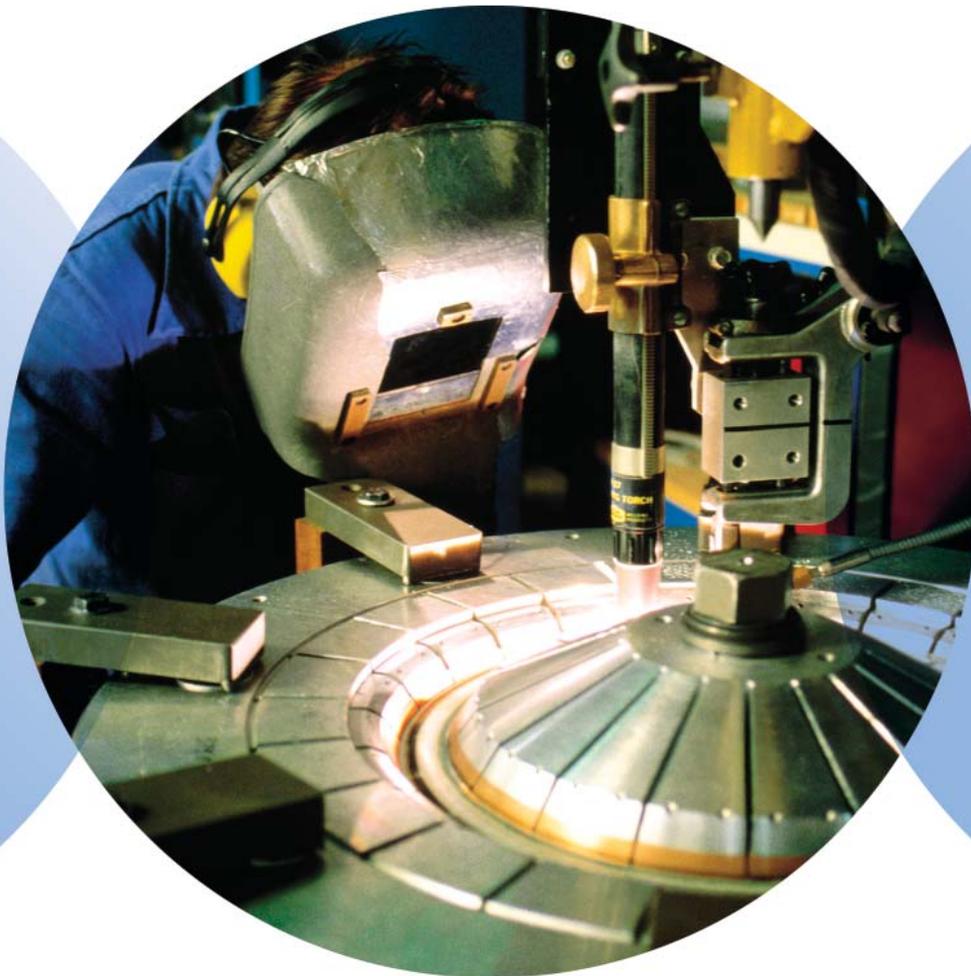


Slips, trips and falls for manufacturing

Zurich 10-point program



Introduction

How safe are your floors? How about your stairs? Have people fallen recently? You are not alone if you have had slips and falls in these areas.

In the U.S., there are more than one million people injured from slip, trip and fall incidents every year, according to the Bureau of Labor Statistics. 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 workbook

Many factors contribute to slip, trip and fall incidents. This workbook is designed to help you and your management teams become self-sufficient in better controlling slip, trip and fall exposures. This workbook provides a logical process to identify areas at your location that have the greatest potential for slip, trip and fall occurrences. Then, it will show 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 the convergence of several risk factors on the potential for slip, trip and fall incidents. We will take you through this form step-by-step and provide examples where appropriate.

Terminology for contributing factor analysis

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 ten risk factors that are defined below. These ten risk factors became the basis of our 10-point slip, trip and fall analysis methodology.

