ZURICH
Resilience Solutions

Slips, trips, and falls in construction

Zurich's 10-point program

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Introduction

How safe is your jobsite? How about your stairs or temporary stair towers? Have people fallen recently? You are not alone if you have had slips and falls on your projects or in your jobsite offices.

According to the Bureau of Labor Statistics data from 2016 – 2020, over 1 million people are injured in the construction industry from slip, trip and fall incidents every year in the U.S.[1]

The most common injuries are joint injuries, typically to the wrist, elbow, shoulder, and knee. Back injuries also occur often. These types of injuries affect every aspect of your business, from worker injuries to contractors, visitors, and the public.

Purpose of this guide

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. This workbook provides a logical process to identify areas at your location with 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.

Remember that not all construction sites are the same. The job may be in a customer facility with ongoing operations (a mall, school, or factory) or an "out of the ground" construction that starts with excavation and ends with carpeting and fixtures. Consider performing this survey a few times during the operations. This will show the user how to prioritize hazards and develop action plans to help control slip, trip, and fall losses in those areas.

10 risk factors for slips, trips, and falls

Zurich completed a forensic review of many 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 but slippery when wet. Painted surfaces included in parking lots and sidewalks should be reviewed to verify that abrasives were utilized to avoid creating a slippery surface exposure. The more slip-resistant the walking surface in the assessed area, 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.

[1] Bureau of Labor Statistics, U.S. Department of Labor, The Economics Daily, A look at falls, slips, and trips in the construction industry at https://www.bls.gov/opub/ted/2022/a-look-at-falls-slips-and-trips-in-the-construction-industry.htm (visited March 14, 2024).

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. 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 involve anything that protrudes 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 include 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.

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 descend. Consider the frequency of use and give higher exposure ratings if the stairs are used regularly. The more activity 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 that the handrails are uniform around the stair corners and do not present an exposure for users to search for the next section of the railing. Handrails should be secure and easily grasped. Stair treads should be slip-resistant, well-maintained, and free of defects.

Any escalators and elevators need to be considered, too. 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. Elevator or hoist thresholds should be level with the elevator carriage or floor at each level and be slip-resistant.

10. Unusual features

Unusual features include anything unusual that might distract someone 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 unusual features are a major distraction should receive a high exposure rating.

Contributing factor guide

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

- High potential: 4
- Medium: 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 you might encounter. However, this is only a guide. You should 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). Anticipated slip resistance below 0.40 (Below 0.60 if a ramp) under its "normal conditions."	Adequate traction when dry but reduced slip resistance when wet (e.g., smooth concrete, vinyl). Anticipated slip resistance of 0.40 to 0.55 (0.60-0.75 if a ramp) under its "normal conditions."	Adequate traction when dry, only slightly reduced slip resistance when wet (e.g., untreated wood, textured epoxy). Anticipated slip resistance of 0.55-.60, (0.75-0.80 if a ramp) under its "normal conditions."	Adequate traction under all conditions (e.g., carpet, rough concrete). Anticipated slip resistance greater than 0.60 (greater than 0.80 if a ramp) under its normal conditions."
Foreign substance potential	Walking surface contaminants are likely present (e.g., Ice, snow, masonry washdown, slurry water, spray fireproofing, wet mixing of materials, poly sheeting, fueling areas, oiled formwork).	Walking surface contaminants are occasionally present due to non-routine conditions (e.g., spills, leaks, poor housekeeping).	Walking surface contaminants are rare. Common areas, corridors, and walkways are generally well-maintained.	Walking surfaces have virtually no potential for contaminants to be present or to impact the surface's slip resistance.
Surface conditions	Holes, protrusions, mud or soft soil, missing planks on scaffolds, poor condition of trailer bed surfaces.	Cracked and raised edges, chipped, broken, or loose materials.	Initial indications of wear: traffic areas appear "polished," reducing traction.	No observable deterioration in surface conditions.

