

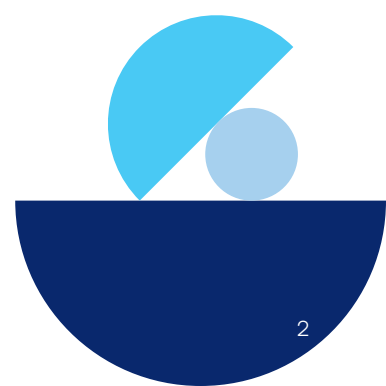
Slips, trips and falls

10-point program to better manage controls and mitigate risk



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Introduction

How safe are your floors? What about your stairs? Have people fallen recently? You are not alone if your organization has had slips, trips and falls.

Slip, trip, and fall (STF) incidents are a potential leading cause for loss within the General industry for both Workers' Compensation and General Liability coverage.

Over one million Americans suffer a STF injury each year and falls account for over 8 million hospital emergency room visits annually.⁶ It is important to recognize the factors that increase the likelihood of a STF and implement controls to prevent them in the future.



Purpose

Many factors contribute to slip, trip and fall incidents. This guide is designed to help you and your management teams become self-sufficient in better controlling these exposures. It provides a logical process to identify areas at your location that have the greatest potential for slip, trip and fall occurrences. It also shows the user how to prioritize hazards and develop action plans to help control slip, trip and fall losses in those areas.

The Zurich 10-point method of evaluating areas for slip, trip and fall potential starts with understanding several contributing risk factors commonly converging to result in a slip, trip and fall event. We have outlined these contributing factors in an evaluation form that is intuitive to use, and we will take you through the use of this tool step by step, providing examples where appropriate.

10 Risk factors for slips, trips and falls

Zurich completed a forensic review of a large number of slip, trip and fall injury cases and identified that the potential for incidents commonly depended on the convergence of 10 Risk factors defined below. These 10 Risk factors became the basis of our 10-point slip, trip and fall analysis methodology.

1. Surface composition

Surface composition refers to the type of floor or exterior walking surface installed and the coefficient of friction or slip resistance the surface provides. Surfaces such as natural stone, asphalt, brick, broom-finished concrete and carpet normally provide adequate slip resistance due to the asperities or raised edges on the surface. Hard smooth surfaces, such as vinyl composition tile, ceramic tile, terrazzo, marble and granite, may appear slip resistant when dry, but could be quite slippery when wet. Painted surfaces included in parking lots and sidewalks should be reviewed to verify abrasives were utilized to avoid creating a slippery surface exposure. The more slip resistant you find the walking surface in the area being assessed, generally the lower the exposure to a slip, trip and fall incident.

2. Foreign substance potential

There is a likelihood that a foreign substance will be on the walking surface and adversely affect the slip resistance. Items to consider include ice, water, liquids, powders, grease or any substances that could be tracked into the building or accumulate on a walking surface. Exposures created by maintenance or third-party cleaning crews should be considered. Vestibules should be reviewed in detail. The higher the potential for foreign substance introduction, the higher the exposure for a slip, trip and fall incident.

3. Surface conditions

These are the actual conditions at the time of the survey. Consider raised or recessed sidewalk edges or curbing, potholes in parking lots, painted surfaces, loose carpeting, loose or broken tiles, holes or pits on the surface, or unusual wear. Poor surface conditions should receive a high exposure rating.

4. Surface changes

These changes are from one type of material to another as someone walks through the area. This is especially critical when the surfaces have widely different slip resistance, such as carpet to tile, brick to epoxy floor, or wet to dry. Surface changes like these create a higher exposure for a slip, trip and fall incident.

5. Level changes

Level changes are defined as floor or exterior walking surface height changes of three or fewer steps. Ramps are defined by the Americans with Disabilities Act as walking surfaces with a slope greater than 1:20 rise/run. Ramps used for people with disabilities should have a slope no greater than 1:12 rise/run or 4.8 degrees with new construction or updates. Additional items to consider include non-uniform steps or stairs, and curbing that is too high.

Six-inch curbs are the standard for most jurisdictions. Convergence issues, such as poor visibility and illumination, can impact level changes dramatically. Level changes that impact pedestrian safety should be considered a high-level exposure.

