

Ladder Safety

Too many falls!



Deaths

- 101 deaths involving ladders by OSHA in 2010
- Over 1000 ladder related deaths since 2000.
- 164,000 emergency room-treated injuries in the U.S. relating to ladders. (CPSC)

These Deaths Were Preventable



If proper access is not provided, people get creative. Never use a pallet as a work platform!

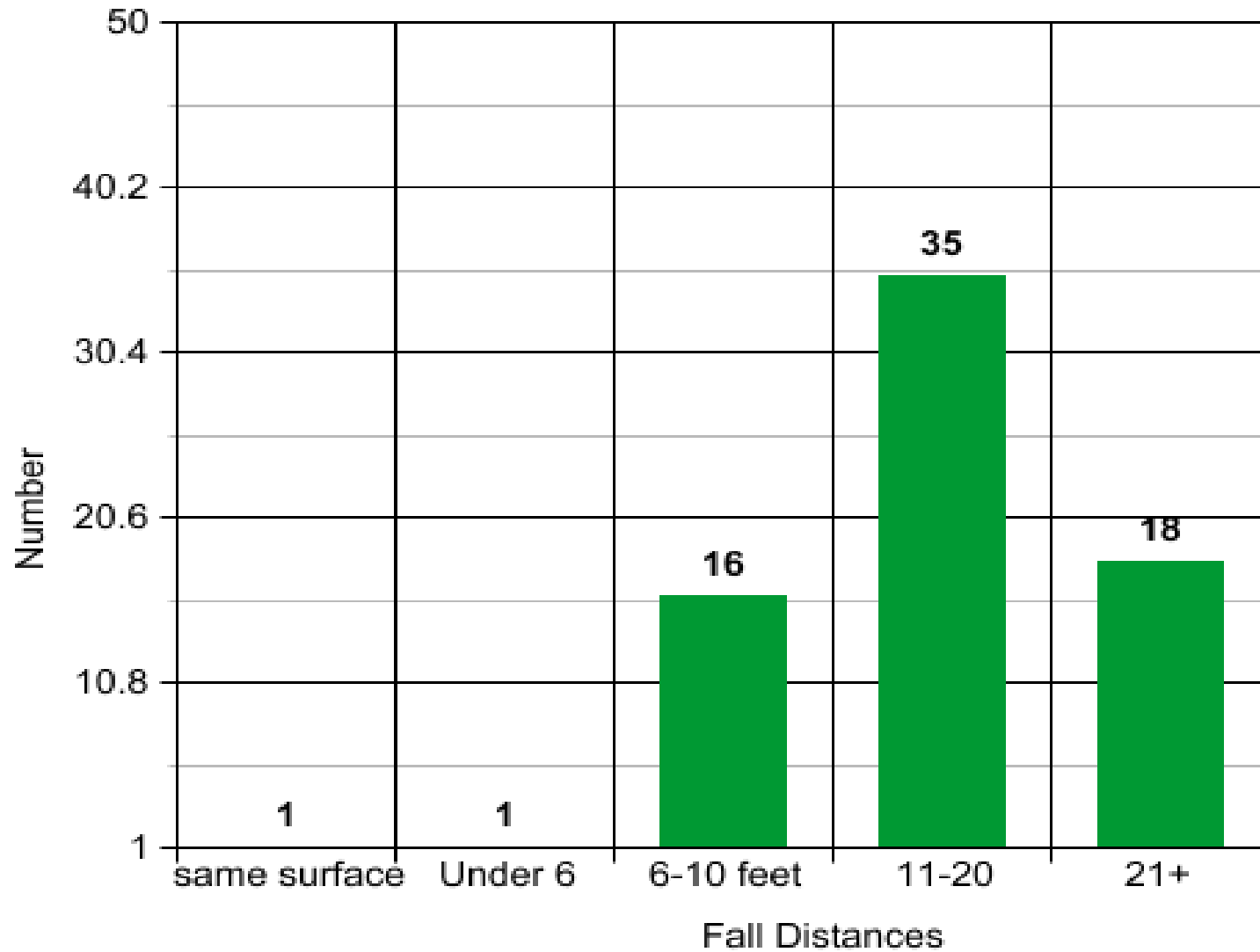
When using a ladder, these are the FIVE largest risks among many:

- **Falls**
 - **Shock from Powerline**
 - **Securement of Ladder**
 - **Working off Ladders**
 - **Confined Spaces**
- All of these are preventable

