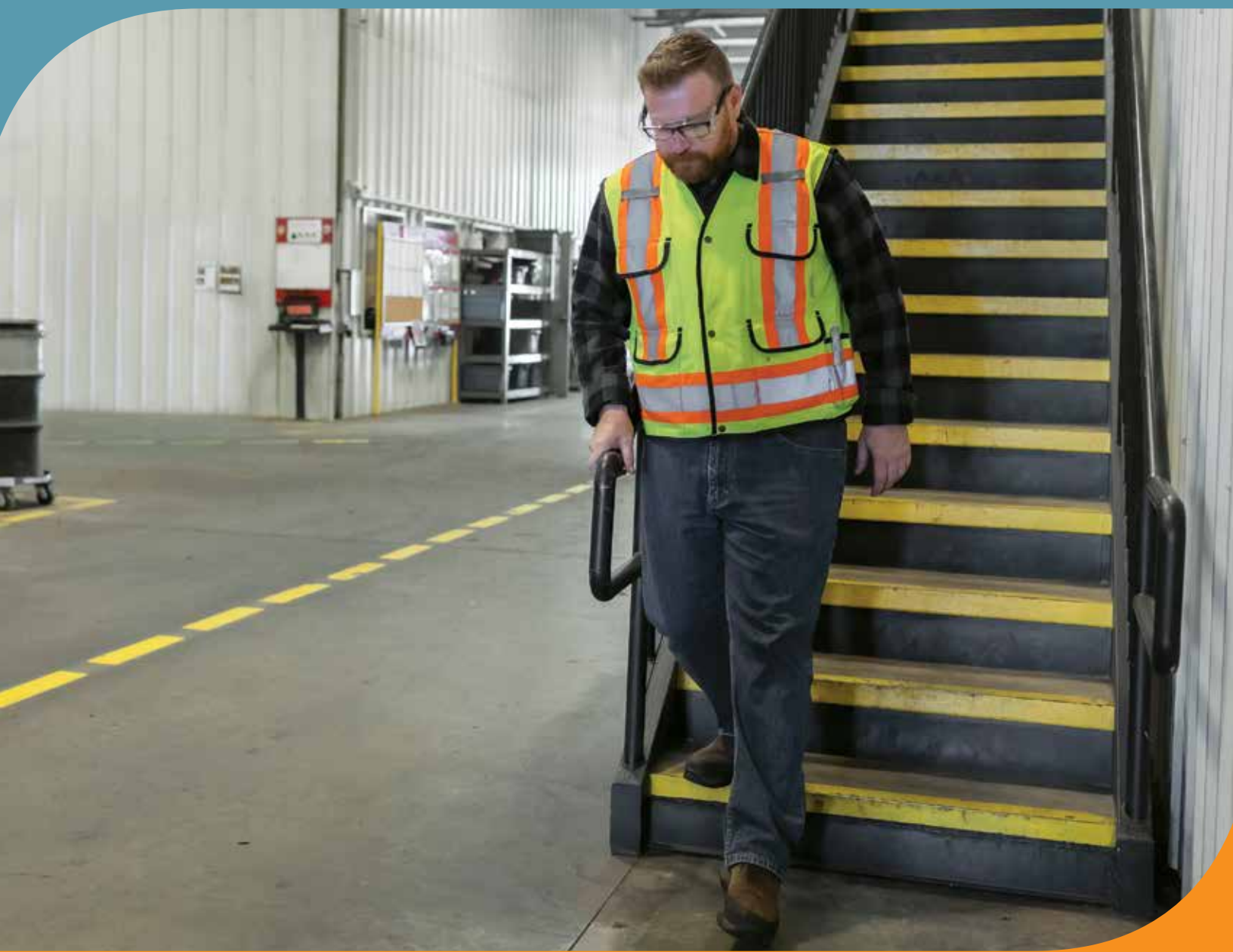


Preventing Slips, Trips, and Falls in the Workplace



About WorkSafeBC

At WorkSafeBC, we're dedicated to promoting safe and healthy workplaces across B.C. We partner with workers and employers to save lives and prevent injury, disease, and disability. When work-related injuries or diseases occur, we provide compensation and support injured workers in their recovery, rehabilitation, and safe return to work. We also provide no-fault insurance and work diligently to sustain our workers' compensation system for today and future generations. We're honoured to serve the workers and employers in our province.

Prevention Information Line

We provide information and assistance with health and safety issues in the workplace.

Call the information line 24 hours a day, 7 days a week to report unsafe working conditions, a serious incident, or a major chemical release. Your call can be made anonymously. We can provide assistance in almost any language.

If you have questions about workplace health and safety or the Occupational Health and Safety Regulation, call during our office hours (8:05 a.m. to 4:30 p.m.) to speak to a WorkSafeBC officer.

If you're in the Lower Mainland, call 604.276.3100. Elsewhere in Canada, call toll-free at 1.888.621.7233 (621.SAFE).

Health and safety resources

All employers — no matter how big or small — are responsible for the health and safety of their workers. To help support your health and safety needs, a wide range of information and resources is available on [worksafebc.com](https://www.worksafebc.com).

Many of our resources are available to order in hard copy from the WorkSafeBC Store at [worksafebcstore.com](https://www.worksafebcstore.com). If you have any questions about placing an order online, please contact a customer service representative at 604.232.9704, or toll-free at 1.866.319.9704.

Preventing Slips, Trips, and Falls in the Workplace

Acknowledgments

This publication would not have been possible without the help of various organizations and individuals involved with slip, trip, and fall prevention in British Columbia. We thank them for their time and expertise.

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Some content on safety footwear has been adapted from the Health and Safety Authority (Ireland) information sheet *Choosing Slip-resistant Footwear*. This document is available in the "Publications and Forms" section of the HSA website (hsa.ie).

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Introduction

Note

To view statistics on injury rates and costs by industry, visit the “Industry statistics” page on [worksafebc.com](https://www.worksafebc.com). To learn more about injuries and claims, compare your firm’s performance to that of your peers, identify trends, and more, visit the “Employer health and safety planning tool kit” on [worksafebc.com](https://www.worksafebc.com).

Each year, 11,000 British Columbians are injured by slips, trips, and falls in their workplaces. These incidents can have a tremendous impact on the injured workers as well as their families and co-workers. Injuries from falls can include sprains, bruises, concussions, fractures, and even burns and cuts. Pain and suffering, disability, stress, and even a loss or change of employment can result.

For businesses, injuries from slips, trips, and falls can be financially devastating. Each year, these injuries cost B.C. businesses more than 260,000 lost workdays and more than \$206 million in workers’ compensation payments. Direct costs can include claim payments, increased insurance premiums, and fines. Indirect costs may include incident investigations, the hiring and training of temporary employees, and production or service interruptions, ultimately leading to loss of business.

Across all industries, slips, trips, and falls are the costliest workplace incidents and some of the biggest causes of general productivity loss. Of all workplace injury claims in B.C., 20% of them are related to slips, trips, and falls.

About slips, trips, and falls

Slips happen when there’s not enough grip or traction between a person’s bare foot or footwear and the walking surface. Trips happen when people lose their balance after their feet collide with objects or they miss a step when going up or down stairs. Falls often result from slips or trips.

The importance of prevention

Although they occur frequently and can be costly, slips, trips, and falls are some of the most preventable types of workplace incidents. Effectively managing the risk of slips, trips, and falls in the workplace involves three steps:

- Identify the hazards.
- Assess the risks.
- Implement effective controls (such as eliminating or substituting the hazard).

About this guide

Who should use this guide

This guide was written for employers and joint health and safety committee members.

Purpose of this guide

This guide describes requirements of the Occupational Health and Safety Regulation as well as best practices that can help employers reduce the risk of slips, trips, and falls. It is practical and presents hands-on information employers can use at their workplaces.

Readers will gain an understanding of the following:

- **Myths about slips, trips, and falls.** “All safety footwear is slip resistant.” “A slip-resistant floor is a silver bullet.” These and other common misconceptions may lead some employers to overlook the true causes of slips, trips, and falls.
- **Causes of slips, trips, and falls.** Slips, trips, and falls in workplaces result from a combination of factors, including workplace design, flooring, contamination, cleaning and housekeeping practices, the environment, footwear, work procedures and practices, and human performance factors. Understanding how these factors combine and potentially contribute to slips, trips, and falls is key to effectively managing the risk.
- **How slip, trip, and fall prevention fits into occupational health and safety (OHS) programs.** Although many B.C. workplaces have slip, trip, and fall prevention plans in place, this guide describes how to incorporate them into an existing OHS program.

Scope of this guide

This guide addresses same-level slips and trips (i.e., those that involve workers slipping or tripping on the same level as they are standing), which often result in falls. Same-level slips and trips are distinct from slips and trips from a height.

Wording in this guide

In this guide, the word *must* means a requirement specified in the Regulation. The word *should* indicates that a particular action, although not specified in the Regulation, will improve safety in the workplace. Please note that the word *worker* includes supervisors, managers, and other workers.

This guide does not replace the Occupational Health and Safety Regulation

This guide is meant to give you a basic understanding of how to reduce the risk of slips, trips, and falls. Refer to the Occupational Health and Safety Regulation to be sure you are meeting your legal responsibilities for workplace health and safety. You can find a searchable version of the Regulation and its accompanying Guidelines at [worksafebc.com/law-policy](https://www.worksafebc.com/law-policy).

Countering myths about slips, trips, and falls

What does coefficient of friction mean?

The coefficient of friction (CoF) is the level of friction between the floor and a worker's footwear. The CoF is most commonly reported on a scale from zero to one, with zero representing the lowest slip resistance, and one, the highest. For more information, see page 25.

This chapter challenges a number of common misconceptions about how to reduce the risk of slips, trips, and falls.

Myth: All safety footwear is slip resistant.

Fact: Many footwear suppliers advertise their products as “non-skid,” “slip-proof,” “non-slip,” or “anti-slip.” But unless the supplier provides coefficient of friction test results for the types of contaminants and the surfaces where workers will use the footwear, assume the footwear isn't slip resistant. For more information on slip-resistant footwear, see page 50.

Myth: A new floor is always the best solution.

Fact: There are many ways to increase the slip resistance of an existing floor, often at a fraction of the cost of replacing it. For more information on how to improve the slip resistance of your existing floor, see page 31.

Myth: Textured floors always enhance slip resistance.

Fact: Although this might be true in some cases, adding a texture or profile — a raised geometric pattern — to a floor can reduce the contact surface between floor and footwear, making the floor even more slippery.

Myth: Housekeeping is a job for cleaning staff.

Fact: Cleaning staff are usually in charge of day-to-day cleaning operations. However, the best approach to slip, trip, and fall prevention is to educate and train all staff in reporting spills, cleaning minor contamination, picking up trash, and tidying workspaces.

Myth: Reducing worker distraction is the best prevention method.

Fact: Good workplace design and prompt cleaning prevent more slips, trips, and falls.

Myth: All floor-cleaning methods are equal.

Fact: Different flooring materials require different cleaning methods. Scrubbing, water levels, cleaning agents, and rinsing can all vary from floor to floor. Clean floors according to the manufacturer's instructions to avoid problems such as residue buildup or the breakdown of anti-slip properties.

Myth: Safe work procedures are a guarantee against slips, trips, and falls.

Fact: Safe work procedures are an integral part of a safe workplace. However, eliminating slip and trip hazards at the source and installing engineering controls are more effective ways to control slip and trip risks.

Myth: Slip-resistant shoes are the best prevention method on a floor that's permanently contaminated.

Fact: Having the right type of flooring or flooring treatment is more effective at reducing slips than using only slip-resistant footwear. But keep in mind that even permanently contaminated floors benefit from cleaning to remove excess contamination.

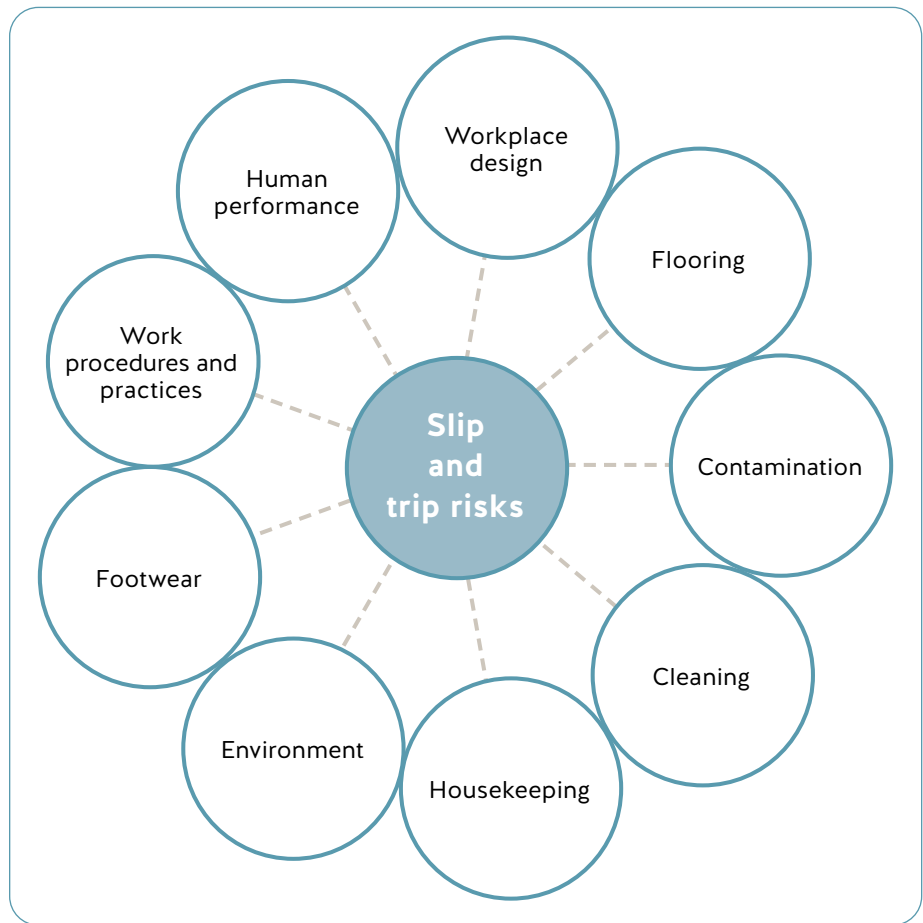
Myth: A slip-resistant floor is a silver bullet.