Surface composition

Surface composition is the type of material that makes up the floor surface. The higher the coefficient of friction, the higher the rating. Although the coefficient of friction is a key indicator for this rating, measuring the coefficient of friction (COF) is a controversial subject due to the use of a variety of slipperiness testing devices (slipmeters) and standards. Accepted industry practice is to measure COF on a dry surface. Lowering the COF on a wet surface should be addressed under the Foreign Substance Potential factor. With this in mind, carpeting, rough brick or concrete will have a high rating as well as resilience of the floor (ability to absorb shock or impact) for this risk factor; terrazzo tile, a low rating.

Foreign substance potential

This potential is the likelihood that a foreign substance will be on the walking surfaces and adversely affect the coefficient of friction. Items to consider include ice, water, liquids, powders, and grease. Also, consider floor care products such as waxes and sealers. Do not forget to note the potential of foreign substances being brought in on the soles of shoes. The higher the potential for foreign substance introduction, the lower the risk factor rating will be.

Surface conditions

These are the actual conditions at the time of the survey. Consider loose carpeting, loose or broken tiles, holes or pits on the surface, or unusual wear. Poor surface conditions should receive a low rating.

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 coefficients of friction, such as carpet to tile, brick to epoxy floor, or wet to dry. Surface changes like these should be given a low rating.

Level changes

Level changes are defined as step up or step down, ramps and other sloping changes greater than 8:1 ratio. Items to consider include non-uniform steps and ramps with an excessive slope. These should be given a lower rating.

Obstructions

Obstructions are items that can contribute to the likelihood of a slip or fall, which is anything that protrudes into the normal walking path. They include items such as extension cords, hoses, product storage, material handling equipment guards such as concrete posts, parts of equipment, and temporary storage/holding areas. Factors to consider include the proximity to traffic areas and the permanency of the item, with normally a higher rating for permanent features. Familiarity of the person walking to the area or obstruction is also a factor.

Visibility

Visibility pertains to more than just lighting (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, dust clouds, etc.

Stairs

Stairs are defined as more than three steps. Consider the frequency of use, whether they are for emergency use only, etc., and giving higher ratings if the stairs are used on a regular basis. Curved or spiral stairs would receive a lower rating. Also, consider handrails and maintenance. Escalators and elevators, if any, need to be considered. When not operating, escalator steps do not generally meet the standard step geometry for stairs.

Human factors

The assumption is that different people have different physical capabilities. Human factors are elements such as demographics (i.e., age), shoe types, familiarity with the areas traveled, and physically challenged persons. Carrying awkward packages/materials can also negatively affect the rating. Give lower ratings to those areas where human factors play a critical negative factor.

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 by a particular process, alarms/buzzers, strobe lights 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. Areas where unusual features are a major distraction should receive a low rating.

Total score

This is the total score for each of the evaluated areas out of a possible 100 points.

Number of areas evaluated

The number of areas that were reviewed in this evaluation; this number will be used to calculate the composite score.

Composite score

This is the average overall score out of 100 possible points for the audited location. Each of the individual scores is added up and then divided by the number of areas evaluated.

Related terms

- **Coefficient of friction:** Describes the amount of friction provided by a surface. Can be measured by a slipmeter, if available. In simple terms, more friction is better than less.
- **Slope:** Vertical distance divided by horizontal distance from top to bottom. Width is irrelevant.
- **Tread:** Horizontal part of a stair step.
- **Riser:** Vertical part of a stair step.

Instructions for completing the slips, trips and falls evaluation form

Refer to the numbers on the sample slips, trips and falls evaluation form.

1. Identify the areas you will be evaluating. The best case scenario is to evaluate every area that has foot traffic, but, if this is not possible, you should prioritize by those areas that have the most foot traffic. You may combine some areas in a single evaluation. List the areas you will evaluate.
2. Assess each area in relation to the contributing factors (see "Contributing factor analysis and Contributing factor guide"). Use a scale of 1 - 10 (1 being high potential, 10 being very low potential). An area receiving a 1 may have obvious hazards such as broken tile or torn carpeting. An area receiving a 10 would have no obvious slip and fall hazards and good administrative control. (An absence of a contributing factor also scores 10, e.g., no stairs.)
3. Total the scores. Determine how the area rates on the scale shown on the form. Reassess the areas that rate very low potential and high potential to confirm the ratings are consistent. This shows how significant this area is to the condition of the entire property.
4. Total all the area scores and divide by the number of areas. This sum is the composite score for the property. There is a maximum of 100 points. The composite score is most useful as a baseline for future evaluations.