Accident Causation Factors

- 91 falls: 1 same surface, 2 under six feet, 16 fell 6-10 feet, 35 fell 11-20 feet, 14 fell 21-30 feet, 0 fell 31-40 feet, 4 fell over 40 feet. 19 were unknown distance
- 11 Electrocutions: 9 powerlines, outside lighting, 277 lighting inside.
- 5 Collapses: 5 confined spaces
- 1 Fire while on Ladder 1
- 1 Insect bites
- 2 Struck by: crane counterweight, struck by crane walkway
- 1 Explosion: Silo exploded threw employee off
- (note: some were shock then a fall. Both were counted then. Same for struck by)

Ladder Fall Heights



2010 OSHA IMIS data

Planning

- Sometimes it takes a lot of work to do things wrong.
- Elimination of fall hazards using the hierarchy of controls should be performed by all companies.



Hierarchy of Fall Protection

- Elimination – such as Cameras to monitor work. Elimination through design
- Passive Fall Protection – Guardrails, Covers
- Travel Fall Restraint
- Administrative Control – such as climber training, warning systems
- Fall Arrest



Cameras used to monitor locations.

Injury Prevention Basics

- Management Leadership
 - Employee Participation
 - Hazard Prevention and Control
 - Education and Training
 - Program Evaluation and Improvement
 - Communication and coordination on multi-employer sites
- These principles are adopted and recognized by...
 - 2100 VPP Companies
 - 1600 SHARPs
 - 1926.20, 1926.21
 - 1910.119
 - ANSI Z9.10
 - OHSAS 18001
 - States AR, CA, LA, HI, MN, MT NV, NH, NY, OR, WA

Training

Train workers:

- When to use a ladder vs. aerial lift
- How to inspect a ladder
- Proper setup of ladders
- Fall protection required for fixed ladders.



"You weren't listening. I said, 'Don't fall.'"

Training

- Employers must provide a training program for each employee using ladders and stairways. The program must enable each employee to recognize hazards related to ladders and stairways and to use proper procedures to minimize these hazards. For example, employers must ensure that each employee is trained by a competent person in the following areas, as applicable:
- The nature of fall hazards in the work area;
- The correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used;
- The proper construction, use, placement, and care in handling of all stairways and ladders; and
- The maximum intended load-carrying capacities of ladders used.
- In addition, retraining must be provided for each employee, as necessary, so that the employee maintains the understanding and knowledge acquired through compliance with the standard.

1926.1060(a) and (b)

Ladder Safety - Prevention

- Climbing and descending:
 - Check to see if ladder is secure.
 - Have both hands free to hold on to the ladder, or at least one hand.
 - Face the ladder when climbing or descending
 - Keep the area around the top and bottom of ladders clear.
 - Only one person on a ladder!