Fact: The benefits of cleaning a floor — even one that's modestly slip resistant — regularly and properly far outweigh the benefits of the best slip-resistant floor that isn't properly cleaned.

Factors that influence the potential for slips and trips

Slips and trips happen in the workplace for many reasons. However, the key factors that influence the risk of slips and trips can be grouped into nine related categories. Applying best practices in each of these categories significantly reduces the risk of slips and trips. The nine categories are as follows:

- **Workplace design** is the way a workplace is planned, organized, and equipped to ensure both productivity and worker safety. Examples of good design include handrails on stairs, and canopies and umbrella bins at entrances.
- **Flooring** composition (what the floor is made of) and profile (its degree of roughness) determine how slippery a floor will be. Flooring factors are associated with contamination.
- **Contamination** results when something — water, oil, soap residue, or a semi-solid such as leaves, for example — ends up on a walking surface. Contamination rarely causes a slip or trip by itself. However, it interacts with flooring, footwear, and cleaning factors to cause loss of balance.
- **Cleaning** factors stem from the tools, methods, or products used to remove contaminants from walking surfaces. Cleaning factors are linked to contamination. That's because cleaning methods vary depending on the type of contamination.
- **Housekeeping** involves much more than tidying and dusting. It means putting all items (e.g., tools, materials, and personal belongings) away according to a standard and a schedule.
- **Environment** includes factors such as lighting, temperature, and noise that can distract workers or mask hazards.
- **Footwear** factors stem from the material and construction of shoes and how much friction they provide on the floor. Footwear itself isn't usually a cause of slips and trips, but it is linked to flooring factors and contamination.
- **Work procedures** are written descriptions of how a task should be done. They may be general or specific, depending on the type and complexity of the task. **Practices** are the rules that govern how (or the *manner* in which) a workplace approaches tasks and processes.
- **Human performance** factors (such as eyesight, hearing, and balance) sometimes contribute to slips and trips. These factors vary from person to person.



The nine categories of factors that influence the risk of slips and trips

For more information on the factors, see the “Applying risk controls to the factors that may contribute to slips and trips” chapter beginning on page 18.

Starting off right: The keys to successful prevention efforts

Most slip and trip prevention efforts start with a high level of energy and participation but fail to achieve sustainable results. That's often because these efforts lack a clear framework that embeds prevention into daily activities and processes.

Three other essential ingredients include the following:

- Management commitment
- Worker involvement
- Training and education

Get management on board

Management commitment should be the starting point for all injury-prevention plans in a workplace, including those for slips and trips.

Commitment

Owners, managers, and supervisors should take an active role in identifying and fixing slip and trip hazards. A key part of this involves committing human and financial resources to control hazards at the source. If it's not possible to address all issues at once, develop a plan to prioritize and solve them over time. (See "Assessing risks: Know which hazards to address first" on page 12.)

It's also crucial that management set good examples. For example, a business owner who is seen holding a handrail while using stairs sends a positive message to the whole organization.

Here are some other actions that managers and supervisors can take:

- Engage the joint health and safety committee and other managers, supervisors, and owners. You may need to convince these groups that slips and trips are serious and their support is vital.
- Oversee the implementation of workplace practices and standards such as housekeeping and footwear. (See pages 41 and 50.)
- Expect accountability and troubleshoot with workers when required (with an emphasis on understanding rather than enforcement).

- When a slip or trip incident occurs, don't assume the worker is at fault. Instead, analyze all the factors that influence the potential for slips and trips, including lighting (environment), layout (workplace design), contaminants, and housekeeping. (See page 6.)
- Be a role model. Pick up trash from the floor, use handrails, remove obstacles on walkways, and give positive feedback to workers who follow safe work practices. When necessary, reinforce expectations around safe work practices. (See page 56.)

Training

Training gives managers a greater understanding of their role in prevention and how their actions matter. Review the sections of the OHS program that apply to slips and trips, and cover the following topics:

- What slips and trips are, and their causes and consequences. (Provide statistics and explain how injuries can affect workers personally and professionally.)
- The most common slip and trip hazards at the workplace. (Make sure to include specific examples.)
- How to report a slip or trip. (See page 59.)
- How to report a spill. (See page 67.)
- How to use a spill response kit. (See page 67.)
- Expected workplace practices. (See page 67.)
- Footwear requirements or policy. (See page 66.)
- Housekeeping standards and expectations. (See page 41.)
- Winter weather plan. (See page 47.)
- How to role model safe work practices.
- How to give feedback on work practices.
- How to identify barriers to safe work practices.
- How to investigate a slip or trip incident.

Plan to do an initial training session followed by annual refresher training.

Get workers on board

Efforts to identify hazards and assess and control risks are more likely to be successful when workers are actively involved. Staff engaged in front-line work are well positioned to point out slip and trip hazards and quickly deal with minor ones.

Involvement

Some ways to engage workers in the process include the following:

- Educate workers on sections of the OHS program that apply to slip and trip prevention. (See page 61.)
- Encourage workers to report issues and near misses to supervisors or to safety or union representatives.
- Listen to workers' reports and act on them.
- Provide positive feedback to workers who voice concerns. Keep communication open by reporting back to them. (See page 56.)
- Invite the joint health and safety committee to review the inspection and incident reports and to provide recommendations.
- Explain the reasons for risk controls to workers and others.
- Allow workers to try out the controls and get their feedback before making controls permanent.

Training

Training workers gives them a greater understanding of their role in prevention and how their actions matter. Go over the sections of the OHS program that apply to slips and trips, and cover the following topics:

- What slips and trips are, and their causes and consequences. (Provide statistics and explain how injuries can affect workers personally and professionally.)
- The most common slip and trip hazards at their workplace. (Make sure to include specific examples.)
- How to report a slip or trip. (See page 59.)
- How to report a spill. (See page 67.)
- How to use a spill response kit. (See page 67.)
- Expected workplace practices. (See page 67.)
- Footwear requirements or policy. (See page 66.)
- Housekeeping standards and expectations. (See page 41.)
- Winter weather plan. (See page 47.)

Plan to do an initial training session followed by annual refresher training.

Managing the risk of slips and trips

Under the Regulation, employers must maintain floors, platforms, ramps, stairs, and walkways available for use by workers in a state of good repair and free of slip and trip hazards. This is done through identifying hazards, assessing risks, and implementing control methods.

Identifying hazards

Slip and trip prevention begins with identifying and documenting the hazards that exist and where they are in your workplace. There are four parts to this process, and the resulting information forms a hazard identification report. This section provides an overview of the process.

Inspect the workplace

To begin, establish a team of management and workers from different departments and work areas. (The team members will point out hazards that may be common in their areas but don't exist on inspection day.) The team should travel around the workplace and note areas of concern, as well as the condition of all surfaces, such as stairs and platforms. Inspect all workplace areas, including yards, parking lots, offices, and storage places. (Consider using the "Hazard identification checklist" on page 75.)

Create a slip and trip map

Sketch or map the layout of the work area, and mark the locations of slip and trip incidents and known hazards. Sometimes the significance of incidents, especially near misses, isn't immediately apparent, but this changes once they are grouped on a map. The completed map may reveal, for instance, a place where incidents repeatedly occur, or a previously unidentified hazard. For more information, see the "Slip and trip mapping tool" on page 84.

Review feedback and reports

Review worker feedback and reports of concern. Go over historical records such as inspection reports, incident data, incident reports, and near-miss reports. Gather as much information as possible about where, when, how, and why slips and trips are happening and who they are happening to.

Interview people

Talk to workers, supervisors, and joint health and safety committee members. Ask them to explain areas of concern.

Assessing risks: Know which hazards to address first

Deciding which slip and trip hazards to address first can be challenging. And the process can be especially demanding if there's a long list of hazards but human and financial resources are limited.

Ranking hazards by probability and severity

A useful way to rank each hazard is based on probability (i.e., how likely it is to cause an incident) and severity or impact (i.e., how serious an incident would be).

Generally speaking, the more likely an injury is to occur and the greater its severity, the higher the risk level assigned to a hazard. For example, a recurring oil leak from a piece of equipment in a high-traffic area would be a high-risk hazard. Conversely, a one-time water spill in a rarely used area of the parking lot would be a low- to medium-risk hazard.

Use the following risk matrix to determine the level of risk.

Risk assessment rating matrix

		Impact			
		Minor	Moderate	Major	Extreme
Probability	Rare	Low	Low	Medium	Medium
	Unlikely	Low	Medium	Medium	Medium
	Moderate	Medium	Medium	Medium	High
	Likely	Medium	Medium	High	High
	Very likely	Medium	High	High	High

Rating	Action
Low	This hazard may not need immediate attention.
Medium*	Do something about this hazard as soon as possible.
High	Do something about this hazard immediately.

* Don't underestimate "medium" consequences. They could be very important — give them serious consideration.

Some hazards can be eliminated easily, while others will need to be managed using temporary controls until permanent controls are implemented.

Ranking hazards through trend analysis

Another way to rank hazards is through a trend analysis. This involves examining the data gathered in the hazard identification phase for trends or patterns. For example, if 50% of slips and trips happen at freezer entrances, it's clear there is one or more problems at those locations, and those hazards should be addressed first. Use the "Slip and trip mapping tool" on page 84 to identify locations that need attention.

Once you have a clearer picture of the trends in your workplace, you can tell which of the hazards you identified are most likely to cause slips or trips and how severe the resulting injuries may be.

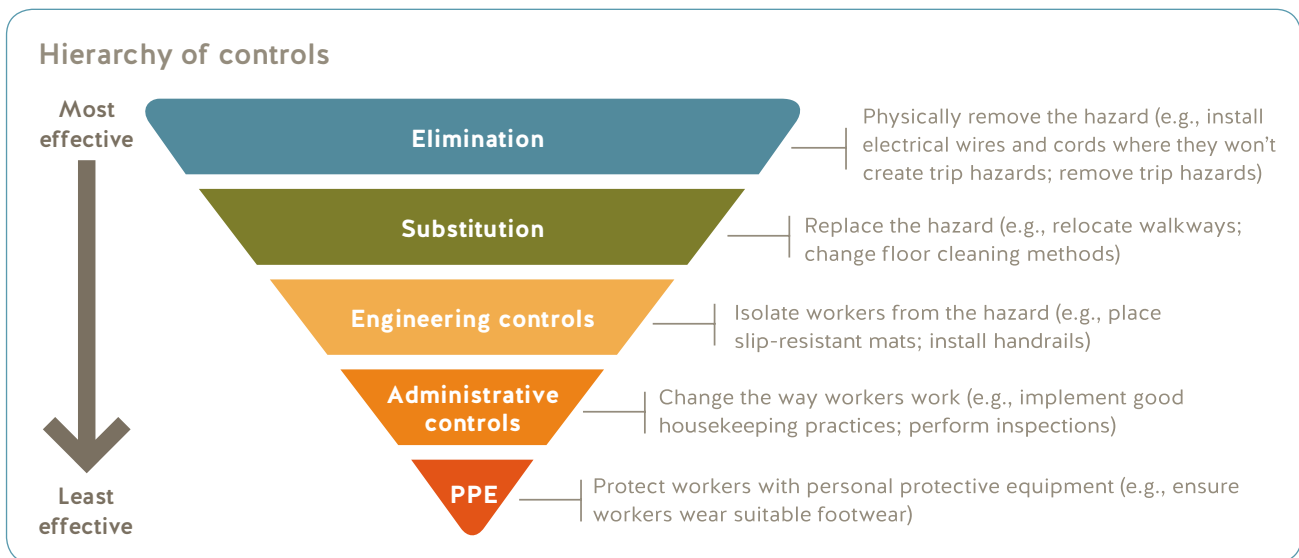
Controlling risks

A control is a remedy applied to a hazard. If a hazard can't simply be eliminated, multiple controls may be needed to effectively reduce the risk.

Hierarchy of controls

The hierarchy of controls (shown on the next page) ranks control methods from most effective to least effective. As an employer, you should implement controls that fall as high in the hierarchy as possible.

At the top of the hierarchy, elimination (i.e., complete removal of the hazard) is the most effective category of controls. At the bottom of the hierarchy, personal protective equipment is the least effective category of controls. Always aim to implement controls from the elimination, substitution, or engineering categories.