Contributing factor	High potential (Score: 4)	Medium potential (Score: 3)	Low potential (Score: 2)	Very low potential (Score: 1)
Surface changes	Carpet to glazed tile, brick to epoxy, dry to wet, smooth concrete to rough concrete, steel steps to planking, unfilled stair pans, dirt to steel, etc.	Vinyl to ceramic, painted concrete curbing.	Carpet to rough concrete, wood to rough concrete, pavement to gravel, 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. Changes in elevation used for access, leaveouts for flooring, and grade to drain where the drain is not functioning.	Any walking surface with a slope > 1:20 but < 1:12. Uniform six-inch curbing. Bumps and subtle level changes.	Any walking surface with a slope < 1:20. Uniform curbing < 6 inches.
Obstructions	Poor housekeeping, obstacles in the walkway, creating the need to step around or over objects, material storage or temporary laydown areas, utility stubs ups, temporary fencing, barricade tape, rebar, and shear connectors.	Obstacles in the walkway are arranged, guarded, or protected to minimize tripping hazards. Long-term product storage areas and/ or equipment, sea vans/ cargo boxes/ storage trailers, stairs, temporary power drops or cords, hole covers, temporarily parked equipment or vehicles.	There are no obstacles in the walkway, but there is potential for objects to fall/drift unexpectedly into the walkway. Equipment and racks in aisles.	No obstacles or potential for obstacles to be present in the walkway.
Visibility Per OSHA 1926.56(a) Table D-3	There is no contrast in level changes and very low light. Light levels are far below activity minimum requirements: 5 FC – General construction area lighting. 3 FC – Concrete placement, excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas. 5 FC – Indoors (warehouses, corridors, hallways, and exits). 5 FC – Tunnels, shafts, and general underground work areas (Exception: minimum of 10 FC at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines-approved cap lights shall be acceptable for use in the tunnel heading. 10 FC – General construction plants and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, and workrooms) 30 FC – First aid stations, infirmaries, and offices.	Level contrasts are indicated but not obvious. Light levels do not meet activity minimum requirements: 5 FC – General construction area lighting. 3 FC – Concrete placement, excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas. 5 FC – Indoors (warehouses, corridors, hallways, and exits). 5 FC – Tunnels, shafts, and general underground work areas (Exception: minimum of 10 FC at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines-approved cap lights shall be acceptable for use in the tunnel heading. 10 FC – General construction plants and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, and workrooms) 30 FC – First aid stations, infirmaries, and offices.	Level contrasts are obvious but not indicated. Light levels meet activity minimum requirements: 5 FC – General construction area lighting. 3 FC – Concrete placement, excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas. 5 FC – Indoors (warehouses, corridors, hallways, and exits). 5 FC – Tunnels, shafts, and general underground work areas (Exception: minimum of 10 FC at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines-approved cap lights shall be acceptable for use in the tunnel heading. 10 FC – General construction plants and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, and workrooms) 30 FC – First aid stations, infirmaries, and offices.	Level contrasts are obvious through visual markings and indications. Light levels exceed activity minimum requirements: 5 FC – General construction area lighting. 3 FC – Concrete placement, excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas. 5 FC – Indoors (warehouses, corridors, hallways, and exits). 5 FC – Tunnels, shafts, and general underground work areas (Exception: minimum of 10 FC at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines-approved cap lights shall be acceptable for use in the tunnel heading. 10 FC – General construction plants and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, and workrooms) 30 FC – First aid stations, infirmaries, and offices.