Following the reassessment process, determine which critical slip and fall factors you will address first. You may choose to attack an area that has a low rating. Or, you may choose to address a contributing factor that is consistently rated low, for example, with visibility ratings of 1 and 2.

Contributing factor guide

Although it would be impossible to come up with 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 just a guide. You must use your judgment to **determine the most appropriate number**.

	1-3 High potential	4-6 Moderate	7-8 Low potential	9-10 Very low/none
Composition	scf = .00 - .40 polished terrazzo	.40 - .49 marble	.50 - .59 asphalt tile	.60 and above carpet/brick/rough conc.
Foreign substance potential	Wet floors in production areas from hydraulic oils, water, wood dust, liquid chemicals, etc	In and around packaging areas	Warehouses offices	Almost no potential
Surface condition	Holes in floor, ruts, low spots, missing tile/brick	Small cracks in floor, patched surfaces, holes in carpeting	Worn flooring, cracked flooring or tile	No improvement needed
Surface changes	Wet to dry floors	Acid brick to epoxy covered concrete	Pavement to gravel	No change
Level	Ramp greater than 8:1 slope, stairs greater than 45° or 12:12 slope	Step-up or step-down	Bumps and subtle level changes	Completely level
Obstructions	Poor housekeeping, pallets out of place, scrap	Hydraulic hoses, electric cords	Loaded pallets temporarily in aisles	None
Visibility	No-contrast level changes, very low light level, or area with high lights obscured by storage	Contrast in colors and low light levels or areas with dust, steam, etc	Contrast in colors and adequate lighting with no air contaminants obscuring vision	No improvement needed or no exposure
Stairs (Includes any elevators and escalators)	Many stairs, shop built stairs, spiral staircases or uneven treads, damaged metal stair facings	Maintenance deficiencies in stair surfaces, elevators or escalators	Stairs, installed and well maintained to meet OSHA, NFPA 101 and ANSI standards	No stairs, or emergency only
Human factors	High frequency of visitors to the plant, tours given to outside groups where high heels, slick soles or disabled, may be present	Some potential for pedestrians not familiar with area and without proper safety footwear such as visitors	Minor potential for pedestrians not familiar with area such as occasional office personnel without proper safety shoes	No high-risk traffic expected
Unusual features	High number of unusual features such as wet/slippery conditions, forklift traffic, loading docks, horseplay among employees, etc	Distraction may include several items such as a particular process, alarms and forklift traffic, noisy areas	Only one or two distracting features	No distracting features

What the terms mean

Below are some definitions of the terms used on the slips, trips and falls evaluation form:

Assessed by	The name of the person completing the form
Property	The name and address of the property being evaluated
Areas evaluated	Specific areas of the property being evaluated
Contributing factors	Those conditions that may affect fall potential
Surface composition	Type of material that makes up the floor surface
Surface changes	Changes from one type of material to another as someone walks through the area
Foreign substance	Likelihood that other substances will be found on the floor potential
Surface conditions	Actual conditions at time of survey
Level changes	Floor height changes of three or fewer steps
Obstructions	Anything protruding into the normal walking path
Visibility	How easy the surface is to see
Stairs	More than three steps
Human factors	The assumption that different customers have different physical capabilities
Unusual features	Anything out of the ordinary that might distract a person walking through the area
Composite score	Average of the total scores for all areas evaluated

An example

Metal Fabricator Specialists, Inc.

Choose areas

Jim B. is evaluating Metal Fabricator Specialists Inc. and decides to look at the slip, trip and fall potential in five areas: receiving, machining, maintenance, rack storage aisles, and lobby and offices.

Rate areas

While observing each area, he rates the area in each of the ten contributing factors. He previously read the contributing factor analysis; he understood what specific characteristics each of the factors is related to. As he evaluates each area, he refers to the examples in the contributing factor guide before he chooses a number from 1-10.

Calculate totals

After all the contributing factor boxes have been filled in, he totals each column to get a score for that specific area. Now he can tell how the areas compare to each other and to the rating scale on the form.

Calculate composite

The final step is to determine an overall score for the facility, which is actually an average of all the areas evaluated. Jim B. adds each area's total score and then divides this number by the number of areas evaluated. This is the composite score. There is a maximum total of 100 points for the composite score.