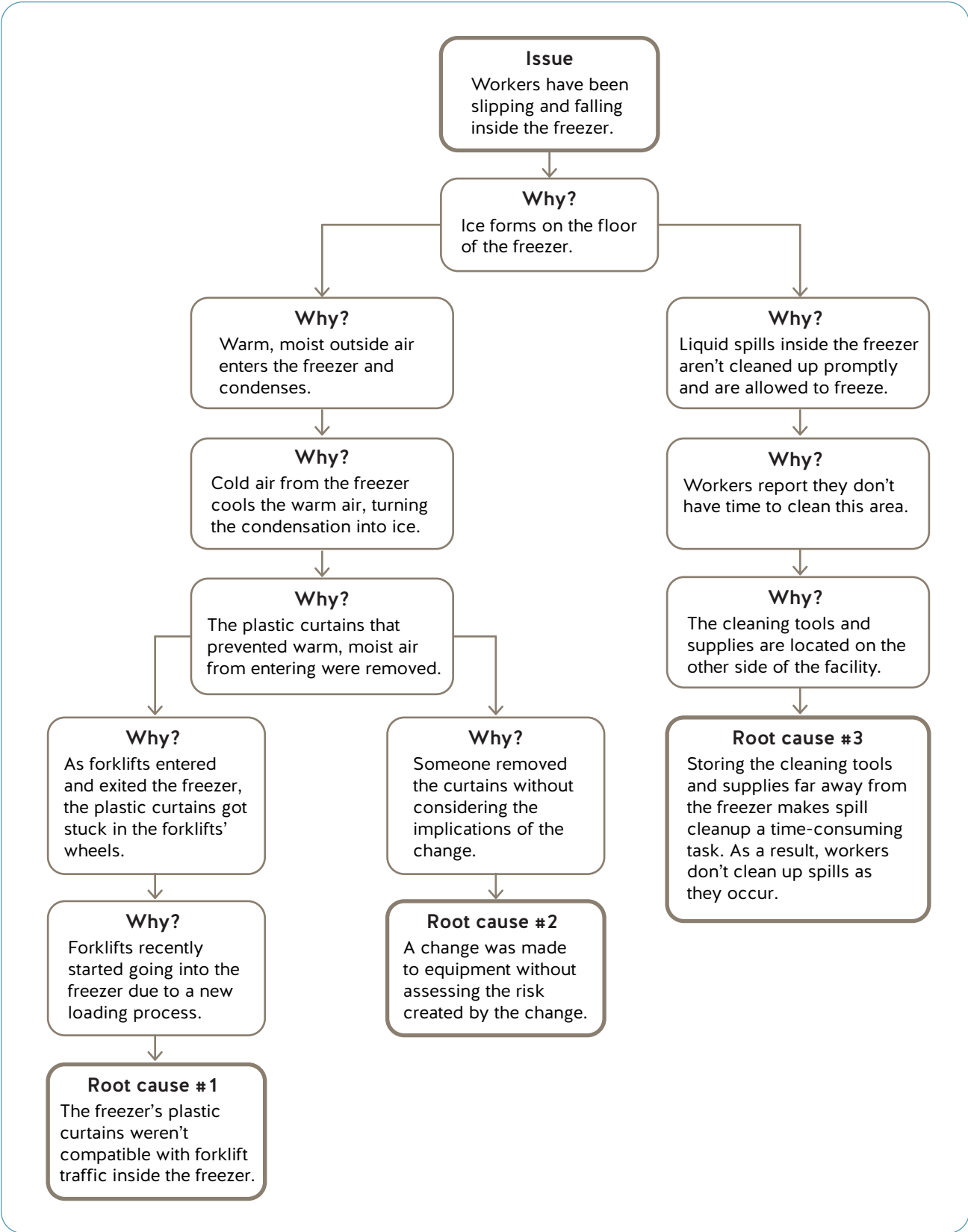
Eliminate hazards at the source

The most effective risk controls eliminate hazards at the source. For example, if workers are slipping on ice in a walk-in freezer, effective risk controls do more than clean the floor and remove the ice. They also remove the causes of the slippery conditions. Those causes may be a faulty temperature control, a lack of plastic curtains at the freezer door, or a water spill.

To identify root causes, use the 5 Whys technique. 5 Whys is a process used to explore the root causes of a particular problem. In this technique, you ask “why” several times until you identify a root cause such as a piece of equipment or a work process that directly controls the hazard. There may be multiple lines of questioning that uncover multiple root causes.

For example, a food warehouse has had multiple slip injuries. After using the “Slip and trip mapping tool” (see page 84), the employer discovers that 90% of the slips happened on an icy surface in a walk-in freezer. The following flow chart uses the 5 Whys technique to identify the root causes of this hazard.

5 Whys analysis of slips and falls in a walk-in freezer



The 5 Whys analysis shows there were several root causes for this hazard:

1. The freezer's plastic curtains weren't compatible with forklift traffic inside the freezer.
2. A change was made to equipment (i.e., the plastic curtains were removed) without assessing the risk created by the change.
3. Storing the cleaning tools and supplies far away from the freezer made spill cleanup a time-consuming task. As a result, workers didn't clean up spills as they occurred.

Following the hierarchy of controls, the preferred, most effective control is to eliminate the hazard. Examples of how to eliminate the hazard include the following:

- Change the type of plastic curtains to those that allow forklift traffic.
- Change the loading process so that forklifts aren't required inside the freezer.
- Change the location of the cleaning tools.

If there are additional root causes, follow the hierarchy of controls to address the hazards.

Because this type of analysis takes time and effort, identify a group of the highest-risk hazards on which to perform the 5 Whys analysis. This keeps the focus on fixes that will result in the greatest benefits.

Note

Changes in equipment, work processes, work rates, pay incentives, or layout may create risks where none existed before, as shown in the freezer example. Be sure to conduct a hazard identification review during the planning of a change. This eliminates the hazard before the change is implemented and reduces the work and productivity losses involved in fixing it later.

Monitoring and reviewing: Do the controls work?

After implementation, control measures should be monitored, reviewed, and (if necessary) revised to make sure they are working as intended.

Review control measures in the following instances:

- An inspection or an incident report shows that a measure is no longer effective (e.g., when a slip-resistant floor coating is worn out).
- A workplace modification, such as a new layout, creates a new or different hazard. (Make sure to conduct the review before the modification.)
- A new hazard is identified (e.g., a spill).
- Consultation with workers indicates a review is necessary.
- A joint committee member or the worker health and safety representative requests a review.
- An incident occurs.

Applying risk controls to the factors that may contribute to slips and trips

This chapter examines the nine categories of factors that contribute to slips and trips and explains some of the controls that may be applied. It also identifies elements that may be included in a modified OHS program. (For more information, see “Leveraging an existing occupational health and safety program” on page 61.)

1. Workplace design

Many organizations have dramatically reduced their slip and trip injury rates by changing the way their workplaces are built and arranged. Good workplace design eliminates hazards and uses fewer financial and human resources compared to other potential fixes. Elimination of hazards is the most effective type of control under the hierarchy of controls.

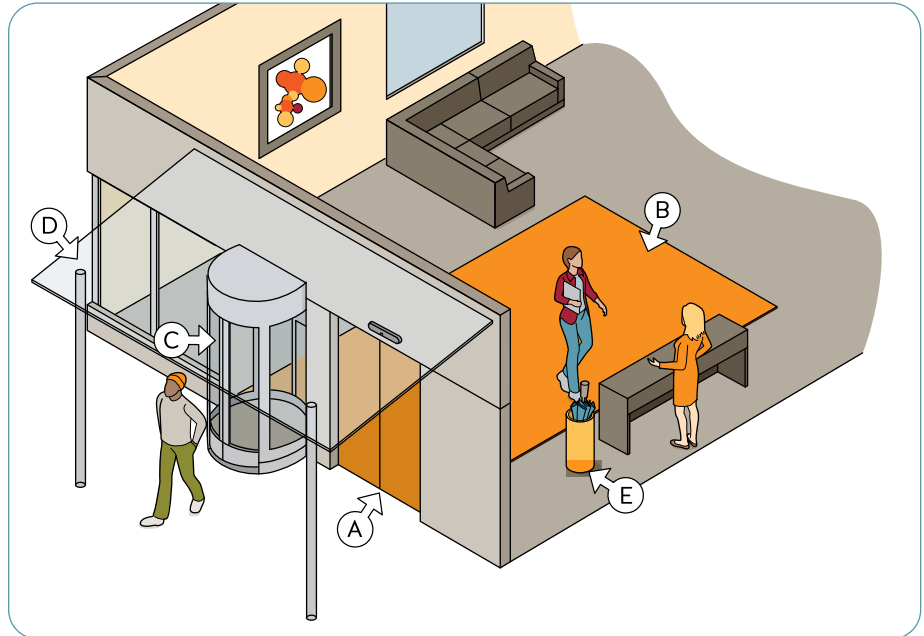
Some of the most effective layout and design features and their benefits are shown in the following images and tables.

In the Regulation

Section 4.33 of the Regulation requires that work areas be arranged as follows:

- (1) A work area must be arranged to allow the safe movement of people, equipment and materials.
- (2) If, to ensure safety, an aisle or passageway is designated for pedestrian traffic, the route must be clearly indicated by markings or other effective means and, where practicable, floor or grade markings must be used.

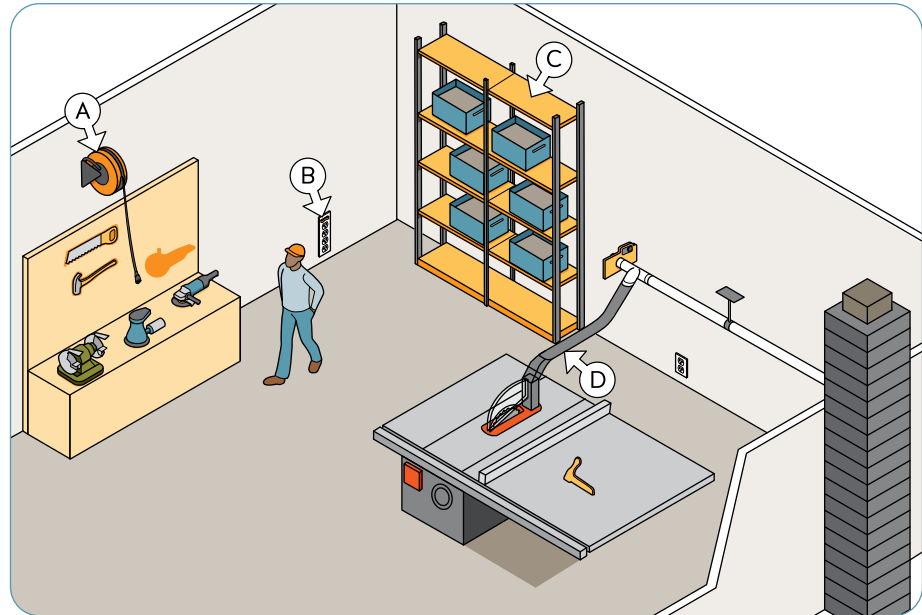
Building entrance



Layout or design feature and its benefits

- A. Self-closing doors at entrances help keep rain and snow from entering.
- B. Foyer or entrance design allows for appropriately sized water-absorbent mats. These mats remove water and dirt from shoes.
- C. Rotating doors require pedestrians to take several steps on the entrance mats, which help to dry their shoes before they enter the building.
- D. Exterior canopies over entrances help keep rain and snow from entering.
- E. Umbrella bins or bagging stations allow visitors to leave or cover wet umbrellas and help reduce water contamination inside the building.

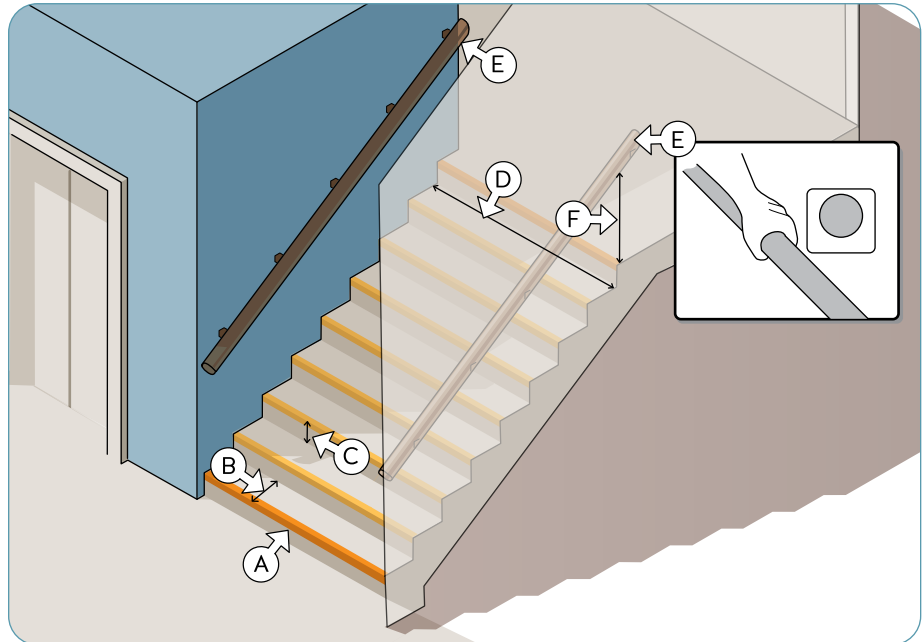
Production floor



Layout or design feature and its benefits

- A. Self-retracting overhead electrical cords reduce clutter and eliminate trip hazards.
- B. A sufficient number of electrical outlets helps eliminate the use of extension cords that can become trip hazards.
- C. Adequate storage space (such as shelving, cupboards, and lockers) keeps equipment and personal items off the floor.
- D. Enclosures and ventilation keep airborne contaminants from settling on the floor and creating a slip hazard.

