

Walking-Working Surfaces: Practical Tips for Minimizing Slip and Fall Hazards and Avoiding Costly OSHA Violations

Presented by:

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Standards at a Glance

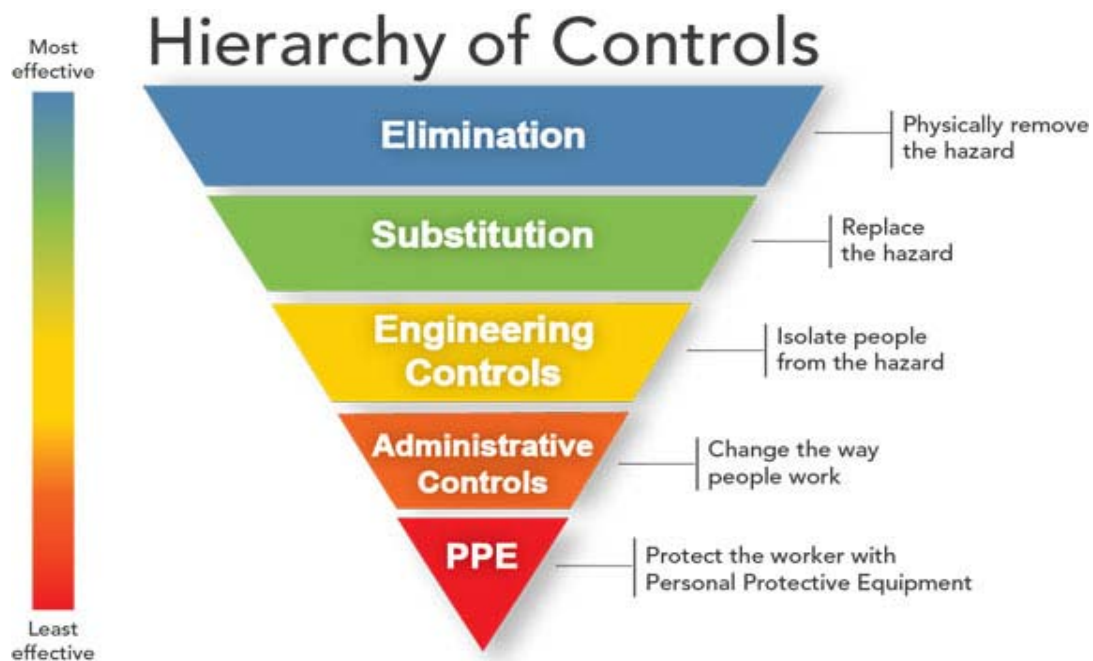
Old Rule — Subpart D	New Rule — Subpart D
1910.21 — Definitions	1910.21 — Scope and Definitions
1910.22 — General Requirements	1910.22 — General Requirements
1910.23 — Guarding Floor and Wall Openings and Holes	1910.23 — Ladders
1910.24 — Fixed Industrial Stairs	1910.24 — Step Bolts and Manhole Steps
1910.25 — Portable Wood Ladders	1910.25 — Stairways
1910.26 — Portable Metal Ladders	1910.26 — Dockboards
1910.27 — Fixed Ladders	1910.27 — Scaffolds and Rope Descent Systems
1910.28 — Safety Requirements for Scaffolding	1910.28 — Duty to Have Fall Protection and Falling Object Protection
1910.29 — Manually Propelled Mobile Ladder Stands and Scaffolds (towers)	1910.29 — Fall Protection Systems and Falling Object Protection – Criteria and Practices
1910.30 — Other Working Surfaces	1910.30 — Training Requirements

Who complies?

- Manufacturing
- Warehousing
- Utilities
- Oil & gas extraction
- Retailers
- Offices

Employer Requirements

1. Identify and evaluate
2. Provide appropriate PPE or fall protection systems
3. Conduct regular inspections and maintenance
4. Provide training



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1. Identify and evaluate

- All places of employment, passageways, storerooms, service rooms, and walking/working surfaces

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2. Provide PPE or FPS

1. Guardrail systems;
2. Safety net systems; or
3. Personal fall protection systems, such as personal fall arrest, travel restraint, or positioning systems.

