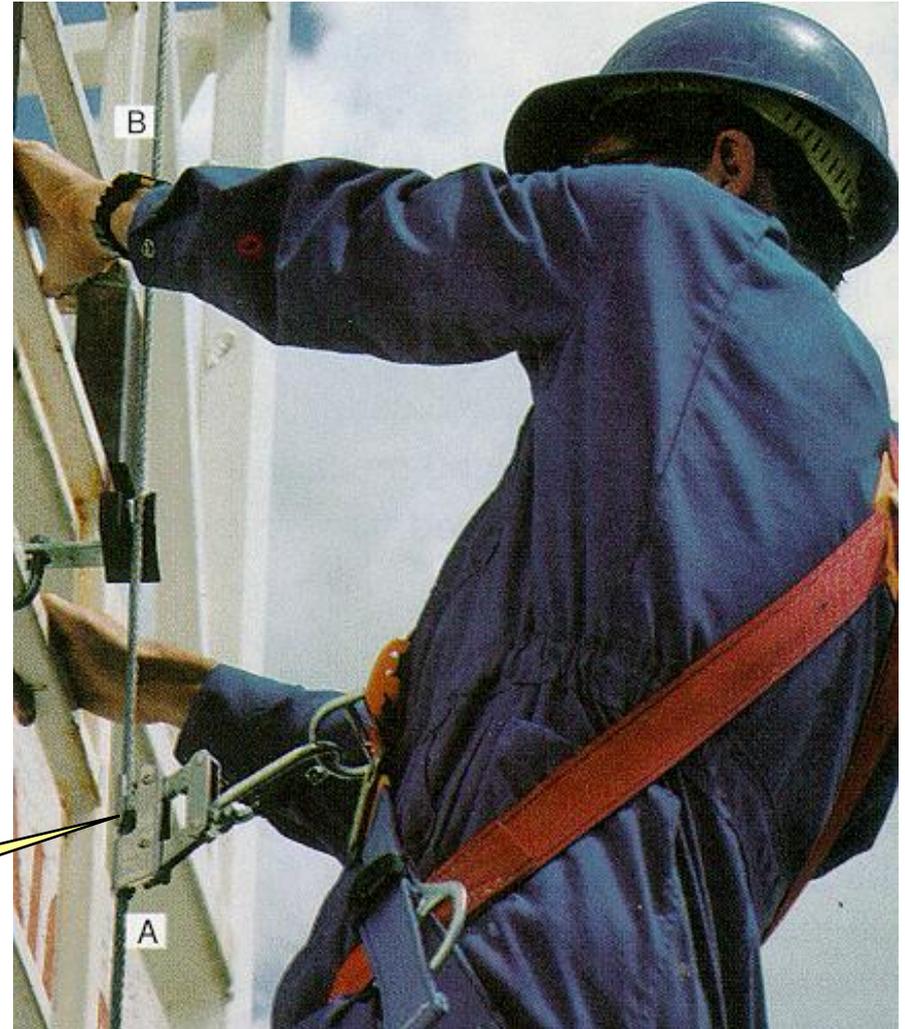


LADDER CLIMBING DEVICES



- *Fixed ladders over 20 ft in height require ladder climbing devices*
- *Anchorage strength – 3,000 lbs*
- *Free fall distance - 2 ft*
- *Rope grab shall not be used or connected to a HLL*

Rope grab



RAISING/LOWERING DEVICES



*For confined
space entry*



FALL PROTECTION STAIRWAYS

- 1. Break in elevation of 19” requires stairway or ladder.**
- 2. Doors opening onto a stairway requires a platform of no less than 20” wide (the swing of a door shall not reduce the width of a platform to less than 20”)**
- 3. Stairways having 4 or more risers or rising more than 30” whichever is less, shall be equipped with:**
 - a. At least one handrail and one stair rail along each unprotected side or edge**
- 4. See Section 21.E of COE Manual and OSHA 1926 Subpart “X” for additional details on stairways and ladders**

