



Slips, Trips, & Falls

University Facilities

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1.0 Slips, Trips, & Falls Identification and Prevention

1.1 Objectives

- 1.1.1 Costs of slips, trips & falls (STFs)
- 1.1.2 Definitions
- 1.1.3 Causes of STFs
- 1.1.4 Risk factors
- 1.1.5 Prevention/minimization

2.0 Costs of STFs

2.1 Slips, trips & falls can happen anywhere in your operation

2.2 Slips & trips can result in falls, possibly disability or death

2.3 Costs to employer & worker can be substantial

2.4 To the employer:

- 2.4.1 Loss of productivity & business
- 2.4.2 Increased industrial insurance premiums
- 2.4.3 Costs associated with training replacement worker

2.5 To the worker:

- 2.5.1 Lost wages & out-of-pocket expenses
- 2.5.2 Pain
- 2.5.3 Temporary or permanent disability
- 2.5.4 Reduced quality of life
- 2.5.5 Depression

2.5.6 Death

3.0 Frequency of STFs

3.1 Slips, trips & falls make up majority of general industry accidents

- 3.1.1 15% of all accidental deaths; 2nd leading cause behind motor vehicles
 - 3.1.1.1 ~12,000/year
- 3.1.2 One of most frequently-reported injuries
 - 3.1.2.1 ~25% of reported claims/year
- 3.1.3 Over 17% of all disabling occupational injuries result from falls

3.2 Most could have been prevented

4.0 STF Injuries

- 4.1 Sprains & strains
- 4.2 Bruises & contusions
- 4.3 Fractures
- 4.4 Abrasions & lacerations

5.0 Typical Injury Sites

- 5.1 Knee, ankle and/or foot
- 5.2 Wrist &/or elbow
- 5.3 Back &/or shoulder
- 5.4 Hip
- 5.5 Head

6.0 Definitions

- 6.1 Slip
 - 6.1.1 Too little friction or traction between feet (footwear) & walking/working surface, resulting in loss of balance
- 6.2 Trip
 - 6.2.1 Foot or lower leg hits object & upper body continues moving, resulting in loss of balance
 - 6.2.2 Stepping down to lower surface & losing balance

6.3 Fall

6.3.1 Foot or lower leg hits object & upper body continues moving, resulting in loss of balance

6.3.2 Stepping down to lower surface & losing balance

7.0 Causes of Slips

7.1 Wet product or spills on smooth floors or walking surfaces

7.1.1 Water

7.1.2 Mud

7.1.3 Grease

7.1.4 Oil

7.1.5 Food

7.1.6 Blood

7.1.7 Offal

7.2 Dry product or spills making walking surface slippery

7.2.1 Dusts

7.2.2 Powders

7.2.3 Granules

7.2.4 Wood

7.2.5 Plastic wrapping

7.3 Highly-polished floors can be slick even when dry

7.3.1 Concrete

7.3.2 Marble

7.3.3 Ceramic tile

7.4 Freshly-waxed surfaces

7.5 Transitioning from one surface to another

- 7.5.1 Carpeted to vinyl
- 7.5.2 Grid to smooth concrete
- 7.6 Sloped walking surfaces
- 7.7 Loose, unanchored rugs or mats
- 7.8 Loose floorboards or shifting tiles
- 7.9 Wet, muddy or greasy shoes
- 7.10 Ramps & gang planks without skid- or slip-resistant surfaces
- 7.11 Metal surfaces
 - 7.11.1 Dock boards & dock plates
 - 7.11.2 Platforms
 - 7.11.3 Sidewalk & road covers
- 7.12 Mounting & dismounting vehicles & equipment
- 7.13 Climbing ladders
- 7.14 Loose, irregular surfaces such as gravel
- 7.15 Sloped, uneven or muddy terrain
- 7.16 Weather hazards
- 7.17 Leaves, pine needles & other plant debris (wet or dry)