Easy as ABC

- Anchorage
- Body-Harness
- Connector

3. Regular Inspections & Maint.

- Routines are Good!
- Prior to each use
- Annually (Documented)
- Certified V. Non-Certified

4. Provide Training

- Toolbox Talks / Safety Briefs
- Annual / Refresher
 - Competent / Qualified Training
- Post-Accident/Incident
 - Failure/Damage

Slips, Trips & Falls

- Slips, trips, and falls constitute the majority of general industry accidents.
- According to OSHA, these accidents account for 15% of all accidental deaths, second only to motor vehicle accidents as a cause of fatalities.

Slips, Trips & Falls

- OSHA's Walking-Working Surfaces Rule, in effect since 2017, addresses these accidents. The rule (29 CFR Part 1910, subpart D), which affects *all* general industry walking-working surfaces, as well as revised and new provisions for fixed ladders and rope descent systems, also addresses training on fall hazards and fall protection systems.

Slips, Trips & Falls

- Under this comprehensive rule there are also requirements on the design, performance, and use of personal fall protection systems to the general industry Personal Protective Equipment (PPE) standards (29 CFR part 1910, subpart I).
- And, the rule incorporates advances in technology and industry best practices that have been developed since OSHA adopted subpart D in 1971 and will provide challenges for safety managers nationwide.

Topics

- Key requirements that must be met under OSHA's walking working surface rule and related regulations to avoid costly violations

Topics

- A systematic process for analyzing walking working surface/fall risks in general industry to help prevent related injuries and comply with OSHA requirements

Topics

- How to assess walkways for slip and fall potential to reduce or eliminate hazards
 - Housekeeping
 - Housekeeping
 - Housekeeping

Contingency Plans

- Need to develop contingency plans for foreseeable incidents, such as:
 - Spills
 - Weather-related events
 - Housekeeping and maintenance
 - Renovations
 - Wear and tear
 - Electrical and special hazards

Internal Accident Investigation

- Key elements for success in your internal investigations process following slip and fall-related incidents, including:
 - Who should be on the team?
 - How best to structure the process?
 - How to document the findings?
 - How to ensure successful follow-through on identified corrective actions?

Strategies for approaching senior management to get the buy-in and support you need in the process

- The cost not to pay for safety?
 - Can perform a cost analysis profile
 - Research how other companies have had issues and how much it cost them
 - Show how successful other companies have been by improving safety and reducing EMR (Experience Modification Rate)

Proven strategies for reporting, tracking, and completing identified corrective actions

- Spreadsheets which track recordables, incidents and near misses and then use the information to evaluate the success or failures of your safety plan

Top 10 Hazards for Slips, Trips & Falls

- Contaminants on the Floor
- Indoor Walking Surface Irregularities
- Outdoor Walking Surface Irregularities
- Weather Conditions: Ice and Snow
- Inadequate Lighting
- Stairs and Handrails
- Stepstools and Ladders
- Tripping Hazards: Clutter, Loose Cords, etc.
- Improper Use of Floor Mats and Runners
- Poor Drainage: Pipes and Drains

Objectives

- Costs of slips, trips & falls (STFs)
- Definitions
- Causes of STFs
- Risk factors
- Prevention/minimization



Costs of STFs

- Slips, trips & falls can happen anywhere in your operation
- Slips & trips can result in falls, possibly disability or death
- Costs to employer & worker can be substantial



Costs of STFs

- To the employer:
 - Loss of productivity & business
 - Increased industrial insurance premiums
 - Costs associated with training replacement worker



Costs of STFs

- To the worker:
 - Lost wages & out-of-pocket expenses
 - Pain
 - Temporary or permanent disability
 - Reduced quality of life
 - Depression
 - Death