Contributing factor	High potential (Score: 4)	Medium potential (Score: 3)	Low potential (Score: 2)	Very low potential (Score: 1)
Human factors	A high volume of pedestrians unfamiliar with the walkway, no control of footwear, high frequency of infirm population using ambulation aids, and individuals constantly carrying awkward materials.	Some individuals are unfamiliar with the walkway, persons permitted access without slip-resistant soles, and several pedestrians using ambulation aids. Individuals are not familiar with construction sites and without proper footwear. Individuals frequently carrying awkward materials.	Most pedestrians are familiar with the walkway, a limited number of persons are permitted without proper footwear, and there is rare use of ambulation aids by pedestrians. Individuals intermittently carrying awkward materials.	All pedestrians familiar with walkways, slip-resistant footwear in use, and no individuals using ambulation aids. No awkward carrying of materials.
Ladders/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 a high potential for contaminants. Many missing stairs, steps, uneven treads, improper securement, missing or improper height rails, ship's ladders, and job-built ladders. Elevator: Doors not level at the floor, excessive gap, and significant change in the floor surface. High potential for contaminants on the 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). Temporary treads and landings have worn below the level of the top edge of the pan. Elevator: Floor surface shows signs of wear, potential for contaminants. Inspection and/or maintenance practices are not to standard. Escalator: Inspection and/or maintenance practices are not up to standard. Visual cues are fading.	Stairs: Tread and landing surfaces show beginning signs of wear and low potential for contaminants (liquids, dust, and dirt accumulation). Stairs are installed and well-maintained to meet OSHA, NFPA, and ANSI standards. Elevator: Floor surface shows initial signs of wear, low potential for contaminants. Inspection and/or maintenance practices meet the minimum standards. Escalator: Inspection and/or maintenance practices meet minimum standards.	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. Stairways that will not be a permanent part of the structure on which construction work is being performed shall have landings of not less than 30 inches (76 cm) in the direction of travel and extend at least 22 inches (56 cm) in width at every 12 feet (3.7 m) or less of vertical rise. Except during stairway construction, foot traffic is prohibited on skeleton metal stairs where permanent treads and/or landings are to be installed at a later date unless the stairs are fitted with secured temporary treads and landings long enough to cover the entire tread and/or landing area. Elevators: Similar floor surface, flooring in good condition. Escalator: All components are 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, etc.). Forklift traffic with marked traffic lanes, painted floor with slip-resistant additive showing signs of wear, drainage grates, speed bumps, building expansion joint not level, and recessed metal grating over the floor drains.	Unusual features exist, but are controlled. Visual distractions exist (e.g., displays, noise, alarms).	Unusual features exist, but are controlled, including forklift traffic with guarded traffic lanes, approved slip-resistant additive integrated into floor markings, gratings are level with openings < ½-inch in the predominant direction of travel and slip resistant. No other visual distractions.

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 and focus on those areas/sites that possess 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 with foot traffic, but if this is not possible, you should prioritize areas with 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 the sites and 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	Human factors	Stairs, including elevators/escalators	Unusual features	Area score
1.											
2.											
3.											
4.											
5.											
6.											
7.											
8.											
9.											
10.											
11.											
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19.											
20.											
21.											
22.											
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 – Construction

While "falls from height" remain the leading cause of worker fatality in construction, "falls to the same level," such as those commonly occurring in slip, trip, and fall incidents, are a leading cause of injury.

STF-related injuries are often the most frequent, most severe and have the greatest overall impact on workplace efficiency of any jobsite exposure – constantly chipping away at the bottom line. STF-related injuries are one of the leading causes of worker compensation losses in construction.

In 2020, more than 1 in 5 workplace deaths occurred in the construction industry. Just over one-third of the deaths in this industry were due to falls, slips, and trips, and were almost entirely from falls to a lower level. The construction industry accounted for 46.1 percent of all fatal falls, slips, and trips in 2020, similar to previous years shown in the chart. To see the chart, please Click here. Within the private construction industry, nonfatal injuries and illnesses that resulted from falls, slips, and trips occurred at a rate of 31.4 per 10,000 full-time workers in 2020. The rate across all private industries was 21.7. Nonfatal workplace injuries or illnesses resulting from falls to a lower level happened at a rate of 15.7 in the construction industry; the rate for the private industry at large was 5.1.[2]

According to 2023 Zurich construction claims data, there were 3,667 STF claims with an average net incurred claim cost of $13,960.

Construction assessment guide

Area to review	Contributing factors	Control methods
Active construction	• Surface composition • Foreign substance potential	• Control access to or mitigate surface with control (i.e., mats, salt, or sand). • Housekeeping of debris or spills. Pre-risk analysis and emergency preparedness as applicable.
	• Surface conditions	• Place hole covers over openings. Maintain routine housekeeping. Highlight hazards with marking paint.
	• Surface changes	• Control travel path where possible. Routine audits of project and work areas for associated hazards.
	• Level changes	• Place handrails, ladders, and stairs where required. Control general movement of personnel onsite. Use visual cues such as signage, tape or paint.
	• Obstructions	• Remove protrusions. Manage cord use. Control access to active work. Maintain housekeeping.
	• Visibility	• Temporary lighting program that meets OSHA requirements. Task lighting. Proper eyewear for work conditions.
	• Human factors	• Trained employees. Proper techniques. Proper PPE. Increase awareness of risk and controls.
	• Stairs/ladders	• Ladders/stairs to be per OSHA requirements. Handrails and guardrails where required. Provide daily competent person inspections where required and ladder training.
	• Unusual features	• Review project adjacent walkways. Manage working decks for distractions. Designate areas for washout, etc.