8.0 Causes of Trips

- 8.1 Uncovered hoses, cables, wires or extension cords across aisles or walkways
- 8.2 Clutter, obstacles in aisles, walkway & work areas
- 8.3 Open cabinet, file or desk drawers & doors
- 8.4 Changes in elevation or levels
 - 8.4.1 Unmarked steps or ramps
- 8.5 Rumpled or rolled-up carpets/mats or carpets with curled edges
- 8.6 Irregularities in walking surfaces

- 8.6.1 Thresholds or gaps
- 8.7 Missing or uneven floor tiles & bricks
- 8.8 Damaged steps
- 8.9 Non-uniform, improper or irregular steps
 - 8.9.1 Taller or shorter
 - 8.9.2 Shallower tread depth
 - 8.9.3 Otherwise irregular
- 8.10 Debris, accumulated waste materials
- 8.11 Trailing cables, pallets, tools in gangways
- 8.12 Objects protruding from walking surface
- 8.13 Uneven surfaces
- 8.14 Sidewalk/curb drops
- 8.15 Speed bumps
- 8.16 Tire bumpers
- 8.17 Wheelchair ramps & curbs
- 8.18 Driveways

9.0 Environmental Conditions Increasing Risk of Trips & Slips

- 9.1 Poor lighting
- 9.2 Glare
- 9.3 Shadows
- 9.4 Bulky PPE (includes improper footwear)
- 9.5 Excess noise or temperature
- 9.6 Fog or misty conditions
- 9.7 Poor housekeeping
- 9.8 Improper cleaning methods & products

9.9 Inadequate or missing signage

10.0 Human Factors Increasing Risk of Trips & Slips – Physical

10.1 Failing eyesight &/or visual perception

10.2 Age

10.3 Physical condition & fatigue

10.4 Stress or illness

10.5 Medications, alcohol & drug effects

11.0 Human Factors Increasing Risk of Trips & Slips – Behavior

11.1 Carrying or moving cumbersome objects or simply too many objects at one time

11.2 Not paying attention to surroundings or walking distracted

11.3 Taking unapproved shortcuts

11.4 Being in a hurry and rushing

12.0 STFs are Preventable

12.1 Design of workplace & work processes

12.1.1 Design workplace & processes to prevent potential exposures to slip & trip hazards

12.2 Good housekeeping

12.2.1 Maintain clear, tidy work areas free of clutter

12.3 Safe walking practices

12.3.1 Follow safe walking practices & routes

12.4 Wearing proper footwear

12.4.1 Wear proper footwear with good traction

12.5 Learn to fall “properly”

12.5.1 There are techniques that can minimize fall injuries

13.0 Workplace/Work Process Design

- 13.1 Contain work processes to prevent discharge, splatter, or spillage of liquids, oils, particles, dusts & offal onto floor
 - 13.1.1 Local exhaust ventilation
 - 13.1.2 Extraction/collection systems
 - 13.1.3 Enclosures
 - 13.1.4 Work surfaces with raised or lipped edges
 - 13.1.5 Catch/drip pans, drain-offs
- 13.2 Use drip trays to contain leaks of lubricant onto floor from machinery
 - 13.2.1 Perform regularly scheduled maintenance
- 13.3 Use adequate ventilation to avoid smoke, steam & condensation of water & grease onto floor
- 13.4 Provide adequate lighting to keep work areas, aisles & paths of travel well lit
- 13.5 Mark/highlight step edges & transition areas (changes in elevations)
 - 13.5.1 Use anti-skid paint, slip-resistant coatings & strips
- 13.6 Make sure stairs have sufficient lighting & hand rails
- 13.7 Provide effective drainage, false floors or work platforms
- 13.8 Install slip-resistant floors in high risk areas

14.0 OSHA's Regulations

- 14.1 29 CFR 1910 Subpart D

15.0 Housekeeping

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

16.0 Aisles

- 16.1 Sufficient safe clearance maintained where mechanical handling equipment is used
- 16.2 Aisles and passageways kept clear and in good repairs

16.3 No obstruction across or in aisles that could create a hazard

16.4 Permanent aisles and passageways shall be appropriately marked.

17.0 Floor Openings

17.1 Every stairway floor opening guarded by a standard railing

17.2 Railing provided on all exposed sides (except at entrance to stairway)

17.3 Every ladder way floor opening or platform shall be guarded by a standard railing with standard toe board 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.