6. Obstructions

Obstructions consist of anything that protrude into the normal walking path and can contribute to the likelihood of a slip, trip or fall. They include items such as extension cords, hoses, product storage, material handling equipment, guards, concrete posts, parts of equipment, parking lot bumpers, speed bumps and temporary storage/holding areas. Factors to consider include the proximity to pedestrian traffic areas and the permanency of the item. Another factor is the person's familiarity with the area or obstruction.

7. Visibility

Visibility pertains to more than just lighting (i.e., how easy the surface is to see). Other considerations include glare, shadows, bright lights and color contrasts. Environmental factors that can affect visibility need to be considered. These include mist, steam, condensation and dust clouds. Poor visibility increases the adverse impact of surface changes, level changes and a pedestrian's ability to see potential obstructions. Areas with poor visibility should receive higher exposure ratings.



8. Human factors

The assumption is that different people have different physical capabilities. Human factors are elements such as demographics (e.g., age), shoe types, familiarity with the areas traveled, and people with physical challenges. Carrying awkward packages/materials can also negatively affect the rating. Slip, trip and fall exposures increase where human factors play a critical negative role.

There have been many studies conducted over recent years regarding how the walking gait and the minimum foot clearance (MFC) measures may be used to predict the chance of falling. Studies of this sort continue today.

The feeling is when a person has a low MCF value or score, he/she may be at a higher risk for falls due to tripping, especially on uneven surfaces or due to unexpected obstacles. Various human conditions and the age of the person may affect the MFC value.

9. Stairs (including elevators and escalators)

Stairs are defined as more than three steps and are a major source of falls. Falls from stairs are more likely to result in a serious injury, and a serious injury is more likely to occur while pedestrians are descending. Consider the frequency of use and giving higher exposure ratings if the stairs are used on a regular basis. The more activity that occurs on the stairs, the more likely an incident will occur. Step geometry must be uniform to prevent missteps and tripping or falling.

Curved or spiral stairs receive a higher exposure rating. Confirm handrails are uniform around stair corners and do not present an exposure in which users are searching for the next section of railing.

Handrails should be secure and easily grasped. Stair treads should be slip-resistant, well maintained, and free of defects.

Any elevators and escalators need to be considered too. Elevator thresholds should be level with the elevator carriage at each level and be slip-resistant. When not in operation, escalator steps do not generally meet the standard step geometry for stairs, which could increase the exposure for a slip, trip or fall.

10. Unusual features

Unusual features include anything out of the ordinary that might distract a person walking through the area. This reflects the impact of distractions or unusual features. Examples include distractions created by a particular process, alarms/buzzers, strobe or flashing lights, high pedestrian traffic, high vehicle traffic or unusually close proximity to material handling equipment, signs, information boards, displays, large windows, and decorative lighting. There typically will be a convergence of issues, such as level changes, obstructions or poor surface conditions associated with the unusual features. Areas where there are unusual features are a major distraction, needing high exposure rating.



Contributing factor guide

When assessing an area, you will evaluate each factor to determine whether it contributes to a very low, low, medium or high potential for a slip, trip and fall. Based on your observations, each contributing factor will be scored as follows:

- High potential: 4
- Medium potential: 3
- Low potential: 2
- Very low potential: 1

To assist you in scoring, we have developed the following guide. Although it would be impossible to develop an absolute definition for each level of contributing factor, we can give a range of examples to illustrate some of the more typical conditions that you might encounter. However, this is only a guide. You must use your judgment to determine the most appropriate score.