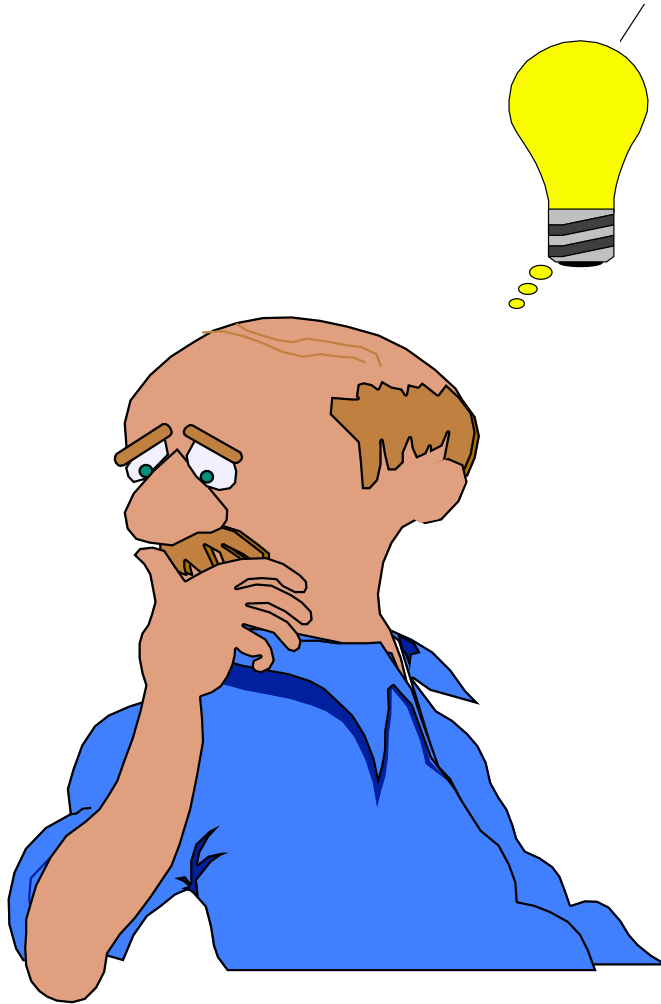


Is a Ladder a Work Platform?

- Many accidents occur while a person is working from the ladder.
- Is there an alternative?



BRAINSTORM!



Change a
Fluorescent
Light Bulb
Exercise

Three Step Procedure & Exercise

- Identify each major step of the job task
- List the hazard(s) to each major step
- Determine the control(s) that would prevent an accident for each hazard identified
- Break into groups
- List only three steps, hazards, control for changing a fluorescent light bulb
- Go!!! (5 minutes)

Job Safety Analysis - Blank form - Copy for use at the workplace

Item	Work activity	Hazard	Risk control	Persons responsible	Completion
Number	Break the job down into steps	What could harm someone?	What can be done to make	Who will make sure it	Date and signoff
			the job safe?	happens?	

Changing A Light Bulb Ballast

- Event Date: 08/19/2009
- An employee was on an aluminum ladder over twenty five feet from the ground when working on replacing a ballast for a 400 watt mercury light bulb.
- The power supply line was energized.
- The circuit breaker for the lighting fixture was tripped.
- The employee fell off the ladder.
- The employee was taken to a hospital where he was pronounced dead.

Post Job Hazard Analysis

What do I do next ?

- Correct the unsafe conditions and processes.
- Train all employees who do the job on the changes
- Make sure they understand the changes
- Assign additional needed actions/follow-ups

Step Ladders

- Used on stable surface
- Not used as a ext. ladder
- Inspected for defects
- Never used on a scaffold



Step Ladders

- Inspected for defects
- Ensure stability
latches are engaged
- What's wrong here?



Is There an Alternative to Ladders?



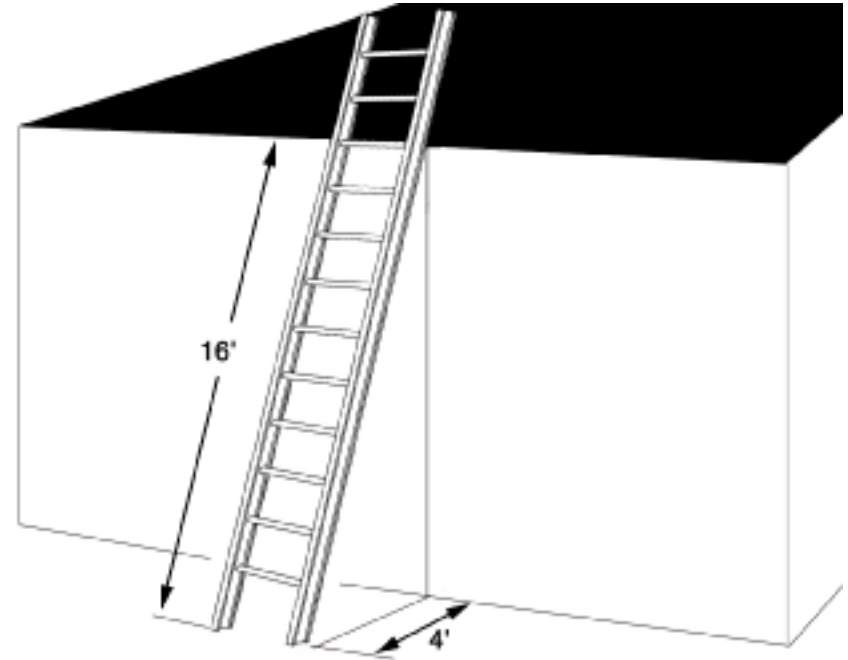
Extension Ladder

- 4:1 Pitch
- 3' extension above landing
- Not near electrical
- Secured from slipping
- One of the most common ladder falls are from these.



The Ladder Pitch

- 1926.1053(b)(5)(i) Non-self-supporting ladders shall be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder (the distance along the ladder between the foot and the top support).