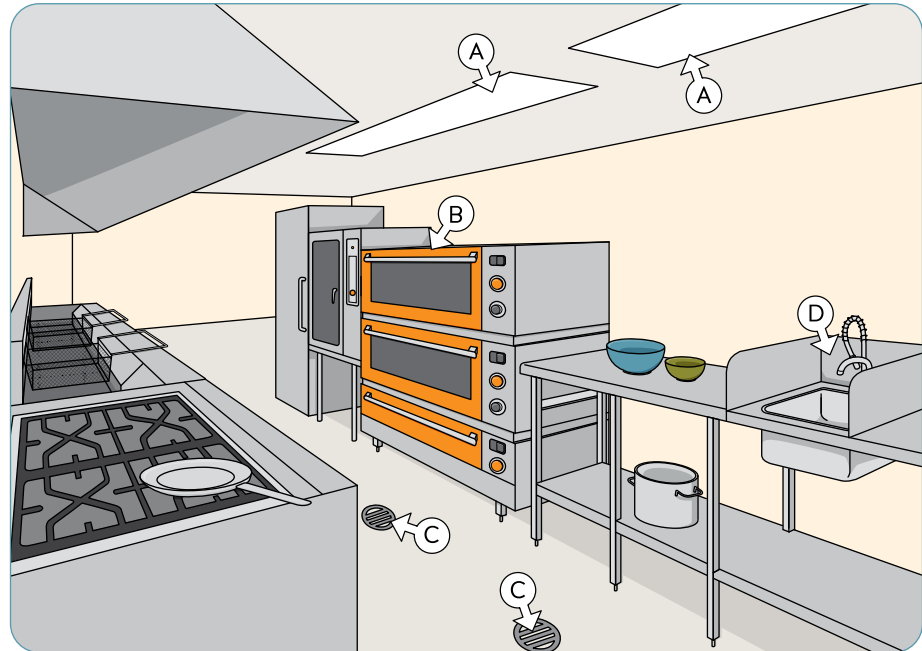
Stairs



Layout or design feature and its benefits

- A. Contrasting paint or distinctive flooring patterns (e.g., raised or embossed areas) on the leading edges of steps, staircase landings, and the ends of ramps reduce the risk of tripping.
- B. Consistent stair tread run (the horizontal distance or depth of each step) reduces the risk of tripping. Stair tread run shouldn't vary more than 5 mm ($\frac{3}{16}$ in.) between steps.
- C. Consistent riser (vertical part of a stair) height throughout flights of stairs reduces the risk of tripping. Stair riser height shouldn't vary more than 5 mm ($\frac{3}{16}$ in.) between steps.
- D. Stairs that are wide enough to allow people to walk up and down easily and pass each other safely reduce the risk of tripping.
- E. Handrails designed so that people can comfortably and firmly grasp them allow people to regain their balance if they stumble. Such designs allow people to curl their fingers and thumb around part or all of the handrail.
- F. Handrail height between 86.5 and 107 cm (34 and 42 in.) reduces the risk of falling.

Kitchen



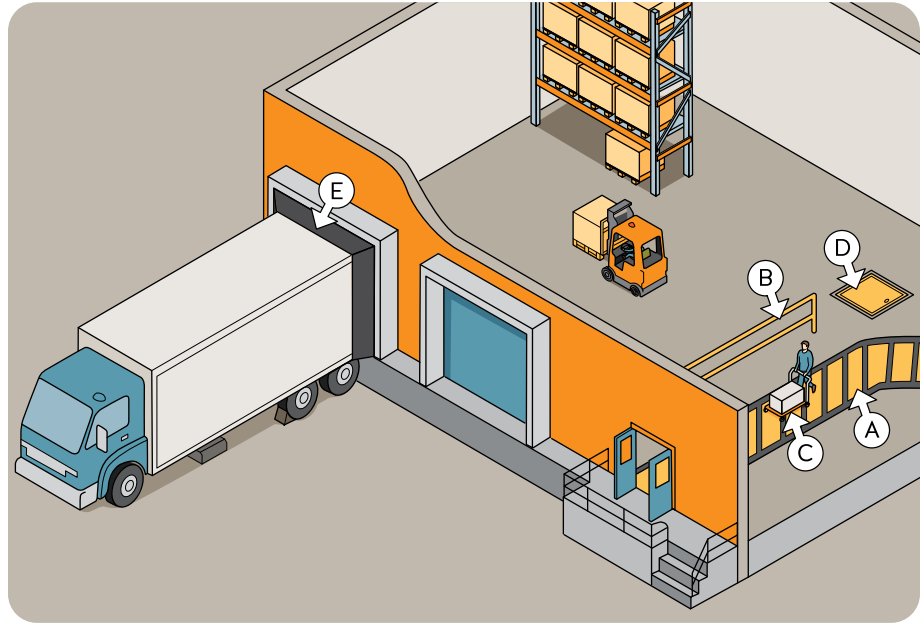
Layout or design feature and its benefits

- A. Appropriate lighting levels reveal contamination or obstacles on the floor.
- B. Grouping equipment and tasks minimizes walking distance and the need to carry items between areas. (For example, place cookers, fridges, and sinks as close together as possible. Workers shouldn't have to cross work areas to get to staff rooms or change rooms.)
- C. A drain cover that's flush with the floor eliminates a trip hazard.
- D. Anti-splash faucets and soap dispensers reduce the amount of water and soap splashing onto the floor.

About toe clearance

Toe clearance is the distance between the toe and the ground when the foot swings forward during normal walking. In other words, toe clearance is how high people lift their feet when they walk. A change in level, or an obstacle the size of a worker's toe clearance, could cause the worker to trip. The average toe clearance is between 9 and 22 mm ($\frac{3}{8}$ and $\frac{7}{8}$ in.). In general, consider any obstruction of 10 mm ($\frac{3}{8}$ in.) or higher a potential trip hazard.

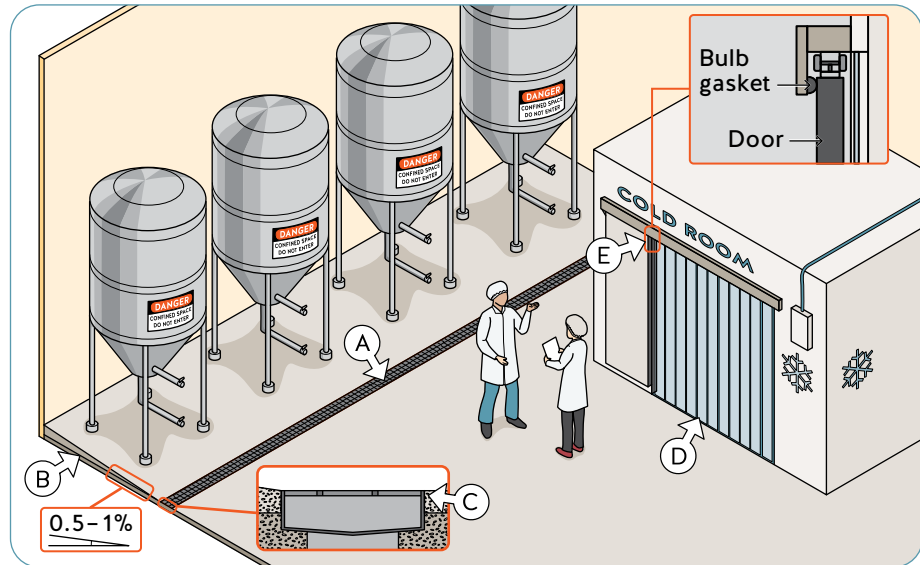
Warehouse



Layout or design feature and its benefits

- A. Planned and marked walkways and pedestrian crossings help prevent pedestrians from taking less-safe routes (e.g., those with slip and trip hazards or vehicle traffic).
- B. Barriers prevent mobile equipment from crossing walkways. This reduces the risk of distractions that may cause slips or trips, as well as the risk of collisions with pedestrians.
- C. Dolly carts minimize the need to carry loads.
- D. Distinctively coloured mouldings between different walking surfaces help prevent tripping. (Mouldings shouldn't rise more than 1 cm [$\frac{3}{8}$ in.] from floor level.)
- E. Loading docks sealed with rain covers help prevent rain and snow from entering.

Tank farm



Layout or design feature and its benefits

- A. Drainage points in areas with frequent water contamination help prevent pooling.
- B. Sloped flooring that directs water toward a drain helps prevent pooling. The floor surrounding a drainage point should be designed with a 0.5 to 1% slope toward a drain to allow water flow.
- C. Drains and grates (over a trench) that are installed flush with the floor reduce the risk of tripping.
- D. Automatic roll-up doors or plastic barriers installed in cold storage rooms help reduce the amount of air entering, condensing, freezing, and causing slip hazards at entrances.
- E. Airtight gaskets and joints on the doors or barriers of cold storage rooms prevent cold air from condensing and freezing the surrounding air and causing slip hazards.

2. Flooring

The flooring in a workplace should suit the work tasks and the contamination that occurs as a regular part of business. Whether the goal is to install a new floor or improve an existing one, knowing the basics of slip resistance and roughness can make it easier to assess flooring options.

In the Regulation

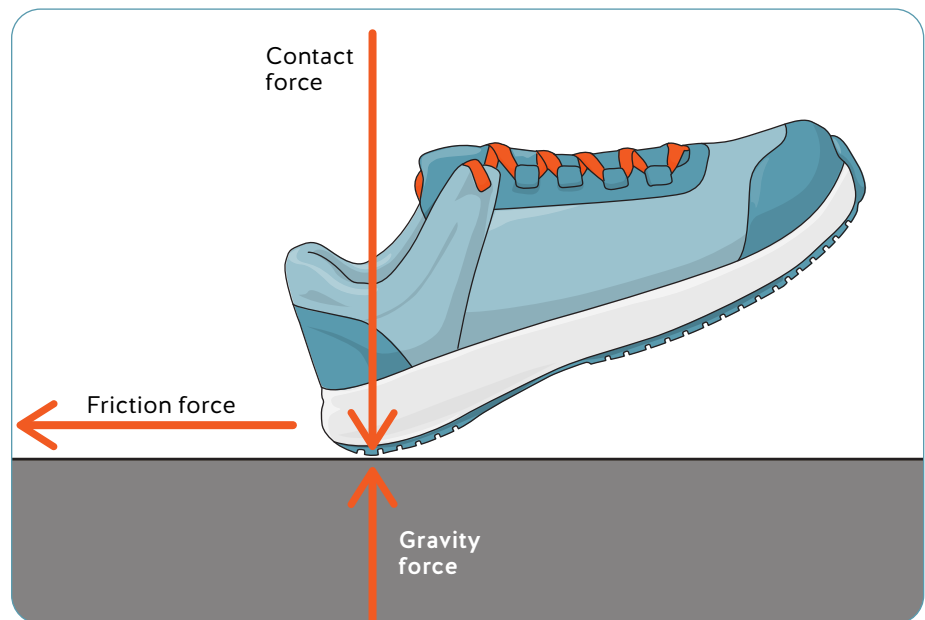
Under section 4.39(1) of the Regulation, “Floors, platforms, ramps, stairs and walkways available for use by workers must be maintained in a state of good repair and kept free of slipping and tripping hazards.”

Measuring slip resistance

The degree of slip resistance is most commonly described as a coefficient of friction (CoF). CoF tests can be conducted in-house or by a hired contractor on existing flooring. Make sure the testing method is recognized by a reputable standards organization such as the American Society for Testing and Materials (ASTM) or the American National Standards Institute (ANSI).

Coefficient of friction

CoF is the level of friction between the floor and a worker’s footwear (or bare feet at a swimming pool or yoga studio, for example). A CoF is most commonly reported on a scale from zero to one, with zero representing the lowest slip resistance, and one, the highest. An effective slip-resistant, flat floor measures at least 0.6, while a ramp measures 0.8. (Note that CoF doesn’t have a unit. As a proportion, it’s represented by a number only.)



Friction is a force that holds back the movement of a sliding object. Friction acts in the opposite direction to the way the object is sliding. In general, the higher the CoF, the higher the amount of friction between the shoe and the floor, and the safer the floor will be. Contact force is the force applied by the floor against the shoe.

CoF tests fall into dynamic and static categories, as discussed below.

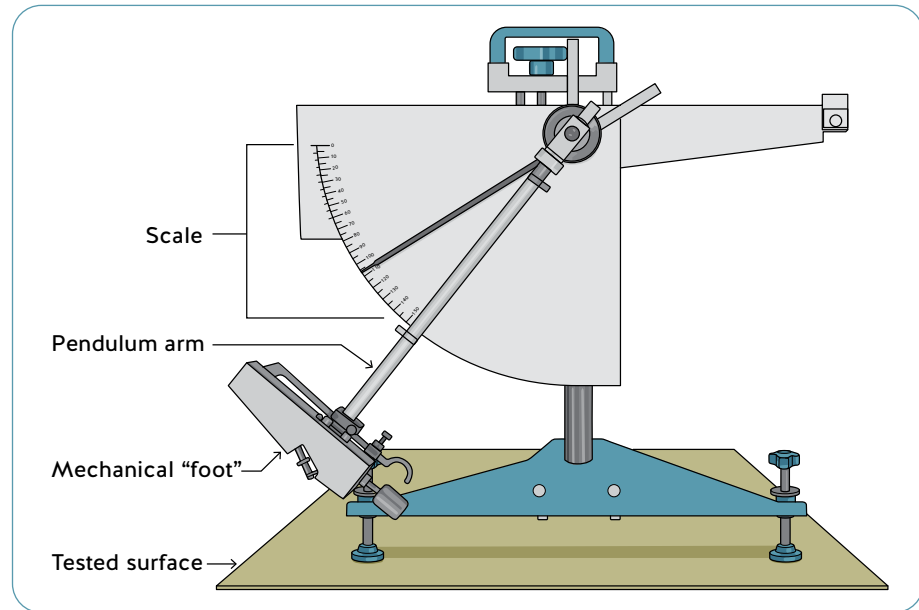
Dynamic coefficient of friction (DCoF) is measured with an object in motion. This is the preferred test because during a slip, the footwear is in motion against the floor.

Static coefficient of friction (SCoF) is measured with a still or static object and measures the force needed to make the object move.

Wet slip-resistance testing

While floor surfaces can be tested while they are wet or dry, pay close attention to the results of wet testing. That's because slips are most likely to occur in wet conditions.