Slips, trips and falls contributing factor guide

Contributing factor	High potential (Score: 4)	Medium potential (Score: 3)	Low potential (Score: 2)	Very low potential (Score: 1)
Surface composition	Highly polished and smooth surface (e.g., glazed tile, polished marble, granite). Anticipate a very low slip resistance reading if tested.	Adequate traction when dry, but reduced slip resistance when wet (e.g., smooth concrete, vinyl). Anticipate a medium slip resistance reading if tested.	Adequate traction when dry, only slightly reduced slip resistance when wet (e.g., untreated wood, textured epoxy). Anticipate a high slip resistance reading if tested.	Adequate traction under all conditions (e.g., carpet, rough concrete). Anticipate a very high slip resistance reading when tested.
Foreign substance potential	Walking surface contaminants are likely present (e.g., water, oil, alcohol, chemicals). This could be the result of a process, location, or a spill.	Walking surface contaminants are occasionally present due to non-routine conditions (e.g., spills, leaks, tracking).	Walking surface contaminants are rare. Area is remote to tracking and leak sources, with most likely hazard due to beverage spills.	Walking surfaces have virtually no potential for contaminants to be present or to impact surface's slip resistance.
Surface conditions	Holes in floor, ruts, missing floor tiles/material, unrepaired tears in carpeting.	Worn flooring, patched surfaces and cracked flooring.	Initial indications of wear; traffic areas appear "polished," reducing traction.	No observable deterioration in surface conditions.
Surface changes	Carpet to glazed tile, brick to epoxy, dry to wet, etc.	Linoleum to ceramic, wood to linoleum, etc. Painted concrete curbing.	Carpet to rough concrete, wood to rough concrete, etc.	No change in surface.
Level changes	Any walking surface with a slope > 1:8. High curbing > 12 inches.	Any walking surface with a slope > 1:12, but < 1:8. Uneven curbing.	Any walking surface with a slope > 1:20, but < 1:12. Uniform six-inch curbing.	Any walking surface with a slope < 1:20. Uniform curbing < 6 inches.
Obstructions	Poor housekeeping, obstacles located in the walkway, creating the need to step around or over objects.	Obstacles in the walkway, but arranged, guarded or protected to minimize tripping hazard.	No obstacles in the walkway, but potential for objects to fall/drift unexpectedly into walkway.	No obstacles or potential for obstacles to be present in the walkway.

Slips, trips and falls contributing factor guide (continued)

Contributing factor	High potential (Score: 4)	Medium potential (Score: 3)	Low potential (Score: 2)	Very low potential (Score: 1)
Visibility Note: Foot candle (fc) information listed here is for general guidance only. For specifics, please refer to your local requirements.	No contrast in level changes, very low light level (interior < 2 fc, exterior < 0.20 fc). Visibility is obscured by large object or storage. High glare potential.	Level contrasts are indicated, but not obvious. Light levels are low (interior > 2 fc, but < 5 fc, exterior > 0.20 fc, but < 0.90 fc). Visibility is restricted by large object or storage. High glare potential when leaving building.	Level contrasts are obvious, but not indicated. Light levels meet activity minimum requirements (public spaces 3 fc, basic orientation 5 fc, working spaces 10 fc). Visibility may be impacted by shadows and/or glare.	Level contrasts are obvious through visual markings and indications. Light levels exceed activity minimum requirements (public spaces 3 fc, basic orientation 5 fc, working spaces 10 fc). Visibility is not obscured or restricted.
Human factors	High volume of pedestrians unfamiliar with walkway, no control of footwear, high frequency of those at advancing age with/without medical conditions affecting mobility. Individuals constantly carrying awkward packages.	Some individuals unfamiliar with walkway, persons permitted access without slip resistant soles, several pedestrians using ambulation aids. Individuals frequently carrying awkward packages. Age and condition of travelers significant.	Most pedestrians familiar with walkway, limited number of persons permitted without slip resistant soles, rare use of ambulation aids by pedestrians. Individuals intermittently carrying awkward packages.	All pedestrians familiar with walkway, slip resistant footwear in use, no individuals using ambulation aids.
Stairs (Includes any elevators and escalators).	Stairs: Not constructed to standard (e.g., treads and/or risers inconsistent, uneven or inadequate; handrails missing or at improper height). Treads and/or landings have high potential for contaminants. Elevator: Does not level at floor, excessive gap, and significant change in floor surface. High potential for contaminants on walking surface. No inspection or maintenance records. Escalator: Visual cues inadequate at entrance and exit, system operating erratic, no inspection and/or maintenance records.	Stairs: Tread and landing surfaces show visible signs of wear, potential for contaminants (liquids, dust and dirt accumulation). Elevator: Floor surface shows sign of wear, potential for contaminants. Inspection and/or maintenance practices not to standard. Escalator: Inspection and/or maintenance practices not to standard. Visual cues fading.	Stairs: Tread and landing surfaces show beginning signs of wear, low potential for contaminants (liquids, dust and dirt accumulation). Elevator: Floor surface shows initial sign of wear, low potential for contaminants. Inspection and/or maintenance practices meet minimum standard. Escalator: Inspection and/or maintenance practices meet minimum standard.	All standard and code requirements are met. Inspection and maintenance requirements exceed minimum requirements and are documented. Stairs: Slip resistant treads and landings. Very low potential for contaminants. Elevators: Similar floor surface, flooring in good condition. Escalator: All components in good condition and working properly. Good visual cues are in place.
Unusual features	Convergence of multiple factors, including high volume of forklift traffic with no marked traffic lanes, painted floors without slip resistant additive, visual and/or auditory distractions (e.g., signs, displays, warning signals), tire stops, smooth metal or diamond plate panels over utility access or drainage troughs.	Multiple visual distractions exist (e.g., displays, noise, alarms). Decorative attractions such as water fountains, etc.	Unusual features exist, but are controlled. Some visual distractions exist (e.g., displays, noise, alarms).	Unusual features exist, but are controlled by proper location or placement. No other visual distractions.