Extension Ladder

- Inspect for defects
- Training
- Ladder feet set correctly
- Consider eliminating working from these and just use for access.
- Worker must not lean their belly button past side rails or they will lose their balance



Ladder is too short

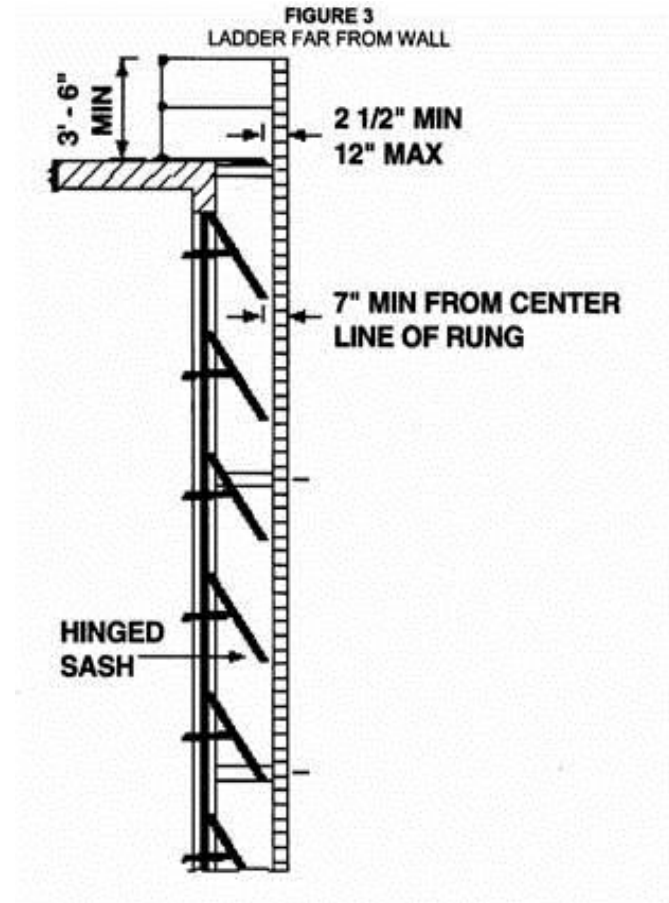
Transitions

- Many falls are transition from ladder to surface such as floor or roof.
- Ladder not extending over the edge 3 feet



Fixed Ladder

- Stairs should be in place if used everyday. 1910.24
- Use fall arrest while climbing
- Keep lanyard short to 12 inches if possible.
- Inspect ladder for looseness and proper rails to roof



Fixed Ladder

- Roof ladders will need fall arrest above 20 feet in length.
- 2003 fatal climbing a 40 foot fixed ladder w/o fall arrest in Morris, IL



Ladders on Machinery

- Can ladder be dislodged?
- Is scaffold feasible?
- What other hazards?



Pull Down Ladders

- Inspect for securement
- Weak springs means it will come down fast
- Wear hard hat when pulling down



Scaffold and Ladders

- OSHA has specific rules for ladders and scaffolds
- 1910.28 or 1926.451 for scaffolds
- 1910.25, 1910.26, 1910.27 and 1926.1030 for ladders
- Read manufacturer's rules!



Ladder Stands

- Inspect for stability and no broken welds.
- Use as work platform vs. a step ladder.
- Does the ladder stand move when on it?



Confined Space

- Many ladder falls are due to environment causing the person to fall.
- Any underground structure could have a lack of oxygen.
- Test the air!!!
- Follow 1910.146 for confined spaced.
- Plan for Rescue!



Powerlines

- Aluminum Conducts Electricity
- Fiberglass is not perfect.
- If you touch a live circuit and a grounded surface you will be shocked.



This is an unsafe condition

Fire and Ladders

- Determine if there is a potential for fire under the ladder
- Wind Towers, dust collectors, flammable tanks and silos are locations where the ladder may have a fire at the bottom.

Insects

- Bees and wasps cause workers to fall.
- Consider using stair platform or aerial lift.
- Wear PPE
- Consider using a professional exterminator.



Ladder Trucks

- Follow manufacturer inspection and look for leaking fluids.
- Powerlines are source of many electrocution
- Do not overload the ladder.
- Make sure fall protection is used or built in.