Both CoF tests can be carried out on floors that are dry, wet with water, or lubricated with oils and other contaminants. Dry slip resistance isn't an indicator of wet slip resistance. In fact, the two often vary inversely, so both tests are usually necessary.



The pendulum CoF test is the most widely used pedestrian slip-resistance test method worldwide. It's designed to replicate a pedestrian heel strike, the point at which most slips occur. A swinging arm is released, and a rubber slider at one end strikes and passes along the floor. The more slippery the floor is, the higher the arm will go after striking the floor.

Floor roughness

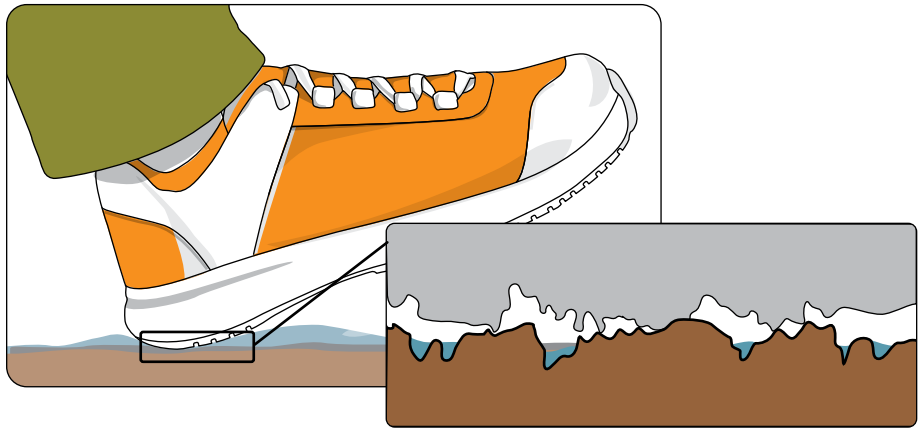
Roughness is another factor that helps determine slip resistance. Very smooth floors tend to have low slip resistance, especially when wet, as do smooth leather shoe soles.

Roughness refers to the degree to which the peaks of a rough floor break through a contaminant and contact the heel of a shoe or a foot. The thicker the contaminant, the rougher the floor needs to be to prevent slipping.

Roughness is measured in micrometres (μm) and is calculated as the average distance of several peak-to-valley measurements on the floor surface. The higher the roughness, the higher the slip resistance. A floor with a roughness measurement of more than 20 μm has a low potential for slipping. A floor with a roughness measurement of less than 10 μm has a high potential for slipping.

National Floor Safety Institute (NFSI) Certified “High-Traction” Products

The NFSI, a U.S.-based non-profit organization, evaluates and certifies flooring materials, floor-care products, and cleaning equipment for slip-resistant performance. For a list of products certified by the NFSI, visit [nfsi.org](https://www.nfsi.org).



The thicker the contaminant, the rougher the floor needs to be to prevent slipping.

There are several roughness meters on the market, and employers performing this test in-house should consult a flooring professional. Some floor types (e.g., carpet, heavily gritted epoxy, tamped concrete, or rough stone) may be too rough to measure with metering devices.

Flooring manufacturers aren't required to test their products for slip resistance or to report the test results, but they may advertise them as slip resistant anyway. If a flooring material has been tested, the results are usually published in the product's specifications. If a product hasn't been tested or the results aren't available, consider other options.

What to look for in a new floor

The ideal time to research flooring that reduces slip and trip hazards is during one of the following:

- The initial design stage for a workplace
- The planning stage for remodelling a workplace

If you make an uninformed choice, it can be expensive later in terms of both injuries and replacement costs.

When researching flooring options, consider the following:

- What type of work will take place on the floor?
- Who will use the floor?
- How much pedestrian traffic will there be?
- What sort of contamination will occur, and how often?
- What are the cleaning requirements?

Discuss the options with a flooring supplier, and request the results of wet-floor and dry-floor DCoF testing. (During this testing, the floor is wet and the shoe sole or foot is in motion against the floor.) Some manufacturers test the DCoF with an oil contaminant on the floor.

If the workplace has wet conditions, ask the flooring supplier for the following:

- Roughness measurements
- Slip-resistant options (such as abrasive coatings or texturizing) to increase the surface roughness

Flooring guide

There are dozens of flooring options, and you'll likely find more than one that will meet your needs. The following table will help you compare the options.

Type of flooring	Slip resistance			Slip-resistance treatment options							Applications	Notes
	High	Low	Low when wet	Textured finish	Slip-resistant coating	Exposed aggregate layer	Adhesive strips	Acid etching	Floor mats	Manufactured flooring profile		
Carpet	x										Corridors, offices, and places where spills are unlikely	Installed from wall to wall to prevent trip hazards. For the same reason, floor transitions should be flush to the surface.
Ceramic			x		x		x	x	x		Washrooms	Polished or highly polished tiles aren't recommended for use as flooring.
Concrete			x	x	x	x	x	x	x		Commercial and industrial facilities, warehouses, and sidewalks	Often polished or covered with a sealant to prevent absorption of liquids. However, this can reduce slip resistance significantly.
Cork			x		x		x	x	x		Light industry, small kitchens, lecture rooms, and standing mats	Often covered with a sealant to prevent absorption of liquids. However, this can reduce slip resistance significantly.

Type of flooring	Slip resistance			Slip-resistance treatment options							Applications	Notes	
	High	Low	Low when wet	Textured finish	Slip-resistant coating	Exposed aggregate layer	Adhesive strips	Acid etching	Floor mats	Manufactured flooring profile			
Epoxy			x		x	x	x			x		Commercial and industrial settings, hospitals, and clean rooms	Can be mixed with aggregate before pouring to increase slip resistance.
Fibreglass			x		x	x	x			x	x	Industrial walkways and platforms; areas where spills are unavoidable	Can be moulded into grating to improve liquid drainage and slip resistance.
Plastic (PVC)			x			x	x				x	Pool decks, changing rooms, and manufacturing facility platforms and walkways	Can be moulded into grating to improve liquid drainage and slip resistance.
Porcelain		x			x		x	x	x			Bathtubs	Not recommended for use as flooring.
Rubber			x			x					x	Ramps, stair treads, and multi-purpose rooms	Installed with a round stud pattern to assist the visually impaired.
Steel			x	x			x		x		x	Stair treads, walkways, platforms, and heavy-traffic areas; grates spanning openings in floors	Can be moulded into grating to improve liquid drainage and slip resistance.
Stone (natural)			x	x	x		x	x	x			Decorative flooring, washrooms, hallways, museums, conservatories, and offices	Slip resistance may vary depending on the type of stone and variations in the material itself. Slip resistance when wet and polished is very low.

Type of flooring	Slip resistance			Slip-resistance treatment options							Applications	Notes	
	High	Low	Low when wet	Textured finish	Slip-resistant coating	Exposed aggregate layer	Adhesive strips	Acid etching	Floor mats	Manufactured flooring profile			
Terrazzo			x		x	x	x			x		Lobbies and shopping centres	Often covered with a sealant to prevent absorption of liquids. However, this can reduce slip resistance significantly.
Tile (quarry and clay)			x		x	x	x			x		Kitchens, showers, and washrooms	Often covered with a sealant to prevent absorption of liquids. However, this can reduce slip resistance significantly.
Vinyl and linoleum			x		x		x			x		Light industrial facilities, offices, nursing homes, daycare centres, and hospital wards	Often coated to increase slip resistance.
Wood			x	x	x		x			x		Meeting halls, gyms, and offices; for indoor use only	Often covered with a sealant to prevent absorption of liquids. However, this can reduce slip resistance significantly.

Slip resistance of flooring types

The B.C. *Building Access Handbook 2014* provides general guidance on flooring types and their slip resistance, but not their CoF.

Slip resistance of floor and tread finishes

Slip resistance		
Material	Dry and unpolished	Wet
Carpet	Very good	Good
Clay tiles	Good	Poor to fair
Clay tiles, textured finish or non-slip granules	Very good	Good
Concrete	Good	Poor to fair
Concrete, textured finish or non-slip aggregate	Very good	Good
Linoleum	Good	Poor to fair
Rubber, sheet or tiles	Very good	Very poor
Sheet vinyl	Good	Poor to fair
Sheet vinyl, non-slip granules	Very good	Good
Terrazzo	Good	Poor to fair
Vinyl asbestos tiles	Good	Fair

Note: Slip resistance of very good and good is acceptable. Slip resistance of fair and poor is not acceptable. Table reproduced from *Building Access Handbook 2014* with permission from the Province of British Columbia.

Finally, and most importantly, ask a floor-safety specialist for advice about flooring options that are best suited to your workplace. Decide on the minimum slip resistance or CoF you require, and ask suppliers or manufacturers to meet it. (Remember that slip-resistant flooring usually has a CoF of 0.6 or greater.)

Improving slip resistance of an existing floor

If new flooring isn't a feasible option, consider controlling slip hazards by improving your existing floor. First, you may need to determine the slip resistance of the floor, either by hiring a contractor or doing a test in-house. (Search online for local contractors.)

Adding an abrasive to a surface is one method that flooring manufacturers and contractors use to improve slip resistance. The abrasive gives the floor surface “teeth” or increased roughness. These teeth can be very effective in wet or otherwise lubricated locations (e.g., where kitchen grease or machine oil has been spilled).

Other options for enhancing an existing floor and improving its slip resistance are described in the following sections.

Note

Floors often need to be cleaned and maintained differently after roughening. If this is the case with your floor, make sure cleaners are trained and have the necessary equipment.

Textured finishes

Some techniques to manually increase the level of surface roughness include applying textured finishes through diamond grinding, grit blasting, or concrete texturing. These treatments work on a wide range of hard surfaces, including unglazed ceramics, natural stone, and metal flooring. Always apply the treatment to a small area of flooring before treating the whole floor. (Note that some of these processes may produce dust, and the area may need to be closed off temporarily.)

Slip-resistant coatings

These are clear or coloured slip-resistant materials such as epoxies, urethanes, siloxanes, and water-based coatings that can be applied on most flooring types. Coatings need to be reapplied regularly depending on the level of traffic, how the floor is used, and the coating type.

Exposed aggregate layers

Gritty materials like silica, aluminum oxide, clear crystals, glass, or plastic can be added to sealants, paints, and varnishes and applied to a floor for added slip resistance. To be most effective, additives should be sharp, hard, and not completely submerged in the sealant. Brittle materials like sand or silica can chip away, leaving a floor slippery when wet. For this reason, select a grit additive that matches the floor use and the traffic level. Sealants with grit additives may make cleaning more difficult.

Adhesive strips

This tape has abrasive particles bonded to one side. The particles make the surface anywhere from very lightly textured to very coarse, similar to sandpaper. Suited to small areas like staircases and ramps, these strips can also be used on decks and floors to improve surface friction. Apply the strips perpendicular to the walking direction and not more than 10 cm (3¹⁵/₁₆ in.) apart. Check them regularly for peeling edges.

Note

Sometimes a diluted version of an acid etch is recommended for cleaning an etched floor. If so, you'll need to obtain and review the safety data sheet (SDS) for the acid etch product. You'll also need to provide workers with additional training and personal protective equipment as required.

Acid etches

Etching a hard floor, such as ceramic tile or natural stone, can improve its slip resistance in wet conditions. Etches use acid to score the floor surface on a microscopic level. This increases the floor's micro-roughness and makes the surface more likely to break through a fluid contaminant.

Etching is effective in entrances, in showers, on pool decks, and in kitchen dish-pit areas. It's less effective and has a limited life span in greasy areas such as kitchens. In all cases, floor etching is a short-term solution that requires regular testing to ensure it's still effective.

Floor mats

Mats can prevent slipping in contaminated areas and may reduce joint stress when standing for long periods. A mat should be heavy enough to stay in place and have bevelled edges to prevent tripping. It should also allow liquids to fall through it to prevent pooling. The mat material should have a CoF of 0.6 or greater.

Manufactured flooring profiles

Some flooring materials can be machined, forged, extruded, or moulded with a raised profile (e.g., checkered patterns on steel plates). This profile may improve slip resistance if the footwear sole interlocks with the flooring profile.

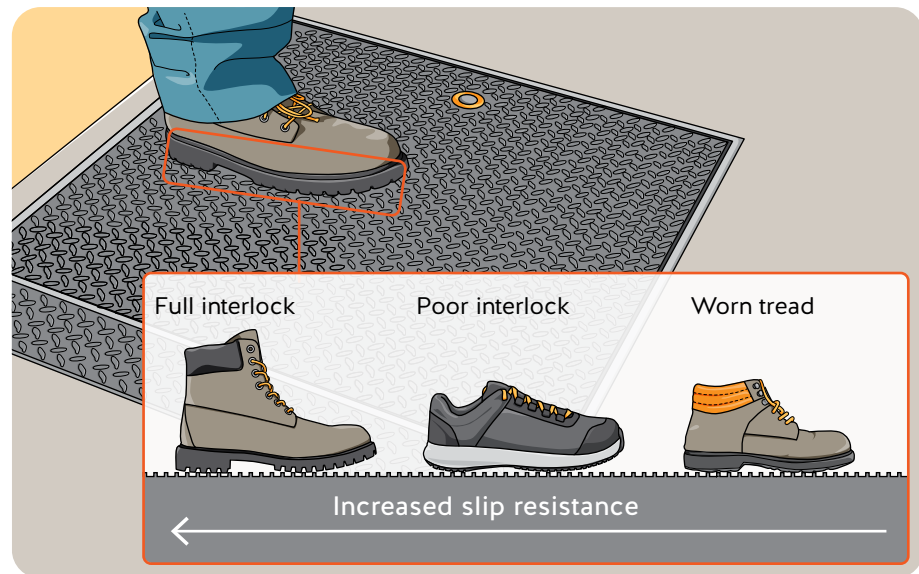
Any increase in friction created by an added profile depends heavily on the following factors:

- The pattern of the profile
- The pattern on the soles or treads of a worker's footwear
- The level of wear on the floor and the shoe sole

However, profiled surfaces can be slippery if the sole treads don't interlock with the profile. The following diagram shows several possible interactions between a shoe sole and a profiled surface. When researching profiled surfaces, ask the flooring distributor or manufacturer if their flooring profile is slip resistant and if they have CoF test results to back up their claims.