Note: There may be times when a specific contributing factor does not apply. When this occurs, the contributing factor is to be omitted from the scoring process.

Slips, trips and falls evaluation form instructions

This evaluation form was developed to provide an efficient method for you to assess a site. The Area score and Overall score can help you prioritize resources to focus on those areas/sites posing the greatest slip, trip and fall potential.

Identify pertinent survey information by filling out the organization's name, site surveyed/address, who surveyed the location, and date fields. Next, identify the areas you will evaluate. Consider evaluating every area that has foot traffic, but if this is not possible, you should prioritize those areas that have the most foot traffic. List the areas you will evaluate.

Assess each area in relation to each contributing factor. (See "Contributing factor guide"). You will score each contributing factor as follows:

- High potential: 4
- Medium potential: 3
- Low potential: 2
- Very low potential: 1

When evaluating an area, you will likely find that most of the contributing factors are present and pose a potential contribution to a slip, trip and fall incident. However, there may be a situation where a contributing factor does not exist (e.g., stairs, including an elevator or escalator, or unusual features). If this is the case, then leave the entry blank.

Once you have completed surveying all the areas at the site, you can calculate an Overall score by totaling the Area scores and dividing them by the number of areas evaluated. List that number as the Overall score.

To consider which areas pose the greatest slip, trip and fall potential and need to be addressed first, rank the Area scores in descending order, focusing improvement efforts on areas with the highest exposure scores.

When reviewing each area's contributing factor score, the goal is to have all contributing factors rated a "1" (Very low potential). If any contributing factor is rated a "4" (High potential), then improvements need to be considered.

If you have evaluated multiple sites, you can use the same ranking approach to prioritize which sites you would focus improvement efforts by ranking each site's Overall score.



Slips, trips and falls evaluation form

Organization name: _____

Site surveyed/address: _____

Surveyed by: _____ Date: _____

Score contributing factor
in each column:
High potential: 4
Medium potential: 3
Low potential: 2
Very low potential: 1
If a factor is not
applicable, leave blank.

Calculate area score:
Add up individual scores
in row.

Areas evaluated	Surface composition	Foreign substance potential	Surface conditions	Surface changes	Level changes	Obstructions	Visibility	Stairs, including elevators/escalators	Human factors	Unusual features	Area score
1.											
2.											
3.											
4.											
5.											
6.											
7.											
8.											
9.											
10.											
11.											
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21.											
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23.											
24.											
25.											

Calculate OVERALL SCORE by totaling area scores, then dividing by number of areas surveyed.

Overall score: _____

To consider which areas pose the greatest slip, trip and fall potential and need to be addressed first, rank the area scores in DESCENDING order, focusing improvement efforts on areas with the HIGHEST scores. While the goal would be to have all contributing factors rated a "1" (Very low potential), any contributing factor rated a "4" (High potential) needs to be improved.