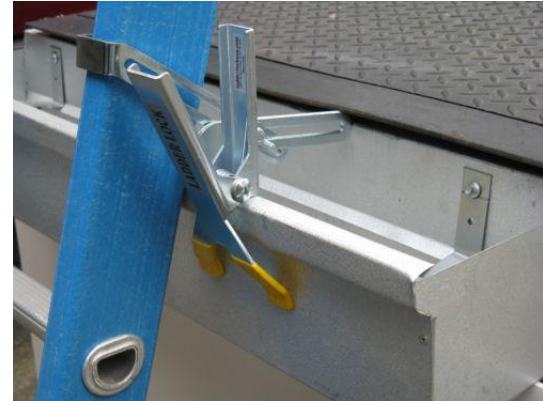
Cell Towers



- No Free Climbing.
- Wear fall arrest designed for the access.

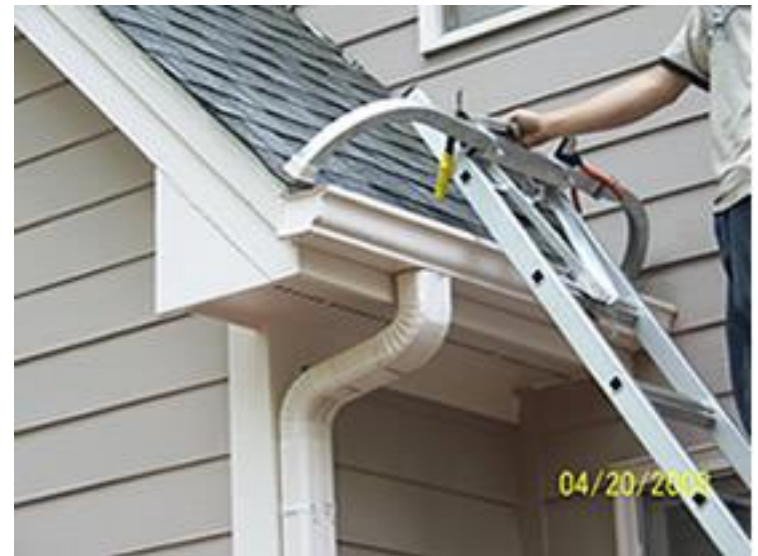
Ladder Securement

- Portable ladders must be secured against movement while in use.
- There are many commercial products that will help.
- 1926.1053(b)(1)



Ladder Stabilizer

- Many ladder slipping to slides would be prevent with these.



Unstable surfaces

- Slip-resistant feet must not be used as a substitute for the care in placing, lashing, or holding a ladder upon a slippery surface.
1926.1053 (b)(7)



Three Point Contact

- How do you get materials up to the roof?



Grain Bin

- Why should be done?



Grain Silo

- What should be added?



Scaffold Ladder

- Could it be better?