Note

“Diamond-plate” metal surfaces include embossed shapes designed to improve wet friction by interlocking with workers’ shoe treads. Although well-designed diamonds can be an improvement over flat metal, some diamonds have the effect of “bumps” and don’t result in good slip resistance. The problem may be made worse if the diamond plate *appears* to offer good friction, inspiring misplaced confidence on the part of pedestrians. This also applies to other flooring surfaces that may appear rough but are slippery when wet.



Profiled surfaces can be slippery if the sole treads don’t interlock with the profile.

Alternatively, flooring materials can be manufactured into grated flooring tiles or covers. These may be suitable options for workplaces with frequent liquid contamination. That’s because the grated flooring pattern allows for liquid drainage and improves slip resistance.

Maintenance

Floors are often damaged during their lifetimes, so regular maintenance is essential. Trips can happen when there’s a change in height in a floor of 1 cm ($\frac{3}{8}$ in.) or more. Inspect flooring regularly for the following signs of wear and tear:

- Loose or broken slabs and tiles
- Uneven walking surfaces
- Peeling or damaged carpeting
- Potholes
- Overgrown paths
- Torn carpet
- Slip-resistant paint, profiling, or tape that’s worn, smooth, or damaged

If repairs can’t be carried out immediately, place a barrier around the hazard.

With regular use, flooring may become rougher or smoother over time. As a result, the floor’s slip resistance can change. An area of floor that looks like the surrounding surface, but is more slippery when contaminated, can cause slips. That’s because of the sudden, unexpected drop in friction.

For local repairs, use a material with similar slip resistance to the surrounding floor. This helps to prevent inadvertently creating areas with lower friction. A loss of friction can occur on tile floors if broken units are replaced with differently finished tiles.

3. Contamination

Of all the factors that contribute to slips and trips, contamination is the most common. Very few slips occur on clean, dry floors.

A contaminant is any liquid or solid that ends up on the floor, such as water, oil, ice, or soap residue. Contaminants such as paper, dust, or other loose particulates may also cause a loss of friction between footwear and flooring.

Types of contaminants

Fluid

Fluid or liquid contaminants are involved in most slip accidents. The fluid causes a thin film (known as a hydrodynamic squeeze film) to form between a person's foot or footwear and the floor, usually at the heel. The film causes a hydraulic uplift (or hydroplane) that prevents proper contact between the footwear and the floor, as shown in the drawing below.



Fluid contaminants can contribute to slips by preventing proper contact between the footwear and the floor.

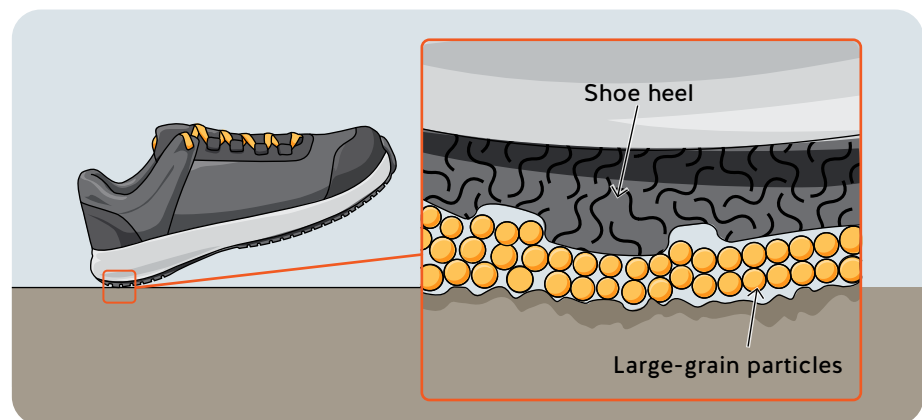
Dry

Dry contaminants (solids) reduce the friction between the footwear or foot and the floor in the following three ways.

Sliding: Fine powders clump together, stick to the shoe, and slide with a person's foot. Only a small amount of contaminant is needed for this to happen. Solids don't squeeze away from the sole when pressed (i.e., they remain under the sole). For this reason, sliding presents a high slip risk, especially on smooth floors. The risk is lower on a rougher floor.

Shearing: Medium-grained powders, such as flour, disintegrate as the sole presses them. This creates smaller particles that fall away as the slide progresses. Shearing presents a lower slip risk than sliding, but it can reduce friction enough to cause a slip.

Rolling: Sandy, gritty, large-grain particles, such as gravel, tend to roll or tumble under the foot (as shown in the drawing below). This may be enough to cause a slip.



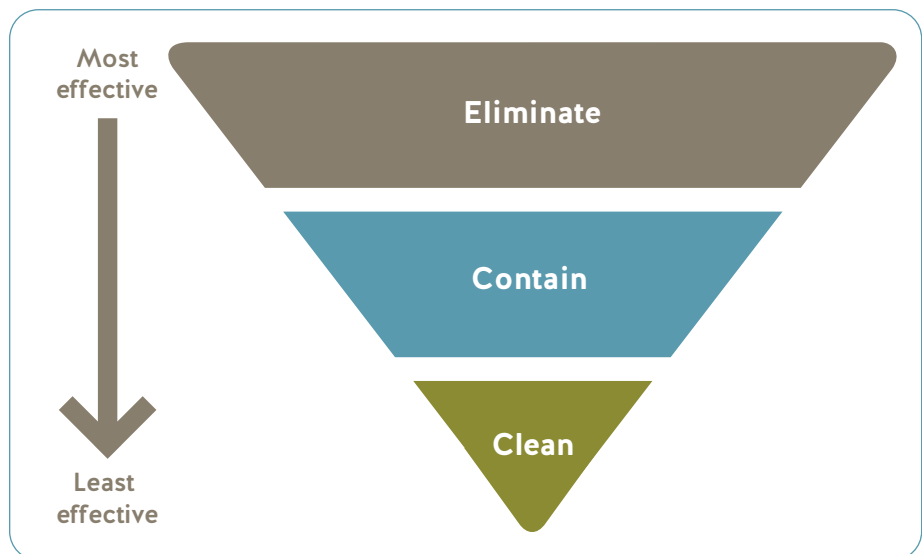
Gravel and other large-grain particles tend to roll under the foot and can cause slips.

Semi-solid

Some contaminants are combinations of solid and liquid (e.g., grapes, mushrooms, chips, and dough). Under these conditions, it's very difficult to control hazards through footwear and flooring alone, so other controls will be needed.

Managing contaminants

Workplace contamination should be addressed through a prevention hierarchy. First, eliminate contaminants if possible. Next, use options that contain or reduce the amount of contaminants. Lastly, clean up contaminants.



Prevention hierarchy for addressing contaminated floors in the workplace

Eliminate

To eliminate a contaminant, identify the source first. Is it a spill or a leak? Is it rainwater or snow? Is it from a work process or from cleaning? The solution could be simple (such as fixing a leak) or more complex (such as changing a work process or the design of equipment).

At first glance, elimination may seem time-consuming and costly. But some alternatives (such as cleaning, applying temporary fixes, and dealing with injuries and return-to-work plans) can cost more time and money.

Contain

If elimination isn't feasible, consider physical or engineered solutions that reduce the amount of contaminant reaching the floor. These solutions may include the following:

- Gaskets or valves
- Drip trays
- Catch trays under equipment such as conveyors
- Absorbent pads around equipment leaks
- Drainage points
- Water-absorbent entrance mats
- Covers for contamination such as oil splashes
- Local exhaust ventilation equipment for released particles

These solutions require maintenance, monitoring, or replacement (as needed) to keep them effective.

Clean

If contaminants can't be eliminated or contained, cleaning is the last level of control. For more information, see "Cleaning" on page 38.

Note

Don't consider all workplace areas to be permanently or frequently contaminated. Use the hierarchy of controls (eliminate, contain, and clean) to reduce the frequency and amount of contamination.

Permanently contaminated floors

In workplaces where contamination is difficult to control (such as pools, breweries, and meat-processing plants), specific design features are needed to reduce the risk of slips and trips. (For more information on design features, see page 18.) The floor should provide workers with a safe level of friction under expected conditions. This is especially important in high-risk areas such as stairways and ramps.

Flooring

High surface roughness is an important feature of a permanently contaminated floor. The rough surface has peaks that break through a contaminant and contact the heel of a shoe or foot. The floor should also have an adequate CoF. Consult with a flooring distributor, manufacturer, or flooring specialist to find the best option. Make sure to ask for the results of a wet-floor DCoF test. For more information on DCoF testing, see page 25.

Other installations suitable for permanently contaminated areas include platforms, catwalks, or mats with holes. The holes allow contaminants to drain away from a walking surface.

Drainage

Walking in pooled water causes a loss of friction between footwear and the floor and makes slipping more likely. To stop water from pooling, install drainage points in areas with frequent water contamination or where wash-down operations are performed. (Trenches are another option, especially in larger areas.) The surrounding floor should be designed with a 0.5 to 1% slope toward a drain. Install drains and grates (over a trench) flush with the floor so they don't become tripping hazards.

A clean floor versus a washed floor

To ensure that a floor's slip-resistant properties are effective, the floor should be cleaned, not washed. While a washed floor may have a buildup of soap, dirt, or spills, a clean floor is rinsed and free of buildup.

4. Cleaning

An effective cleaning routine removes contaminants and reduces the risk of slips. But a poor cleaning routine does the opposite. Improving a cleaning routine can cost very little and significantly reduce incident rates. Watch for the following signs that a floor isn't being cleaned properly:

- The floor isn't fully dry, but is in use.
- The floor has a buildup of cleaning-product residue.
- Cleaning equipment is worn out, dirty, or wrong for the job.
- Slip-resistant flooring properties are breaking down.

Cleaning ABCs

How a floor should be cleaned depends on the type of floor, the type of contaminant, and the activity in the area. Some basic recommendations are outlined below. But always consult a floor-safety specialist, the floor manufacturer, or a cleaning-equipment supplier to discuss the best products, methods, and tools for a floor.

Products

Multi-purpose cleaners aren't always best for the job.

Using the wrong cleaner, or over- or under-diluting a cleaner, is a leading cause of buildup on floors. Follow the product's instructions for dilution.

Methods

Start a cleaning session with fresh water and the right amount of cleaning product. Too much product creates slippery conditions, while too little leaves contamination on the floor. Replace the water as soon as it gets dirty, and consider the following:

- Allow a product time to act on a contaminant, especially grease. Most products work in about three to five minutes; however, organic enzyme cleaners may take longer.
- Scrub the floor, if necessary, to remove contaminants. (Check with the floor manufacturer for specific scrubbing instructions.)
- Rinse the floor. (Leftover product can become a slip hazard later if water spills on it and it is reactivated.)

Tools

Follow the supplier's care instructions to keep equipment clean and in good shape. Get creative with tools and make substitutions when they aren't performing as needed. For example, do the following:

- Use a dry mop or squeegee to remove pooling water and reduce drying time.
- Wring mops with a mechanical aid to reduce the amount of spilled water.
- Try a wet/dry vacuum to remove rinse water, or use a squeegee to direct it down a drain.
- Try a medium-bristle warehouse broom or a deck brush instead of a mop to remove residue.
- Place barriers and signs to keep workers off wet floors.

Schedule

Insufficient cleaning allows dirt and debris to build up. Too much cleaning prematurely wears down a floor's finish. The following rules of thumb can help you avoid over- or under-cleaning:

- Schedule cleaning at regular intervals.
- Clean during times when there is little to no traffic.
- Schedule deep or comprehensive cleaning outside of working hours.
- Plan how and when cleaning staff will respond to urgent spills.
- Stock a spill kit and provide spill stations so workers can clean up small spills and take action when cleaning staff aren't available.

Cleaning policy

Some workplaces use cleaning contractors, while others have in-house cleaning staff. Either way, employers should ensure the cleaning routine is preventive and doesn't create slip or trip hazards.

A cleaning policy should include the following elements:

- A description of cleaning services in case a cleaning contractor is used
- A description of the cleaning tools and products
- A schedule detailing the areas to clean, cleaning times, and how often cleaning occurs
- Safe work practices for cleaning staff that address chemical exposure, sprains and strains, and other hazards
- Performance-tracking metrics

While training in-house cleaning staff, make sure workers understand what they are being asked to do and why. Consider language barriers, and explain using simple language and pictures.

Regularly supervise cleaning staff to ensure the right tools, methods, and products are used. Involve your cleaning staff in creating a cleaning routine. These workers can give insights into the practicalities of the work, and they are more likely to follow a routine they helped develop.

These suggestions aren't limited to in-house cleaning staff. Ensure that contractors consider these recommendations as well.

Note

If hazardous products are present in a workplace and spills could occur, ensure that spill kits are equipped accordingly. Follow the cleanup recommendations listed in the safety data sheet (SDS) for each hazardous product.

Spill response protocol

Spills should be cleaned up immediately using spill kits. Spill cleanup instructions should be posted throughout the workplace. Follow these steps to ensure workers can respond to small spills:

1. Identify the areas where spills may happen and the types of contamination expected. In a bakery, for example, flour spills may happen in the production area.
2. Identify the tools needed to clean up spills. In a bakery, an intrinsically safe (e.g., non-sparking) vacuum cleaner with a HEPA filter is one option.
3. Decide how many spill response kits are needed and where to locate them. In a bakery, kits should be close to the weighing and mixing areas.
4. Document the cleaning procedure, and post it at the kit location. Include instructions for the tools. For example, the bakery should post instructions for the vacuum cleaner. Also give instructions on how to keep workers out of the contaminated area during cleaning, as well as afterwards, when the floor may be wet.