Industry-specific insights: General

Slip, trip, and fall (STF) incidents are a potential leading cause for loss within the General Industry for both Workers' Compensation (WC) and General Liability (GL) coverage. According to Zurich Claims data (Years 2019-2023) the average cost per STF claim was \$15,742 (GL) and \$10,378 (WC).

General industry assessment guide

Areas to address	Most likely contributing factors	Methods for control
Preventing employee/associate slip, trip and fall injuries		
Kitchens and food prep areas	<ul style="list-style-type: none"> Surface composition Foreign substance potential Surface conditions Obstructions Human factors 	Floor surface treatments, if appropriate; use of mats (dish line etc.) Eliminate source of contaminant; improve cleaning practices; proper drainage Repair/replace as needed Good housekeeping; mark/protect walkways; redirect traffic flow Slip resistant shoes
Back of the house (e.g., hallways, storage rooms)	<ul style="list-style-type: none"> Surface composition Surface conditions Obstructions Visibility Human factors 	Increase slip resistance with floor surface treatments, if appropriate Repair/replace as needed, but minimize "patching" Monitor housekeeping; remove stored materials out of hallways Good lighting program Slip resistant shoes; mechanical aids/teamwork for handling awkward packages
Exterior areas (e.g., loading docks, debris disposal)	<ul style="list-style-type: none"> Surface conditions Level changes Obstructions Visibility Human factors Stairs 	Repair/replace worn flooring; routine audit can monitor condition Highlight curbing, verify need for handrails Practice good housekeeping; remove unused equipment from walkways Good lighting program; color contrast Slip resistant shoes; mechanical aids/teamwork for handling awkward packages Treads/risers are consistent/even; handrails are sturdy and graspable
Preventing guest/visitor slip, trip and fall injuries		
Lobby/reception/hallway areas	<ul style="list-style-type: none"> Surface composition Foreign substance potential Surface changes Obstructions Visibility Human factors Unusual features 	Floor surface treatment, if appropriate; permanent matting system Eliminate source; redirect traffic; proper "Wet Floor" signage Minimize changes; inlaid carpet tiles; mat program Good housekeeping; mark/protect walkways; redirect traffic flow; barricades Reduce glare; provide proper color contrast and adequate illumination Provide visual and/or auditory cues; available transport assistance; umbrella bags Mark/protect walkways; reduce noise levels; minimize distractions
Guest rooms	<ul style="list-style-type: none"> Surface composition Foreign substance potential Surface conditions Level changes Obstructions Visibility Human factors 	Floor surface treatments, if appropriate; grab bars in bathroom Provide mats or slip-resistant strips for tubs; proper drainage Repair/replace worn flooring; routine inspections Grab bars in tub/shower; handrails Remove stored furniture/equipment/materials out of room, unless necessary Good lighting program; color contrast Provide transport (ambulation) assistance; provide visual and/or auditory cues
Parking lots	<ul style="list-style-type: none"> Surface composition Foreign substance potential Surface conditions Level changes Obstructions Visibility Human factors Stairs Unusual features 	Surface coating Eliminate source; warning signs where necessary Routine inspections/preventative maintenance program Highlighting; verify the need for handrails Mark walkways; use barricades; redirect traffic flow; warning signs Adequate lighting; color contrast Provide visual and/or auditory cues; provide transport assistance Handrails; slip resistant nosing/tread; signage Minimize distractions; clearly mark walkways

Action plan

Our final step is to determine how to control the problems we have identified. We have prioritized which tasks to work on first, but each issue is unique and requires special consideration regarding the desirable level of control, what resources are available and what is technically feasible. Because of these differences, action plans to control each different exposure will likely be unique, too. You will probably find that in most cases, more than one change is needed to bring a long-term solution to the problem. To assist you in this process, an action plan worksheet for slips, trips and falls has been provided at the end of this section.

There are, however, some basic similarities that can serve as guides to help you through the process of developing an action plan. Contributing factor suggestions are outlined in the table on the following page. As assignment of responsibility is a key factor in making sure suggested changes are actually implemented, management's decisions about each issue should also be documented. You should complete the worksheet for each significant problem identified in the previous steps.