Hazard Recognition

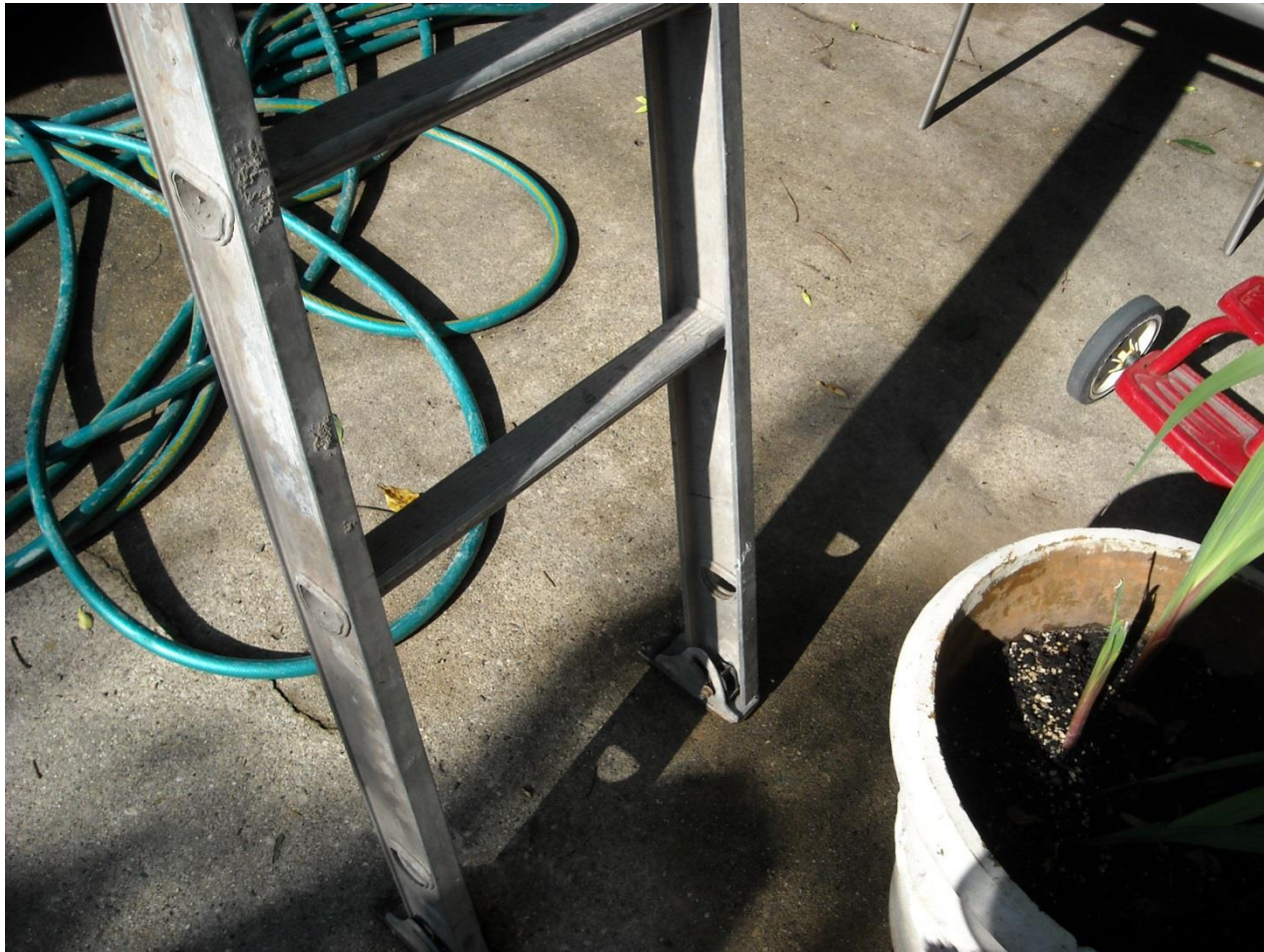
- What's Wrong?



Hazard Recognition



Hazard Recognition



Hazard Recognition



Hazard Recognition



Hazard Recognition



Hazard Recognition



Height Requirement

- A ladder (or stairway) must be provided at all work points of access where there is a break in elevation of 19 inches (48.2 centimeters) or more except if a suitable ramp, runway, embankment, or personnel hoist is provided to give safe access to all elevations. **1926.1051(a)**

CPSC Safety Tips

- Use a ladder that is the proper length for the job. Proper length is a minimum of 3 feet extending over the roofline or working surface. The three top rungs of a straight, single or extension ladder should not be stood on.
- All metal ladders should have slip-resistant feet.
- Never leave a raised ladder unattended.
- Follow use instruction labels on ladders
- Make sure the weight your ladder is supporting does not exceed its maximum load rating (user plus materials).
- The ground under the ladder should be level and firm. Large flat wooden boards braced under the ladder can level a ladder on uneven ground or soft ground. A good practice is to have a helper hold the bottom of the ladder.
- Do not place a ladder in front of a door that is not locked, blocked or guarded.
- Keep your body centered between the rails of the ladder at all times. Do not lean too far to the side while working.
- Do not step on the top step, bucket shelf or attempt to climb or stand on the rear section of a stepladder.

Resources

- <http://www.osha.gov/SLTC/etools/construction/falls/4ladders.html>
 - <http://www.wernerladder.com/safety/>
 - http://www.osha.gov/Publications/portable_ladder_qc.html
 - ANSI A14.1-14.5 series.
-
- And.....(next slide)

Is a ladder the solution?



Further

- This was prepared as a collaborative effort several friends as a preliminary aid for anyone teaching basic ladder safety.
- These are just some the issues. A comprehensive job hazard analysis should be conducted for any task where someone can get hurt.
- This is not an official OSHA publication. Those will be on the OSHA.gov website.
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- 815-354-6853
- I want to thank Pamela Huck, Janet S. and Lisa Kane for all their assistance in answering questions and providing comments.