FALL PROTECTION- ACCESS



- **STAIRWAYS**
- **RAMPS**
- **RUNWAYS**
- **OPENINGS IN**
 - **WALLS**
 - **FLOORS**

GUARD RAILS FOR ACCESS WAYS



Handrail 30-34" High

Stair rail Minimum 36" High

Platform 20"
Wider with door
open

EM 385-1-1 Standards 21.E.08

OTHER FALL PROTECTION SYSTEMS



- *Horizontal and vertical lifeline*
- *Ladder climbing devices*
- *Work positioning and travel restraint systems*
- *Warning line system*
- *Aerial lift equipment/work platforms and staging*
- *Scaffolding Systems*
- *Raising/lowering devices (Equipment)*
- *Covers*
- *Monitoring system*
- *Fall protection plan*
- *Controlled access zone*



See Pages 5 – 8 for definitions of these systems

HORIZONTAL LIFELINE



- **A fall arrest system (FA) that uses flexible wire, rope or synthetic cable, spanned horizontally between two end anchorages, may include in-line energy absorber or lifeline tensioner and turnbuckles**
- **HLL shall be designed installed and used under the supervision of a qualified person as part of a complete FA system which maintains a safety factor of at least two**
- **Depending on the angle of sag and the line's elasticity, the forces generated by a fall are greatly amplified at the anchorages**
- **Presently there are no US standards for HLL**

21.C.09



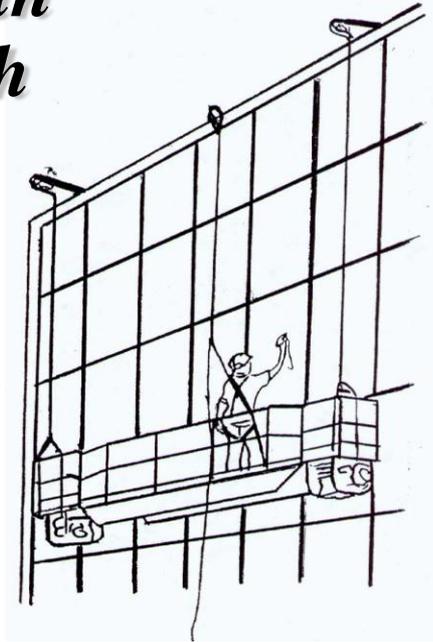
VERTICAL LIFELINE



➤ *A vertically suspended flexible line with a connector at the upper end for tying it to an 5,000 lbs overhead anchorage along which a fall arrestor or rope grab travels.*

➤ *Vertical lifeline shall have a minimum tensile strength of 5,000 lbs*

➤ *Each employee shall be attached to a separate lifeline system*



Suspended scaffold w/independent vertical lifeline

21.C.09

FALL PROTECTION QUESTION



Which of the following is TRUE about lifelines?

- a. Multiple employees can be attached to the same vertical lifeline is acceptable to the contractor's competent person.**
- b. Each employee must be attached to a separate vertical lifeline**
- c. Lifeline can be designed to the actual working loads**
- d. Horizontal lifelines never require locking devices**
- e. None of the above answers is true**

FALL PROTECTION ACCESSWAYS

WHERE PEOPLE OR EQUIPMENT ARE REQUIRED OR PERMITTED TO CROSS OVER EXCAVATIONS, A **WALKWAY OR BRIDGE WITH A STANDARD GUARD RAIL SHALL BE PROVIDED. 25.B.04**

COVERS



- ***Install covers on any hole 2 inches or more in its least dimension in walking working surface such as floors, roof or other openings.***
- ***Covers shall be capable of supporting without failure, at least twice the weight of the employee, equipment and material combined.***
- ***Shall be secured when installed, color coded and clearly marked with the word “HOLE” or COVER”.***

See Page 10 for roofing cover requirements

Ref: 24.A





FALL PROTECTION ISSUES (Continued)