Here are some suggestions for possible controls to get you started:

Physical changes

- Repair deficiencies in floor surfaces.
- Replace slippery floor material with surfaces having a higher coefficient of friction or slip resistance. New construction or remodel activity presents the best opportunity to eliminate unsafe walking surfaces.
- Minimize slip, trip and fall exposures at entrances. Provide permanent matting or recessed gridding in vestibules and provide at least 15 feet of quality entrance matting to help adequately rid shoe soles of moisture and other debris prior to contacting a hard surface. Verify backup matting is stored properly. When possible, mats should be stored in a manner in which they lay flat and are ready for use, and are not rolled or stored on end.
- Explore floor treatments that enhance slip resistance. Test on tile samples when possible. (Some floor dressings or treatments may damage vinyl, linoleum, marble or other sensitive floor surfaces. These products are normally made for durable floor surfaces.)
- Install handrails where appropriate. Add signs, including "Please Use Handrail," to promote use.
- Avoid furnishings or display fixtures that might slip or roll when leaned on.
- Use color contrasts or lighting to make steps or level changes more visible.
- Verify lighting is adequate inside and outside the building.
- Install spill stations or spill cleanup products throughout the facility to provide associates with the proper tools to clean up spills. Provide training and reminders.
- Purchase "Wet Floor" signs that are at least 36 inches high for best visibility and, to avoid creating a trip hazard.

Administrative changes

- Confirm managers/associates are aware of their responsibilities to prevent slips, trips and falls.
- Create appraisal or performance management objectives related to maintaining slip, trip and fall prevention standards.
- Train management and associates not to use chairs, stools, counters, stockroom racking, boxes, etc., as ladders.
- Address slip, trip and fall prevention in daily morning meetings and safety committee meetings.
- Include slip, trip and fall prevention information in self-inspection forms. Ask hourly associates safety awareness questions with regard to slip, trip and fall prevention during the self-inspection.
- Verify managers set the example and never walk by an unsafe act or unsafe condition that could result in a visitor, guest or employee slipping, tripping or falling.
- Introduce a shoe program requiring that only slip resistant shoes are worn.



Contributing factor suggestions

Contributing factors	Methods for control
Surface composition	<ul style="list-style-type: none"> • Install new flooring material with higher slip resistance • Install permanent matting system • Increase traction by implementing a shoe program • Apply slip resistant coating (if appropriate for floor material)
Foreign substance potential	<ul style="list-style-type: none"> • Eliminate source of contaminant • Avoid polymerization/use proper cleaning methods • Install permanent matting system or inlaid carpet at entrances • Install slip resistant gridding in vestibules • Implement non-slip shoe program • Investigate/improve cleaning/housekeeping practices • Apply slip resistant coating (if appropriate for floor material) • Confirm proper signage/warnings and barricades are used • Provide absorbent materials for spill cleanup • Use clean mop heads only for spill cleanup to avoid contaminating walking surfaces • Redirect traffic, as appropriate
Surface conditions	<ul style="list-style-type: none"> • Repair using material with similar walking surface characteristics • Minimize “patch” repair
Surface changes	<ul style="list-style-type: none"> • Install matting system • Provide transitional cues
Level changes	<ul style="list-style-type: none"> • Provide adequate visual cues • Install alternate means to transition elevation change
Obstructions	<ul style="list-style-type: none"> • Improve housekeeping • Mark and protect walkways • Redirect power cords • Remove temporary obstacles • Review/modify walkways with permanent obstructions • Use barricades to prevent striking into obstructions • Redirect traffic flow
Visibility	<ul style="list-style-type: none"> • Improve lighting • Utilize color contrast • Remove obstructions • Reduce glare
Human factors	<ul style="list-style-type: none"> • Provide transport assistance (e.g., carts, wheelchairs) • Install visual and/or auditory cues • Utilize slip resistant walking surfaces for all groups of people • Provide walking surfaces free of defects • Reduce or eliminate trip hazards • Design with anticipation of significant age or physical/mental limitation of pedestrians
Stairs (Includes elevators and escalators)	<ul style="list-style-type: none"> • Confirm railing is continuous around corners to prevent falls • “Please Use Handrail” signs are posted • Install sturdy handrails and slip resistant nosing and treads • Provide visual cues • Confirm handrails are graspable and of the appropriate height • Increase maintenance activities • Minimize surface and level changes on stair landings • Make sure elevator thresholds are even with elevator carriage and are slip resistant
Unusual features	<ul style="list-style-type: none"> • Confirm walking lanes are marked and protected • Reduce noise levels • Avoid creating distractions where multiple risk factors converge