[2] Bureau of Labor Statistics, U.S. Department of Labor, The Economics Daily, A look at falls, slips, and trips in the construction industry at https://www.bls.gov/opub/ted/2022/a-look-at-falls-slips-and-trips-in-the-construction-industry.htm (visited March 18, 2024).

Area to review	Contributing factors	Control methods
Site office/ break area	• Surface composition	• Maintain clean floors. Place mats. Surface for office and break areas to be low risk for STF.
	• Foreign substance potential	• Place trash receptacles to mitigate trash and spilled materials. Housekeeping to include areas daily.
	• Surface conditions	• Repair/replace worn flooring, routine inspections to monitor conditions.
	• Surface changes	• Surfaces for areas are to be typical and uniform. Designed and separated from work areas.
	• Level changes	• Avoid areas with frequent proximity/use of risers or level changes. Eliminate or control access or provide visual cues. Ramps are installed for ADA compliance.
	• Obstructions	• Daily cleanup of the area, including drawing storage racks and other obstructions such as moveable file cabinets, etc.
	• Visibility	• Proper lighting. Highlight the risks that are present with paint or tape.
	• Human factors	• Proper footwear. Office/space arrangement. Cord management.
	• Stairs	• Treads/risers are consistent/even; handrails are sturdy and graspable.
	• Unusual features	• Entrances are clearly marked and located in an easily accessible area without distractions to reach the office trailer.
Lay down/ storage, including exterior areas (parking, garage, site, etc.)	• Surface composition	• Smooth, even surface dedicated to lay down and storage.
	• Foreign substance potential	• Maintain housekeeping and eliminate sources of water intrusion using temporary gutters and site drainage.
	• Surface conditions	Review the placement of materials for changing conditions such as rain, snow, and ice. Repair potholes and other cracks in parking lots. Routine inspections, including any unusual wear.
	• Surface changes	• Smooth transition between lay down and storage with adjacent areas.
	• Level changes	• Identify non-uniform steps or stairs. Highlight parking devices, curbs, and any other structures.
	• Obstructions	• Remove discarded materials, packaging, and construction debris.
	• Visibility	Lighting that meets OSHA requirements for FC category. Require proper eyewear.
	• Human factors	• Proper PPE and work techniques for lifting and moving materials.
	• Stairs/ladders	• Ladders/stairs to be per OSHA requirements. Handrails and guardrails where required. Provide daily competent person inspections where required and ladder training.
	• Unusual features	• Traffic patterns adjacent to roadways and overhead work.

Action plan

Our final step is determining how to control the identified problems. 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 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.

However, some basic similarities can serve as guides to help you develop an action plan. Suggestions for contributing factors are outlined in the table on the following page. Assignment of responsibility is a key factor in ensuring suggested changes are 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.
- Minimize slip, trip, and fall exposures at entrances. Provide temporary mats that are slip-resistant on finished floors. Matting should extend at least 15 feet to help rid shoe soles of moisture and other debris prior to contacting a hard surface.
- 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 temporary handrails as per OSHA requirements. Add signs, including “Please Use Handrail,” to promote use.
- Avoid temporary storage units or job boxes that might slip or roll when leaned on. Lock the wheels.
- Use color contrasts or lighting to make steps or level changes more visible.
- Verify that lighting is adequate inside and outside the building.
- Install spill carts throughout the project to give workers the proper tools to clean up spills. Provide training and reminders. Use Zurich Resilience Solutions Wet Work Permits.
- Purchase “Wet Floor” signs at least 36 inches high for best visibility and to avoid creating a trip hazard.