Sample evaluation

Customer: Metal Fabricator Specialists, Inc.

Address: 2200 S. Shackelford, Little Rock, AR 72211

Assessed by: Jim B.

Date: August 6, 2009

Areas evaluated

1 Receiving						
2 Machining						
3 Maintenance						
4 Rack storage aisles						
5 Lobby and offices						
6						
Contributing factors						
w 1-3 (poor) w 4-6 (below average) w 7-8 (average) w 9-10 (excellent)						
8	10	8	7	10		Surface composition
5	1	4	5	8		Foreign substance potential
8	5	8	8	10		Surface conditions
6	5	9	8	8		Surface changes
9	6	8	7	8		Level changes
8	4	9	8	9		Obstructions
8	9	7	6	9		Visibility
10	9	10	10	9		Stairs
5	7	8	6	3		Human factors
8	3	8	8	8		Unusual features
75	59	79	73	82	0	Total score
					5	Number of areas evaluated

Composite score

73.6

80 - 100 Above average

50 - 59 Low average

70 - 79 High average

30 - 49 Below average

60 - 69 Average

01 - 29 Poor

Assigning priorities

The next step in our process is to decide which exposures are the most significant and should be addressed first. If the priorities are not already obvious, you can use the following matrix to help you. In the table below, put a number in each box. The number should indicate how many times that rating was used on the evaluation form for that area. Those areas with more numbers in the unshaded part of the table will normally be the higher priority and deserve control efforts earlier in your improvement process.

Area	1st	2nd	3rd	4th	5th	6th
Contributing factor ratings	Indicate how many of each number rating was listed for each area.					
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Assigning priorities *(continued)*

For instance, if we use the ratings from Metal Fabricator Specialists, the matrix will look like this:

Area	1st	2nd	3rd	4th	5th	6th
Contributing factor ratings	Indicate how many of each number rating was listed for each area.					
1	0	1	0	0	0	
2	0	0	0	0	0	
3	0	1	0	0	1	
4	0	1	1	0	0	
5	2	2	0	1	0	
6	1	1	0	2	0	
7	0	1	1	2	0	
8	5	0	5	4	4	
9	1	2	2	0	3	
10	1	1	1	1	2	

This distribution shows that the first area is probably the highest priority and the third area is likely the secondary priority.

Action plan

Our final step is to determine how to control the problems we have identified. We have decided our priorities and know which issue to work on first, but each issue is unique and requires special thought about what level of control is desirable, what resources are available and what is technically feasible. Because of these differences, action plans to control each different exposure will likely be unique also. You will probably find that in most cases, more than one change is needed to affect a long-term solution to the problem.

There are, however, some basic similarities that can serve as a guide to helping you through the process of developing an action plan. Each of these considerations is listed in the action plan table on the next page. Also, because assignment of responsibility is a key factor in making sure suggested changes are actually implemented, management decisions about each issue should also be documented. You should complete the table 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 and railings.
- Replace slick floor material with surfaces having a higher coefficient of friction.
- Use floor dressings that reduce slipperiness.
- Install grab bars and rails where appropriate.
- Avoid furnishings that might slip when leaned upon.
- Apply slip-resistant coatings in showers, baths and bathroom floors.
- Use color contrasts to make steps or other level changes more visible.
- Make sure all floor surfaces are adequately lit at night.

Administrative changes

- Ensure supervisors and staff are aware of their responsibilities for fall prevention.
- Identify and flag guests who are at high risk for a fall so the staff is aware of this.
- Schedule and monitor preventive maintenance on rolling equipment.
- Cover fall prevention topics often during employee training.
- Include fall prevention items on routine self-inspection forms.
- Ensure corrective action follow-up by management.

Action plan *(continued)*

Problem needing control					
What improvements in the contributing factors are warranted? (Consider any contributing fact with a score below 7)		Management decisions			
		Will do	Will not do	Target date	Person assigned
List any physical changes to consider to improve the situation (surfaces, objects, facilities, environment, etc.)					
List any administrative changes to consider to improve the situation (policies, procedures, assignment of responsibility, self audits, accident investigations, training, etc.).					

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