Slips, trips and falls: Action Plan Worksheet

Organization name: _____ Date: _____

Site surveyed/address: _____

Surveyed by: _____ Title: _____

Slip, trip and fall prevention item number: _____

Describe issues needing corrective action:

Describe physical changes needed to improve the condition:

Describe administrative changes needed to improve the condition:

Management/team member/property manager responsible for corrective actions

Name: _____ Title: _____

Target completion date: _____ Date completed: _____

Miscellaneous comments/information:



Glossary of terms

Asperities: Raised edges or abrasives on a walking surface. Some products, such as asphalt or broom-finished concrete, will exhibit asperities when hardened. Asperities can also be applied onto surfaces, such as adding sand or glass beads to paint or applying floor treatments with glass beads to a slippery surface. Sandpaper is a good example of a surface with asperities.

Coefficient of friction: Represents the amount of friction provided on a dry surface when tested with a slip meter. The term “slip resistance” should be utilized when talking about the measurement of wet surfaces. The coefficient of friction or slip resistance can be measured by a properly trained or certified individual using the appropriate slip meter. Slip meters used for testing of both wet and dry surfaces must exhibit horizontal and vertical (i.e., normal) movement, similar to human ambulation, in order to be utilized. This reduces the residence time or slip activation time that normally disqualifies other slip meters from being utilized.

Contributing factors: Those conditions that may affect slip, trip and fall potential.

Foreign substance potential: Likelihood that other substances (e.g., water, coffee, oil, alcohol, etc.) will be found on the walking surface.

Human factors: The assumption that different individuals have different physical capabilities.

Level changes: Floor height/surface elevation variations, adjoining surfaces not “flush.” Walking surface height has changes of three or fewer steps.

Obstructions: Anything protruding into the normal walking path.

Riser: Vertical part of a stair or step that is also often referred to as the vertical face.

Slip resistance: The term used to explain a loss of traction due to multiple variables (e.g., the introduction of a contaminant, along with surface composition, shoe/sole material). See its reference under “coefficient of friction.”

Slope: Refers to an inclined walking surface, calculated by measuring the vertical distance and then divided by the horizontal distance, expressed from top to bottom. Also referred to as rise over run; for example, in a 1:20 slope, for every foot of rise, you must travel a distance of 20 feet (run).

Stairs: A series of steps, normally more than three steps going from one level to another.

Surface changes: An immediate transition from one type of material to another type of material (e.g., linoleum to carpet).

Surface composition: Type of material that makes up the floor surface.

Surface conditions: Actual conditions at the time of the survey.

Tread: Horizontal part of a stair step; the part of the stair surface where the foot/shoe normally comes into contact with when climbing.

Unusual features: Anything out of the ordinary that might distract a person walking through the area.

Visibility: How easy the surface is to see.

Resources

- ¹ Di Pilla, Steven. Slip, Trip, and Fall Prevention: A Practical Handbook, Revised Second Edition, Boca Raton, FL, CRC Press; 2010.
- ² English, William. Pedestrian Slip Resistance: How to Measure It, How to Improve it, Second Edition, published by William English, Inc.; 2003.
- ³ Standard Practice for Safe Walking Surfaces, ASTM F-1637-21 ASTM International, 100 Bar Harbor Drive, P. O. Box C700, West Conshohocken, PA 19428.
- ⁴ 2010 ADA Standards for Accessible Design, U. S. Department of Justice, 950 Pennsylvania Avenue, NW, Washington, DC 20530
http://www.ada.gov/2010ADASTandards_index.htm
- ⁵ "Reducing Slips, Trips, and Falls (STF) and Injuries. Mohawkgroup.com. March 2021.
- ⁶ "Industrial Flooring". Health and Safety International. July 2004.

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