17.4 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.

17.5 Every pit and trapdoor floor opening, infrequently used, guarded by a floor opening cover of standard strength and construction.

17.6 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.

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

17.8 Every floor hole into which persons can accidentally walk shall be guarded by either:

17.8.1 standard railing with standard toe board on all exposed sides, or

17.8.2 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.

18.0 Wall Openings

18.1 Every wall opening from which there is a drop of more than 4 feet shall be guarded by one of the following:

18.1.1 Rail, roller, picket fence, half door, or equivalent barrier.

19.0 Open-sided Floors

19.1 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.

- 19.2 The railing shall be provided with a toe board wherever, beneath the open sides,
 - 19.2.1 Persons can pass,
 - 19.2.2 There is moving machinery, or
 - 19.2.3 There is equipment with which falling materials could create a hazard
- 19.3 All open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, guarded with a standard railing and toe board

20.0 Stairways

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

21.0 Railings

- 21.1 A standard railing consists of top rail, intermediate rail, and posts
- 21.2 Have a vertical height of 42 inches nominal from upper surface of top rail to floor.
- 21.3 The top rail smooth-surfaced
- 21.4 The ends of the rails shall not constitute a projection hazard
- 21.5 A stair railing shall be not more than 34 inches nor less than 30 inches from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.
- 21.6 Wood railings, posts at least 2 by 4
- 21.7 Posts \leq 6 feet
- 21.8 Rails, at least 2 by 4
- 21.9 Pipe railings at least 1 1/2 inches nominal diameter
- 21.10 Posts spaced not more than 8 feet on centers.
- 21.11 For structural steel railings
 - 21.11.1 Posts and top and intermediate rails 2 by 2 by 3/8 inch angles
 - 21.11.2 Posts spaced not more than 8 feet on centers.
- 21.12 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.

- 21.13 A standard toe board 4 inches nominal in vertical height
- 21.14 Securely fastened
- 21.15 Not more than 1/4-inch clearance above floor level.
- 21.16 Openings not over 1 inch
- 21.17 Where material is piled to such height that a standard toe board does not provide protection, paneling from floor to intermediate rail, or to top rail shall be provided.

22.0 Fixed Stairs

- 22.1 Provided for regular travel between levels
- 22.2 Where equipment requires attention routinely
- 22.3 Fixed stairs provided where access to elevations is daily
- 22.4 For work around acids, caustics, gases, or other harmful substances
- 22.5 Fixed stairs minimum width of 22 inches
- 22.6 "Stair treads." All treads shall be reasonably slip-resistant and the nosing shall be of nonslip finish.
- 22.7 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.
- 22.8 "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.
- 22.9 "Railings and handrails." Standard railings shall be provided on the open sides of all exposed stairways and stair platforms.
- 22.10 Handrails shall be provided on at least one side of closed stairways preferably on the right side descending.

23.0 Portable Ladders

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

- 23.5 Maintained in good conditions at all times
- 23.6 Locks, wheels, pulleys frequent lubrication
- 23.7 Worn rope replaced
- 23.8 Safety feet and auxiliary equipment in good shape
- 23.9 Ladders inspected frequently
 - 23.9.1 Those with defects withdrawn from service for repair or destruction and tagged or marked as "Dangerous, Do Not Use."
- 23.10 Ladders not placed in front of doors opening toward the ladder unless the door is blocked upon, locked, or guarded;
- 23.11 Tops of the ordinary types of stepladders shall not be used as steps