Frequency of STFs

- Slips, trips & falls make up majority of general industry accidents (USDOL)
 - 15% of all accidental deaths; 2nd leading cause behind motor vehicles
 - ~12,000/year
 - One of most frequently-reported injuries
 - ~25% of reported claims/year
 - Over 17% of all disabling occupational injuries result from falls
- Most could have been prevented

Injuries from Slips, Trips and Falls

Common Injuries

- Sprains, strains
- Bruises, contusions
- Fractures
- Abrasions, cuts

Common Affected Body Parts

- Knee, ankle, foot
- Wrist, elbow
- Back
- Shoulder
- Hip
- Head



Definitions

- Slip
 - Too little friction or traction between feet (footwear) & walking/working surface, resulting in loss of balance
 - Stiction is the static friction that needs to be overcome to enable relative motion of stationary objects in contact.



Definitions

- Trip
 - Foot or lower leg hits object & upper body continues moving, resulting in loss of balance
 - Stepping down to lower surface & losing balance



Potential Trip Hazards?

Definitions

- Fall
 - Occurs when too far off center of balance
- Two types
 - Fall at same level
 - Fall to same walking or working surface, or fall into or against objects above same surface
 - Fall to lower level
 - Fall to level below walking or working surface

Causes of Slips

- Wet product or spills on smooth floors or walking surfaces
 - Water
 - Mud
 - Grease
 - Oil
 - Food
 - Blood
 - Offal



Causes of Slips

- Dry product or spills making walking surface slippery
 - Dusts
 - Powders
 - Granules
 - Wood
 - Plastic wrapping

Causes of Slips

- Highly-polished floors can be slick even when dry
 - Concrete
 - Marble
 - Ceramic tile
- Freshly-waxed surfaces
- Transitioning from one surface to another
 - Carpeted to vinyl
 - Grid to smooth concrete



Causes of Slips

- Sloped walking surfaces
- Loose, unanchored rugs or mats
- Loose floorboards or shifting tiles
- Wet, muddy or greasy shoes
- Ramps & gang planks without skid- or slip-resistant surfaces



Causes of Slips

- Metal surfaces
 - Dockboards & dock plates
 - Platforms
 - Sidewalk & road covers
- Mounting & dismounting vehicles & equipment
- Climbing ladders
- Loose, irregular surfaces such as gravel

Causes of Slips

- Sloped, uneven or muddy terrain
- Weather hazards
- Leaves, pine needles & other plant debris (wet or dry)

Causes of Trips



- Uncovered hoses, cables, wires or extension cords across aisles or walkways
- Clutter, obstacles in aisles, walkway & work areas
- Open cabinet, file or desk drawers & doors



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Causes of Trips

- Changes in elevation or levels
 - Unmarked steps or ramps
- Rumpled or rolled-up carpets/mats or carpets with curled edges
- Irregularities in walking surfaces
 - Thresholds or gaps
- Missing or uneven floor tiles & bricks

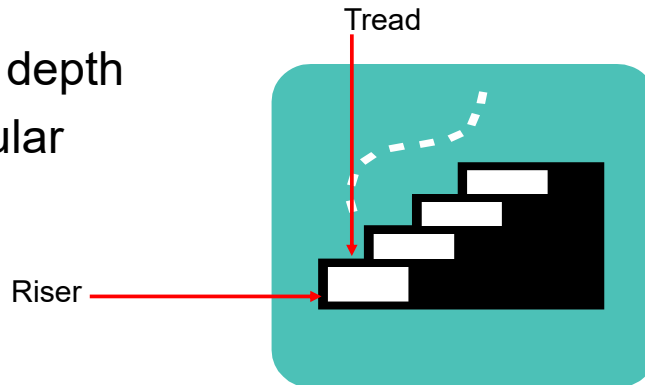
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Causes of Trips

- Damaged steps
- Non-uniform, improper or irregular steps
 - Taller or shorter
 - Shallower tread depth
 - Otherwise irregular