Administrative changes

- Confirm that workers are responsible for preventing slips, trips, and falls. Discuss during safety meetings.
- Conduct safety inspections to maintain slip, trip, and fall prevention standards and make changes as identified.
- Train workers not to use chairs, stools, buckets, etc., as ladders.
- Make sure the ladders provided are the correct type for the task and tall enough so that workers don’t need to stand on the top of the ladder.
- 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. During the safety inspections, ask workers about safety awareness regarding slip, trip, and fall prevention.
- Verify that managers and superintendents set the example and never walk by an unsafe act or condition that could result in a visitor, guest, or employee slipping, tripping, or falling.
- Specify the type of work boots that are required for the jobsite.

Contributing factors suggestions

Contributing Factor	Methods for control
Surface composition	• Use materials with slip-resistant surfaces • Apply slip-resistance coating (if appropriate for the floor material) • Identify appropriate footwear for surfaces • Place controls, such as matting where surface composition has potential for debris build-up
Foreign substance potential	• Areas where debris can build up require identification and containment • Use cleaning methods that do not increase the risk of a slip, trip, or fall • Housekeeping/work practices to include frequent clean up of work area and removal of debris • Planning for tasks that create materials buildup, such as cutting studs or steel or placing concrete block • Require ANSI-approved footwear for construction • Place treatments, such as sand or earth, over surfaces that have a high slip potential • Control access to areas (physical barricades) where surfaces are beyond controls in place • Place appropriate signage to reduce risk through the identification of hazards and heightened awareness • Preparedness for potential spills with controls on hand to clean up, such as spill carts • Consider spill kits with unused equipment to avoid contamination of routine use equipment • Emergency preparedness plans to include all potential spill scenarios

Contributing Factor	Methods for control
Surface conditions	• Dynamic work environments require routine review of the work environment to control surface conditions. • Ensure the common walkways/pathways are free from hazards. Repair broken tiles, cracks in walkways, buckled carpets, potholes, etc., to make walking surfaces level and minimize STF potential. • Cover holes and identify them with paint or tape, cover or fill potholes in parking lots, repair or replace broken tiles, and ensure temporary floor protection is slip-resistant and secured in place.
Surface changes	• Identify areas of transitioning surfaces, such as concrete to soft soil or mud, rough concrete to finished surface, and minimize changes if possible. • Provide visual cues for surface-changing conditions.
Level changes	• Maintain compliance with level changes and required transitions for stairs or ramps. • Uniformity of risers and stairs with handrails where applicable. • Review entry to excavations for appropriate sloped or ladder entry.
Obstructions	• Workplace auditing is critical for the control of obstruction hazards in construction. • Manage electrical cords. • Material storage is organized and appropriately placed and spaced for efficiency, reducing the potential for slip, trip, and fall. • Materials handling training for employees that includes walking-working surfaces and the control of encumbrances.
Visibility	• Lighting plan that includes the use of task lighting where applicable. • Controlling exposure to intense lighting, such as working outdoors. • Using the proper eyewear for the work environment, i.e., dark-shaded safety glasses in sunlight. • Avoid transitions from intensely lit area to low lit area or vice versa. • Adjust work hours so that sunlight can be utilized or avoided.
Human factors	• Provide transport for visitors not accustomed to the job site. • A safety orientation is required for all visitors before going onsite. • Accompany all visitors. • Prohibit or discourage distractions while traversing a jobsite, such as cell phone use.
Ladders/Stairs	• Risers, ladders, and stairs with more than three steps to be maintained and used per OSHA requirements. • Install handrails where applicable. • Ladders secured and extended per OHSA requirements. • Escalators and elevators must be installed, maintained, and be in approved working condition to be used. • Escalators, when not in service, must be closed (Lock out Tag out programs to include all energized systems activities.
Unusual features	• Non-routine activities and work environments should be reviewed for potential distractions (i.e., night work, long hours, renovations that tie into an existing structure, utilities, etc.) • Review work environments adjacent to active locations such as airports, amusement parks, schools, parks, hospitals, etc.

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 wet and dry surfaces must exhibit horizontal and vertical (i.e., normal) movement, similar to human ambulation, to be utilized. This reduces the residence time or slip activation time, which 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) 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, etc.). 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, Published 2007.

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