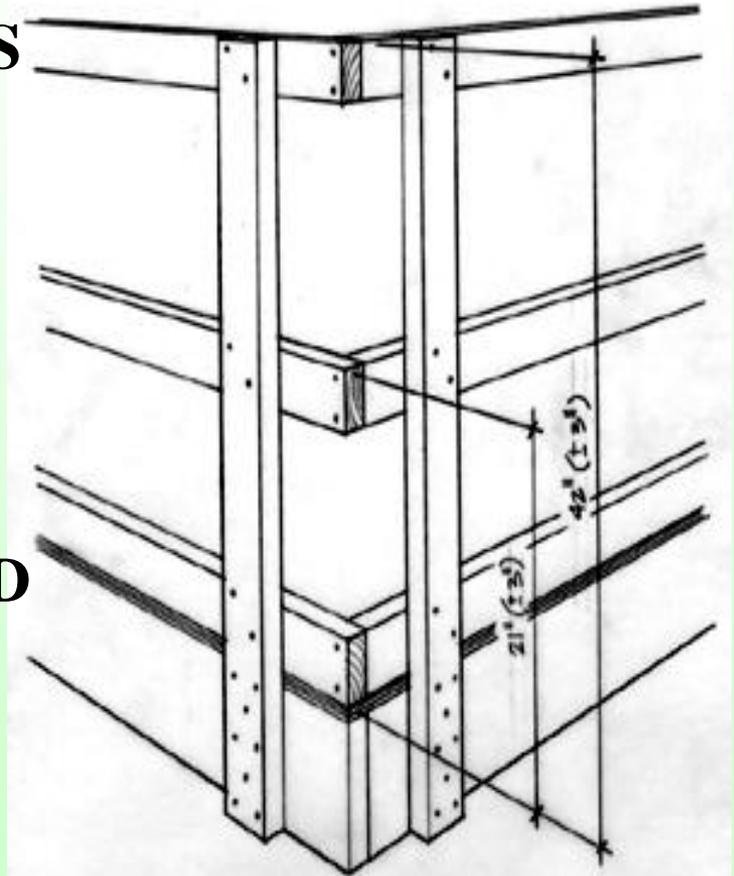


- **Ladder climbing devices (for ladders over 20 ft in height, install stair cases), if not feasible install ladder climbing devices)**
- **Portable and extension ladders *do not* require fall protection- only light work should be performed on portable/extension ladders**
- **Fall protection when working over water**
- **Exceeding the free fall distance of 6 feet- if the maximum arresting force of 1,800 lbs is not exceeded**
- **Full body harnesses and lanyards labeled to meet ANSI A10.14 requirements shall not be used**
- **Never connect a snaphook directly to Horizontal Life Line**

FALL PROTECTION ACCESSWAYS

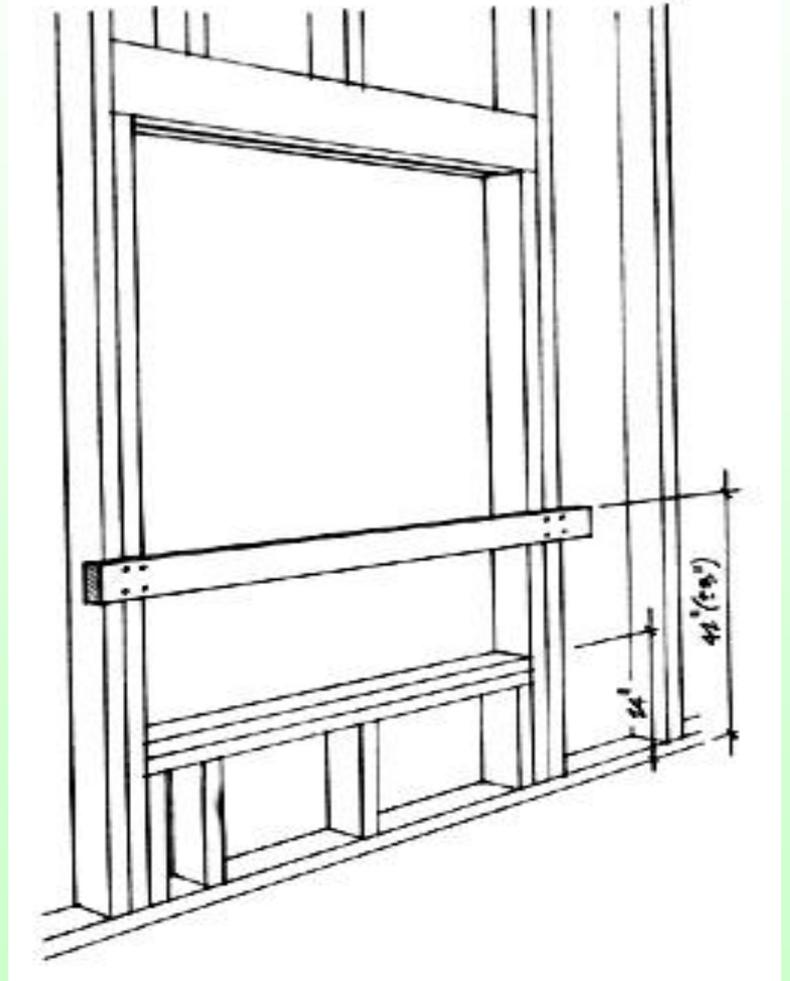
1. HOLES IN FLOORS AND ROOFS AND STAIRWAYS AND LADDER OPENINGS (EXCEPT ENTRANCE) SHALL BE GUARDED. 21.A.15 b