Causes of Trips

- Debris, accumulated waste materials
- Trailing cables, pallets, tools in gangways
- Objects protruding from walking surface
- Uneven surfaces
- Sidewalk/curb drops
- Speed bumps
- Tire bumpers
- Wheelchair ramps & curbs
- Driveways

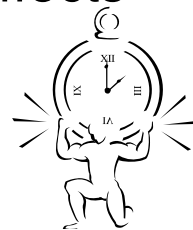
Environmental Conditions Increasing Risk of Trips & Slips

- Poor lighting
- Glare
- Shadows
- Bulky PPE (includes improper footwear)
- Excess noise or temperature
- Fog or misty conditions
- Poor housekeeping
- Improper cleaning methods & products
- Inadequate or missing signage



Human Factors Increasing Risk of Trips & Slips - Physical

- Failing eyesight &/or visual perception
- Age
- Physical condition & fatigue
- Stress or illness
- Medications, alcohol & drug effects



Human Factors Increasing Risk of Trips & Slips - Behavior

- Carrying or moving cumbersome objects or simply too many objects at one time
- Not paying attention to surroundings or walking distracted
- Taking unapproved shortcuts
- Being in a hurry and rushing



STFs are Preventable

- Design of workplace & work processes
 - Design workplace & processes to prevent potential exposures to slip & trip hazards
- Good housekeeping
 - Maintain clear, tidy work areas free of clutter
- Safe walking practices
 - Follow safe walking practices & routes
- Wearing proper footwear
 - Wear proper footwear with good traction
- Learn to fall “properly”
 - There are techniques that can minimize fall injuries

Workplace/Work Process Design

- Contain work processes to prevent discharge, splatter, or spillage of liquids, oils, particles, dusts & offal onto floor
 - Local exhaust ventilation
 - Extraction/collection systems
 - Enclosures
 - Work surfaces with raised or lipped edges
 - Catch/drip pans, drain-offs

Workplace/Work Process Design

- Use drip trays to contain leaks of lubricant onto floor from machinery
 - Perform regularly scheduled maintenance
- Use adequate ventilation to avoid smoke, steam & condensation of water & grease onto floor
- Provide adequate lighting to keep work areas, aisles & paths of travel well lit

Workplace/Work Process Design

- Mark/highlight step edges & transition areas (changes in elevations)
 - Use anti-skid paint, slip-resistant coatings & strips
- Make sure stairs have sufficient lighting & hand rails
- Provide effective drainage, false floors or work platforms
- Install slip-resistant floors in high risk areas

OSHA's Regulations 29 CFR 1910 Subpart D



Housekeeping

- All places of employment clean and orderly and in a sanitary condition
- Workrooms clean & dry
- Platforms, mats, or other dry standing places for wet processes



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Aisles

- Sufficient safe clearance maintained where mechanical handling equipment is used
- Aisles and passageways kept clear and in good repairs
- No obstruction across or in aisles that could create a hazard



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Aisles

- Permanent aisles and passageways shall be appropriately marked.



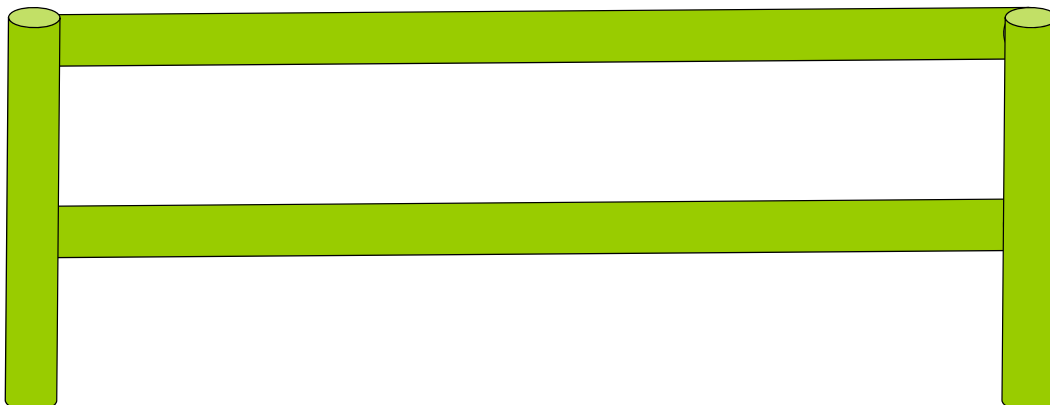
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Floor Openings