The 5S system

In the 1950s, Toyota started what has become one of the most effective housekeeping management systems in the world. The 5S system involves assessing all the items in a space, removing what's unnecessary, and organizing things logically before starting housekeeping tasks. The cycle is then repeated to ensure areas are kept according to the standard. For more information on implementing a 5S program, see page 91.

5. Housekeeping

In the workplace, housekeeping involves much more than tidying and dusting. It means putting all items (e.g., tools, materials, and personal belongings) away according to a standard and a schedule.

All staff (including cleaning staff, managers, and workers) should participate in inspections that ensure standards are met. Good housekeeping practices reduce the risk of slips and trips. They also increase levels of productivity, morale, and quality.

Housekeeping policy

It's important to keep housekeeping top of mind and accurately document all of its aspects. To do so, establish a policy detailing how housekeeping should be done in the workplace. The policy should describe standards, roles and responsibilities, and inspections.

Standards

Workers, supervisors, and managers shouldn't have to guess how to tidy and arrange a workplace. Housekeeping standards define expectations about how an area should look when a shift starts, while work is ongoing, and when a shift finishes. Establish standards by taking the following steps:

1. Get familiar with the layout of the workplace, including aisles, storage facilities, and maintenance.

2. Review the storage and movement of materials from the time they enter the workplace to when they leave.
3. Identify the best places to store individual tools, equipment, and materials. If you know an area will have overflow at times, decide where the overflow will go.
4. Designate staging areas for items that are works-in-progress or for temporary storage. Ensure these locations are clearly marked.
5. Identify all the types of waste and their sources, and decide what should be separated and where it should be stored.
6. Once all items have been assigned locations or “homes,” label the locations with the names of the items.
7. Take pictures of the work area with everything labelled and properly stored. Display the pictures where they are visible to everyone. The workplace, as it appears in the photos, is your housekeeping standard.
8. Establish a schedule for housekeeping (at the end of the day or the end of a shift, for example). Avoid “panic” cleanups. They are costly and ineffective.
9. Introduce new hires to the housekeeping standards during orientation. Emphasize the importance of following them.



Designate staging areas for items that are works-in-progress or for temporary storage. Ensure these locations are clearly marked.

In the Regulation

Section 4.41 of the Regulation states, “Refuse, spills and waste material must not be allowed to accumulate so as to constitute a hazard.”

Roles and responsibilities

Every team member should have a clear role and assigned responsibilities. These could be as simple as cleaning up a workstation at the end of a shift. Supervisors, managers, and owners should clean their own work areas. This demonstrates leadership and raises morale and participation.

Ensure responsibilities and roles are clearly communicated. One way to do this is to integrate housekeeping into job descriptions.



Every team member should have a clear housekeeping role and assigned responsibilities.

Inspections

Hold regular, scheduled housekeeping inspections (once per week is a good interval). Involve owners, supervisors, managers, and workers in these inspections to verify the standards are being met. One method is to compare the area to a photograph or diagram showing the same area cleaned to the standards. You can also use a checklist to confirm the standards are being followed.

If efforts fall short of the standards, look for barriers that prevent workers from meeting them. In many cases, equipment malfunction or poor design is the reason standards aren't met. Front-line workers are in the best position to troubleshoot and correct housekeeping issues, as they have hands-on experience.



Compare the area to a photograph or diagram showing the same area cleaned to the standards.

Note

One way to assess and make continuous improvements to housekeeping practices is with the Plan-Do-Check-Act (PDCA) method. For more information on the PDCA method, see page 88.

At least once a year, review the housekeeping standards to confirm they're effective. If they're not effective, find out why. Are new processes, equipment, or staff affecting housekeeping routines? Review the standards immediately in case of either of the following:

- Significant changes in work circumstances or conditions
- An incident



Hold regular, scheduled housekeeping inspections.

6. Environment

Environmental conditions can create or increase the risk of slips and trips. Environmental conditions include light levels, loud or unfamiliar noises, weather, humidity, condensation, vibration, and more.

Lighting

Proper lighting makes it easy for workers to see dangers and obstacles in their path. If outdoor lighting is inadequate, workers are at higher risk of taking a wrong step off a curb or tripping over a concrete parking block. Indoors, poor lighting can obscure a curled carpet edge or an electrical cord.

Measuring light

There are two common units of brightness or illuminance:

- The lux, which is the amount of light cast (lumens) on 1 square metre
- The foot-candle, or fc, which is the amount of light cast (candela) on 1 square foot

Depending on the area of the workplace, the Regulation requires the following two minimum illuminance levels:

- 22 lux (2 fc) in areas of low activity, such as parking lots, building exteriors, outside areas, and basement areas housing machinery, but which are not regular task areas
- 54 lux (5 fc) in areas of high activity, such as frequently used walkways and building entry and exit points

Be aware that these are the minimum levels required. A workplace may require more illuminance depending on the work task. With proper lighting, features on a path or flaws in flooring should be clearly visible to workers without having to strain their eyes.

To check the light levels in a workplace, hire a contractor or carry out testing in-house using a light meter. With staff in their normal working positions, use the meter to measure the average illuminance throughout the workplace. Then compare the results to the minimum levels required under the Regulation. Also check the workplace for shadows, especially over work areas and on stairways. Ask workers if they have eye strain and if they have to squint to see.

Correcting low light

If light levels are too low, try the following improvements:

- Add light fixtures.
- Reposition light fixtures to the side or in front of workers. Avoid lighting from behind.
- Paint walls and ceilings white or a light colour that reflects light.
- Consider installations that bring in natural light, such as skylights or windows.

For maximum illuminance, clean light bulbs and fixtures regularly to keep dust and dirt from accumulating. If possible, install fixtures with open tops so that dust doesn't settle.

Replace light bulbs as soon as they start to dim.

Correcting glare

Glare occurs when there's too much light coming from a light source. It can also occur when light is directed at a person's eyes from a reflective surface such as a shiny floor or metal equipment. Glare is annoying and uncomfortable, and it lowers a person's ability to notice hazards.

Here are a few ways to correct glare:

- Replace a large, high-intensity light fixture with several smaller, low-intensity fixtures.
- Install fixtures that diffuse light (i.e., spread light over a wider area).
- Cover bare bulbs with louvres, lenses, or other devices that control light.
- Cover reflective surfaces with matte paint or, if a floor is causing the reflection, a floor mat.

If glare comes from the outdoors, use window coverings such as blinds.

Using contrast

Contrast is the difference in brightness or colour that makes objects distinguishable from their background. Poor contrast can mask details like edges and turn obstacles into hazards. Workplace areas that should have contrasting colours are as follows:

- The edges of steps on stairs (i.e., nosing)
- The edges of loading docks and the dock plate
- The edges of platforms and ramps, and other similar changes in level

- Transition areas between two types of flooring
- Covers on electrical cords
- Raised door frames
- Equipment outriggers or building column base plates with raised parts
- Cracks in flooring that result in changes in level (e.g., sidewalk cracks)



Highlighting obstacles with contrasting colours reduces the potential for trips in the workplace.

Weather

Rain, snow, ice, leaves, mud, and other weather-related contaminants can create hazards indoors and out. Know the proper control measures for places like loading docks. And monitor parking lots, walkways, stairs, and other high-traffic areas for weather-related hazards.

Snow and ice

In B.C., injuries stemming from slips and trips are 10% higher in January, in part because of the winter weather. Shovelling and salting or sanding are the traditional controls for ice and snow. These controls fall into two categories:

- **De-icing** is the mechanical removal of snow, ice, or frost.
- **Anti-icing** is the application of chemicals such as salt, magnesium chloride, or calcium chloride. These chemicals delay ice formation and prevent ice from adhering.

Note

Salt degrades concrete and metal, and it may harm animals and plants. Environmentally friendly anti-icers include pickle brine and beet juice. Research online for more information on their use and whether they are suitable for your workplace. Sand and other grits are commonly used to improve friction; however, they have no anti-icing properties. Other friction enhancers include ashes, non-clumping cat litter, and coffee grounds.

Anti-icing agents (also known as anti-icers) should be used as an aid to mechanical removal after shovelling and after snowfall has ended. Anti-icers melt snow and ice to the surface and allow the final layer to be removed with a shovel or broom.

Most workplaces hire contractors to remove snow and ice. They typically also have small, in-house teams to perform small de-icing jobs such as shovelling and anti-icing. Either way, be proactive and plan ahead by doing a walk-through with the contractor and the in-house team. On the walk-through, do the following:

- Decide what tools are required for de-icing. A large area may require heavy equipment, while small spaces require hand tools.
- Decide where tools and snow will be stored. Parking lots may have to be rearranged to accommodate snow piles and heavy equipment.
- Determine where de-icing and anti-icing agents should be applied to ensure pedestrians, vehicles, forklifts, and trolleys have ice-free routes.
- Set a schedule for de-icing and anti-icing applications. (Anti-icers should be applied between snowfalls.)

Don't default to last year's plan, as layouts may have changed.

If contractors do the work, make sure they provide the following:

- The name of the anti-icing chemical they apply and instructions for its use.
- An emergency contact, and their response time, in case of an unexpected snowfall. (An in-house team may need to be trained in de-icing and anti-icing for emergencies.)

Communication during inclement weather

During the winter months, everyone in a workplace should be aware of current weather conditions, as well as the forecast for the next day. Set up a winter weather communication board and post the forecast on it. Remind managers and supervisors to share the information with workers in the field. A communication board should also include the following:

- A map of anti-icer (e.g., salt) storage locations
- A map of the safest walkways, in case snow removal and anti-icers aren't being applied everywhere
- The name and contact details of the person to notify should workers come across slippery conditions in the parking lot or at building entrances

Assign someone to check the conditions in parking lots and other ice-prone areas regularly. Have that person notify the contractor and the in-house team of any hazards.

Note

When a worker's feet get too cold, they lose sensation, and the worker's ability to detect a loss of balance decreases. Wear warm, dry footwear to reduce the risk of falling.

Remember that not everyone is familiar with Canadian winters. Make sure workers understand the hazards posed by snow and ice. And discuss the following topics during worker orientation:

- Appropriate footwear (e.g., boots)
- How to “penguin walk” over ice (i.e., a flat-footed, slightly bent shuffle with arms at your sides)
- The importance of keeping your hands free (e.g., not using a cellphone) and out of your pockets when walking on icy areas
- De-icing and anti-icing products and how they work
- The importance of checking the weather report before leaving for work and of preparing for the conditions

Snow, rain, and dust indoors

In workplaces such as loading docks, trailer yards, and cargo areas, workers and equipment move between indoors and outdoors. This makes it easy for rain, snow, and dust to contaminate indoor walking surfaces. To control the hazard, minimize the opportunities for these contaminants to enter. This involves doing the following:

- Completely seal loading docks by installing rain covers on the outside. With a trailer in place and the dock door open, examine the perimeter of the trailer and dock leveller for gaps. (Look for daylight.)
- Keep loading-dock doors closed when there's no trailer in place.

Cold storage

Cold storage facilities commonly found in restaurants, food-processing plants, and food warehouses have unique climates. These climates should be separated from their surroundings to prevent condensation and ice formation. This involves doing the following:

- Ensure the cold storage room is airtight.
- Install automatic roll-up doors or plastic barriers to reduce air getting in at entrances.
- Install a dehumidifier in the cold storage room.
- Inspect the cold storage area and repair any leaks immediately. If ice or liquid buildups are found, remove them immediately and fix the cause.
- Post a “Keep Closed” sign at the doorway.

In the Regulation

Section 8.4 of the Regulation states, “If an evaluation of workplace conditions is required to determine appropriate personal protective equipment, the evaluation, where practicable, must be done in consultation with the joint committee or the worker health and safety representative, as applicable, and with the worker who will use the equipment.”

7. Footwear

In B.C., employers and workers each have a role in determining the following:


- Whether slip-resistant footwear is necessary in a workplace
- Guidelines for wearing it

Key to these decisions is understanding the following:

- How slip-resistant footwear is marketed, and its role in preventing slips and trips
- How footwear choices are influenced mainly by the flooring and the types of contaminants in the workplace

Safety footwear

Be aware that not all “safety” footwear is slip resistant. Most safety footwear has puncture and impact protection but isn’t slip resistant. Suppliers use a variety of terms to describe products, including slip resistant, slip resisting, anti-slip, and improved grip performance. True slip-resistant footwear has a higher CoF between the floor and the sole of the shoe than other footwear. If the footwear is labelled as slip resistant, ensure the CoF test results are provided. If they aren’t, the footwear may not be slip resistant.



Slip-resisting results

This footwear has been tested in accordance with the slip-resisting requirements of CSA Z195.

	Heel	Flat
Dry quarry tile	1.09 CoF	1.16 CoF
Wet quarry tile	0.56 CoF	0.70 CoF
Wet stainless steel	0.41 CoF	0.52 CoF

Seek the advice of the footwear manufacturer regarding appropriate application.
Tested at XYZ Laboratory on 2020-04-04

Look for slip-resistance test results on product inserts and packaging. Source: Figure 24, CSA Z195:14 (R2019) Protective footwear. © 2014 Canadian Standards Association.

Note

Safety footwear identified with a green patch likely has sole and toe protection. According to *CSA Standard Z195:14 (R2019) Protective footwear, “slip-resisting” or “slip-resistant” footwear must include friction (slip-resistance) test results on the packaging, a label, or a product information sheet.*

Choosing footwear

There are several considerations when choosing slip-resistant footwear. But the type of floor in the workplace and the contaminants present are the most important.