**2. FLOOR AND ROOF HOLES HOLES CAN BE COVERED & CLEARLY MARKED OR GUARDED BY A PHYSICAL BARRIER
21.A.01 & 02**



FALL PROTECTION ACCESSWAYS

**WALL OPENINGS REQUIRE
GUARDING IF THE BOTTOM
OF THE OPENING IS LESS
THAN 3 FEET ABOVE THE
FLOOR. 24.A.05**





TYPES OF FALL PROTECTION TO USE?

IAW Specification Section 013529 Safety and Occupational Health Requirements section 1.7.1 (e) a Fall Protection and Prevention (FP & P) Plan prepared and signed by a qualified person for fall protection which is site specific and addresses all fall hazards in the work place and different phases of construction shall be accepted as part of the Accident Prevention Plan (APP) and kept on the job site for the duration of the project.

TYPE OF FALL PROTECTION

MEANS ALLOWED FOR PROVIDING FALL PROTECTION

| TYPE OF WORK & SITUATION | MEANS ALLOWED FOR PROVIDING FALL PROTECTION | | | | | | | | | |
|----------------------------------|---|------|--------|---|-----------------|--------------------|-----------------------|-----------------|-------------------|-------------------|
| | Conventional Fall Protection | | | | Position Device | Fence or Barricade | Fall Protect Plan (F) | Warning Line(1) | Control Access(2) | Safety Monitor(3) |
| Guardrails | Safe Net | PFAS | Covers | | | | | | | |
| Unprotected Sides/Edges | ✓ | ✓ | ✓ | | | ✓ | | | | |
| Leading Edge Work and Roofs | ✓ | ✓ | ✓ | | ✓ | | ✓ (1) | ✓ (1 & 2) | | |
| Hoist Area | ✓ | | | | | | | | | |
| Holes and Openings | ✓ | | | ✓ | | ✓ | | | | |
| Formwork & Reinforcing | ✓ | ✓ | ✓ | | ✓ | | | | | |
| Ramps/Runways & Walkways(4) | ✓ | | | | | | | | | |
| Excavations Pits, Shafts, Wells | ✓ | | | ✓ | | ✓ | | | | |
| On/Above Dangerous Equipment | ✓ | ✓ | | | | | | | | |
| Overhead Bricklaying | ✓ | ✓ | | | | | | | | |
| Low Slope Roof | ✓ | ✓ | ✓ | | | | | ✓ (1 & 2) | ✓ (1 & 2) | |
| Steep Roof | ✓ | ✓ | ✓ | | | | | | | |
| PreCast Erection | ✓ | ✓ | ✓ | | | | ✓ (1) | | ✓ (1 & 2) | |
| Steel Erection | ✓ | ✓ | ✓ | | | | | | | |
| Residential | ✓ | ✓ | ✓ | | | | ✓ (1) | | | |
| Wall Openings | ✓ | ✓ | | | | ✓ | | | | |
| Sheet piles, h-piles, cofferdams | ✓ | ✓ | ✓ | | | | | | | |

(F) Only if proven infeasible to use a conventional system (OSHA Only)

(1) Warning Line- 6 feet from edge. No employees outside line.

(2) Outside warning line, must have conventional fall protection system.

(3) Safety Monitor NOT ALLOWED in lieu of any fall protection system

(4) Fall Protection required if workers exposed to falls over FOUR FEET

See Student Resources Binder Section E
Page number 4 for this data base