- Every stairway floor opening guarded by a standard railing
- Railing provided on all exposed sides (except at entrance to stairway)



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Floor Openings

- Every ladderway floor opening or platform shall be guarded by a standard railing with standard toeboard on all exposed sides (except at entrance to opening), with the passage through the railing either provided with a swinging gate or so offset that a person cannot walk directly into the opening.



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Floor Openings

- Where operating conditions necessitate the feeding of material into any hatchway or chute opening, protection shall be provided to prevent a person from falling through the opening.



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Floor Openings

- Every pit and trapdoor floor opening, infrequently used, guarded by a floor opening cover of standard strength and construction.
- While the cover is not in place, the pit or trap opening constantly attended by someone or protected on all exposed sides by removable standard railings.



Floor Openings

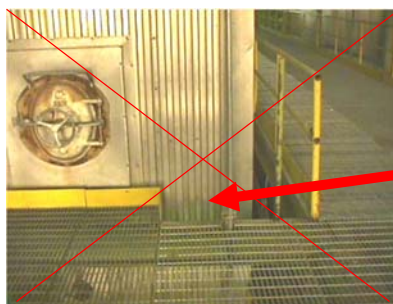
- Every temporary floor opening shall have standard railings, or shall be constantly attended by someone.





Floor Openings

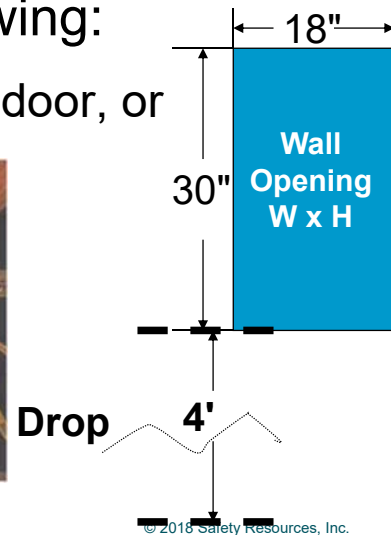
- Every floor hole into which persons can accidentally walk shall be guarded by either:
 - A standard railing with standard toeboard on all exposed sides, or
 - A floor hole cover of standard strength and construction. While the cover is not in place, the floor hole shall be constantly attended by someone or shall be protected by a removable standard railing.



**Floor opening
large enough
to fall through**

Wall Openings

- Every wall opening from which there is a drop of more than 4 feet shall be guarded by one of the following:
 - Rail, roller, picket fence, half door, or equivalent barrier.



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Open-sided Floors

- Every open-sided floor or platform 4 feet or more guarded on all open sides except where there is entrance to a ramp, stairway, or fixed ladder.



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Open-sided Floors

- The railing shall be provided with a toeboard wherever, beneath the open sides,
 - Persons can pass,
 - There is moving machinery, or
 - There is equipment with which falling materials could create a hazard



Open-sided Floors

- All open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, guarded with a standard railing and toe board



Stairways

- Every flight of stairs having four or more risers shall be equipped with standard stair railings or standard handrails.



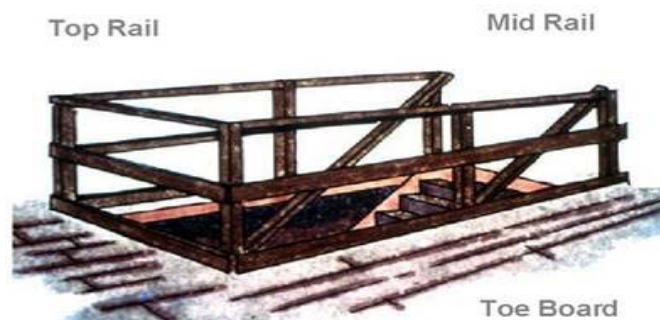
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Railings

- A standard railing consists of top rail, intermediate rail, and posts
- Have a vertical height of 42 +/- 3 inches nominal from upper surface of top rail to floor.
- The top rail smooth-surfaced
- The ends of the rails shall not constitute a projection hazard

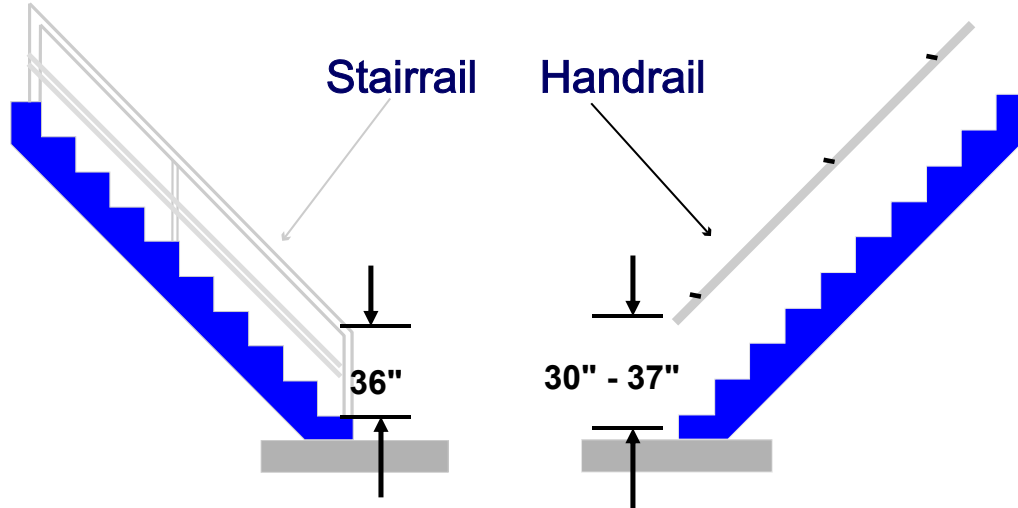


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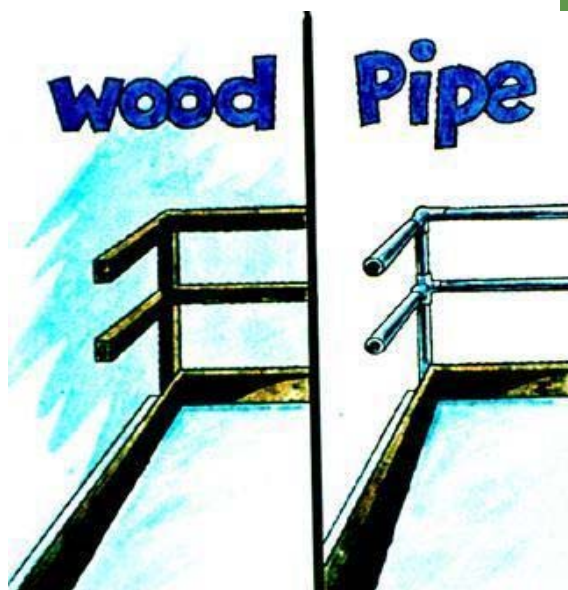
Railings



A stair railing when also used as the handrail shall be not more than 37 inches nor less than 36 inches from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.

Railings

- Wood railings, posts at least 2 by 4
- Posts \leq 6 feet
- Rails, at least 2 by 4
- Pipe railings at least 1 1/2 inches nominal diameter
- Posts spaced not more than 8 feet on centers.



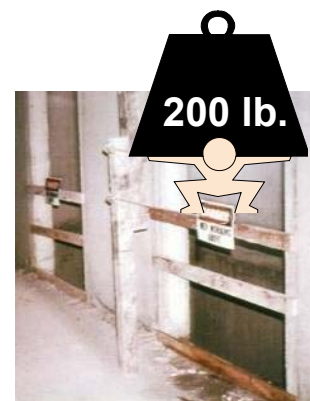
Railings

- For structural steel railings
 - Posts and top and intermediate rails 2 by 2 by 3/8 inch angles
 - Posts spaced not more than 8 feet on centers.



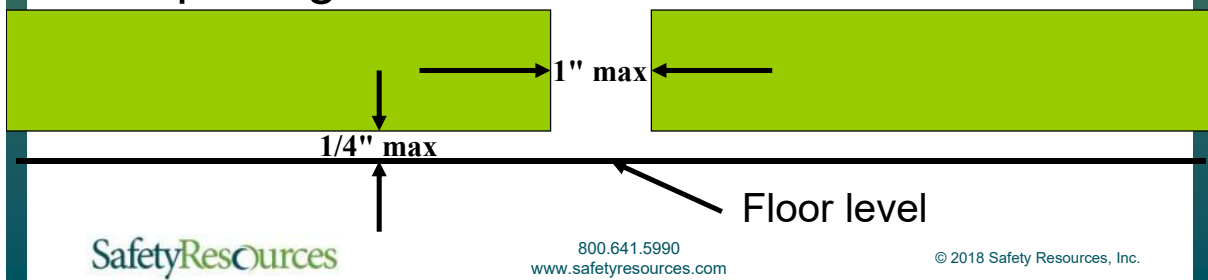
Railings

- The completed structure shall be capable of withstanding a load of at least 200 pounds applied in any direction at any point on the top rail.



Railings

- A standard toeboard 3.5 inches nominal in vertical height
- Securely fastened
- Not more than 1/4-inch clearance above floor level.
- Openings not over 1 inch



Railings

- Where material is piled to such height that a standard toeboard does not provide protection, paneling from floor to intermediate rail, or to top rail shall be provided.



Fixed Stairs

- Provided for regular travel between levels
- Where equipment requires attention routinely
- Fixed stairs provided where access to elevations is daily
- For work around acids, caustics, gases, or other harmful substances



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Fixed Stairs

- Fixed stairs minimum width of 22 inches



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Fixed Stairs

- "Stair treads." All treads shall be reasonably slip-resistant and the nosings shall be of nonslip finish.



- Rise height and tread width shall be uniform throughout any flight of stairs including any foundation structure used as one or more treads of the stairs.

Fixed Stairs

- "Stairway platforms." Stairway platforms shall be no less than the width of a stairway and a minimum of 30 inches in length measured in the direction of travel.



Fixed Stairs

- "Railings and handrails." Standard railings shall be provided on the open sides of all exposed stairways and stair platforms.
- Handrails shall be provided on at least one side of closed stairways preferably on the right side descending.



No handrail on stairs leading to the machine pit

Portable Ladders

- All parts free from sharp edges and splinters;
- Visually acceptable
- Stepladders 20' max.
- Single ladders 30' max.



Portable Ladders

- Maintained in good conditions at all times
- Locks, wheels, pulleys frequent lubrication
- Worn rope replaced
- Safety feet and auxiliary equipment in good shape



Portable Ladders - Inspection



Ladders inspected frequently. Those with defects withdrawn from service for repair or destruction and tagged or marked as

"Dangerous, Do Not Use."

Portable Ladders



Ladders not placed in front of doors opening toward the ladder unless the door is blocked upon, locked, or guarded;

Portable Ladders

- Tops of the ordinary types of stepladders shall not be used as steps





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Dave Wulff, a Safety Consultant with Safety Resources, specializes in construction and manufacturing safety, electrical safety, OSHA Recordkeeping, Research & Development facility safety, and contractor prequalification systems. He serves as a Contract Safety Director for a number of construction and manufacturing clients in and around the state of Indiana. Additionally, he manages safety operations for several national General Contractors and subcontractors nationwide.