Start by doing a workplace walk-through and identifying the following:

- The types of surfaces workers are expected to walk on (e.g., tile, loose gravel, or polished concrete).
- Potential spills and contaminants (e.g., water, oil, or wood dust).
- Surface temperature and weather conditions (e.g., ice patches inside freezers). Lower temperatures may harden the sole material and reduce slip resistance.
- Other features the footwear may need (e.g., toe caps, ankle support, midsole, food-safe, or anti-static).
- The size range needed to cover all at-risk staff.

As noted in the hierarchy of controls on page 14, slip-resistant footwear is part of the least effective category of controls and isn't a solution to all slip and trip hazards. Control hazards at the source as much as possible by controlling contamination, cleaning, and implementing safe work practices.

Next, contact a reputable footwear distributor or manufacturer and ask for a list of suitable options based on the factors identified in the walk-through. Remember that while footwear is often marketed as slip resistant, it may not have been tested. Look for slip-resistance test results on product inserts and packaging. If test results aren't easily available, ask whether the footwear has been tested.

Take the best option, or options, to the workplace and have at least one worker test it on the job. Ask whether the shoes feel slippery underfoot, and seek other types of feedback. Is the footwear comfortable? How is the fit? Would they wear it? Consult with other staff members.

Workers may not wear footwear if it is uncomfortable or impractical, no matter how effective it is. Shoes with visual appeal are also more likely to be used.

Lastly, compile a list of approved footwear (there may be more than one type). Include the list in a workplace footwear policy and in the orientation package for new workers. It's also a good idea to discuss the footwear requirement during the hiring process, as some applicants may not agree or may be unable to comply.

In the Regulation

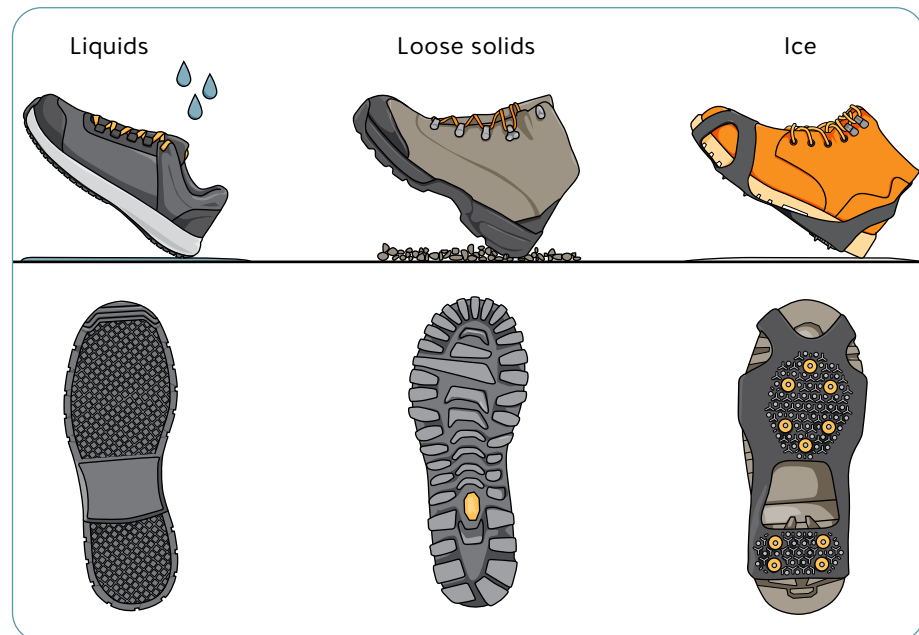
Section 8.23 of the Regulation states that if a workplace has slippery surfaces, appropriate non-slip footwear must be worn.

Soles

The following table and image describe which shoe sole features perform the best in contaminated conditions.

Most effective sole features of slip-resistant footwear by contaminant

Type of floor contaminant	Most effective sole features
Liquids	A flexible, flat, soft sole with a close-packed, well-defined tread pattern in a soft material and deep cleats
Loose solids	A flexible sole with a well-defined tread pattern with wide channels and deep cleats
Ice	Spikes or studs that will “bite” into the ice (but may be slippery on other hard surfaces)



Keep in mind that cold temperatures can make shoe sole materials harder and less slip resistant.

Responsibility for footwear

The Regulation divides the responsibility for safe footwear between employers and workers as follows:

- Employers, in consultation with workers and safety representatives, must evaluate the workplace conditions and prescribe the appropriate footwear.
- Workers must provide (purchase) the prescribed footwear.

In the Regulation



A pair of caulked boots

Under section 8.23(2) of the Regulation, “Caulked or other equally effective footwear must be worn by workers who are required to walk on logs, poles, pilings or other round timbers.”

Employers are also responsible for making sure safety footwear is properly worn, cleaned, inspected, maintained, and stored. Some tips are listed below:

- Implement a workplace footwear policy, including a list of approved footwear types and models. Ensure all workers are aware of the requirements.
- Enforce the footwear policy.
- Inspect workers’ footwear regularly for the correct type and size. Also watch for damage to the sole or heel, and for contaminant buildup in the treads or cleats. (If the treads or cleats constantly clog up, the design may be unsuitable for the work environment.)

A sample footwear inspection form appears on page 94.



Inspect workers’ footwear regularly for the correct type and size.

Shoe covers

Workers wear disposable shoe covers in many controlled or hygienic environments (such as clean rooms, laboratories, and food-processing facilities). The main purpose of shoe covers is to reduce foot-borne contamination. Employers should ensure that the shoe covers don’t pose a slip or trip hazard.

When choosing covers, follow the same footwear selection steps outlined earlier in the “Choosing footwear” section (see page 51). Ensure the covers have been tested for slip resistance.

Keep in mind that the best way to prevent slips in a clean room is to have a slip-resistant floor with no contaminants on it.

Shoes for visitors and temporary staff

It's common for visitors and temporary staff to access areas in a workplace where there might be slip and trip or other hazards. Employers are responsible for ensuring that the footwear used by visitors and temporary staff protects them from slip and trip risks. If workers see visitors wearing slip-resistant footwear as they walk through hazardous areas, it reinforces the message that safety footwear isn't optional.

To include visitors and staff in a footwear program, do the following:

- Define what type of footwear won't be allowed in the workplace. High heels, open toes, and sandals are some examples.
- Inform visitors about the footwear requirements before they arrive.
- Ensure that shoe covers or spare footwear is available in a range of sizes for your visitors and temporary staff.

8. Work procedures and practices

Workplaces can be physically designed to reduce the risk of slips and trips. In a similar way, work procedures and practices can be crafted to reduce the risk.

Procedures

A work procedure is a series of specific steps that guide a worker through a task from start to finish. It may be general or specific, depending on the type and complexity of the task. When developing work procedures, make sure to build in ways to discourage risky behaviours that contribute to slips and trips.

Reduce rushing

Productivity can drive costs down and make business more competitive. But use caution when rewarding workers for achieving higher production rates. Workers may walk faster or even run trying to beat a rate. Be aware of this, and evaluate the reason behind a rate increase, as slip and trip risks may also be higher. In fact, the resulting injuries may cancel out any increase in productivity. Instead, **create procedures describing how to increase rates of work without rushing.** Apart from safety hazards, rushing may also negatively impact the quality of goods and services the company provides.

Avoid carrying loads on stairs

A person's arms are very important for avoiding falls and for preventing injuries if a fall occurs. To prevent falls, people use their arms to grasp handrails and to counterbalance the movement of the body after a loss of balance. To prevent injuries from a fall,

people use their arms to cushion the blow when landing and to avoid or reduce impact to the head and torso. For these reasons, it's very important to keep the arms as free as possible during work tasks.

Avoid carrying loads and boxes as much as possible, especially in high-risk environments (e.g., stairs). Carrying a load can prevent workers from successfully grasping handrails or using their arms to protect themselves after losing their balance. Workers should hold handrails while using stairs. This will help with controlling balance and avoiding falls. **Make sure work procedures describe safe ways to carry and move things around.** For example, direct workers to use an elevator, a carrying bag, or equipment such as a forklift or trolley.



Workers should hold handrails while using stairs.

Reduce clutter

Housekeeping order is maintained, not achieved. Cleaning and organization should be done regularly during the workday, as well as at the end of each shift. Integrating housekeeping into jobs can help ensure this is done. A good housekeeping program identifies and assigns responsibilities for the following:

- Day-to-day cleanup
- Waste disposal
- Removal of unused materials
- Inspection to ensure cleanup is complete

Practices

Practices are written methods outlining in a general way how to perform a task. Practices differ from procedures in that the former are rules that govern how (or the *manner* in which) a workplace approaches tasks and processes. For example, “No running in the workplace” and “Eat only in the break room” are practices.

People may adopt different practices depending on their perception of risk. Because perception of risk varies, safe practices aren’t arrived at or agreed to naturally. Employers should establish, communicate, and model safe practices, and set up the work environment to foster them.

Safe practices won’t be effective if risk-control measures aren’t applied first. For example, encouraging a worker to walk, not run, through a water spill isn’t the most effective way to reduce the risk of slipping.

Here are some safe practices to communicate to workers:

- Don’t carry anything in your arms that blocks your vision.
- Use a cart or a dolly when moving loads.
- Focus when walking. Don’t be distracted by things like cellphones.
- Pay attention to signs.
- Use designated paths instead of shortcuts.
- Walk. Don’t run.
- Slow down.
- Use handrails.
- Report spills.
- Clean up small spills.
- Pick up trash.

Workers may have language barriers. So it can be helpful to explain safe practices using simple phrases, pictures, or demonstrations. If possible, translate the list of safe practices into the languages your workers understand.

Providing feedback to workers

Defining and communicating safe practices are only two parts of the puzzle. Employers should also provide feedback on practices to workers as often as possible. This means giving positive feedback for safe practices and constructive feedback for unsafe practices.

Positive feedback, or noting a safe practice, yields better results than reprimanding an unsafe practice. Give feedback in a way that demonstrates an interest in workers’ well-being. There are very few

instances in which workers engage in unsafe practices because they want to break the rules. (For those cases, have a disciplinary process in place to handle negligence.)

Supervisors should record each time they provide feedback on safe and unsafe practices. This ensures there is feedback and reveals what practices are observed most frequently. Workplaces with a high staff turnover may need to issue feedback more often as new workers learn the rules.

What are human performance factors?

The International Civil Aviation Organization defines human performance as “the human capabilities and limitations which have an impact on the safety and efficiency of operations.”

9. Human performance

Human performance factors may play a role in increasing or decreasing the risk of slips or trips. Employers should be aware of the factors listed below and how they can affect the risk of slips or trips. They should also ensure their workers identify and report to their supervisor any health or medical conditions that may increase the risk of slips or trips.

Human performance factors that may influence workers’ risk of slips or trips include the following.

Eyesight

Vision is an important factor in regulating gait (i.e., how people walk) and seeing hazards in the environment. Poor vision can lead to gait disturbance and loss of balance.

Perception

When workers *perceive* that a walking surface is slippery, they adjust their gait and are less likely to slip. However, not all workers perceive slipperiness, or they may not perceive it the same way. As a result, some workers are less likely to adjust their gait in time to prevent a slip.

Fatigue

Tiredness (as experienced by shift workers, for example) can affect concentration and attention.

Medications

Drugs prescribed for a range of common health conditions can cause drowsiness, dizziness, unsteadiness, and/or blurred vision.

Substance use

Alcohol and drugs affect coordination and balance.

Optimizing human performance

To optimize human performance, encourage workers to do the following:

- Have their vision tested regularly by an eye-care professional.
- Use any required prescription eyewear, such as glasses, contact lenses, or sunglasses.
- Exercise regularly to ensure strength, flexibility, and coordination.

Employers can provide stretch breaks and periods for workers to warm up before starting work. Some workplaces may opt to introduce in-house health programs such as screenings for medical conditions and tests for hearing and vision.

Investigating slips, trips, and falls

Note

Employers must follow the incident investigation and reporting requirements described in the *Workers Compensation Act*. For more information, see the “Incident investigations” page on worksafebc.com.

Employers are responsible for investigating incidents that happen in their workplaces, including slips, trips, and falls. When a worker falls, a number of contributing factors are usually involved. An employer incident investigation identifies the most relevant factors and helps prevent future incidents.

How to approach investigations

Be consistent

It’s important to thoroughly investigate all incidents that result in an injury, including slips and trips that lead to falls. This helps ensure that hazards are identified, risks are assessed, controls are put in place, and trends are identified. Using a hazard identification checklist, such as the sample on page 75, can promote consistency across investigations of slip and trip incidents.

Provide care and keep records

If a fall occurs, first ensure the injured worker receives prompt first aid and medical treatment. Then, immediately record the following details from the place of the incident:

- Weather conditions
- Light level
- Noise level
- Contaminants on the walking surface
- Obstacles on the walking surface
- Flooring type
- Flooring condition (cracks, peeling, or other degradation)
- Flooring changes (levels or types)
- Footwear type (make and model)
- Footwear condition
- Task the worker was performing

Slips and trips are multi-faceted

Many slip incidents occurred among workers at the entrance to a workplace. The business owner thought the tile floor was to blame and replaced it with slip-resistant rubber. He was surprised when the problem continued. Eventually, he considered contamination. (Employees were bringing in water on their shoes.) Only then was the business owner able to control the hazard with an entrance mat that dried workers' footwear.

Consider all the factors

Some categories of contributing factors may be more relevant than others. (For example, contaminants and cleaning play a role in more incidents than environmental conditions.) For this reason, employers may inadvertently focus on one category and overlook the others when investigating the cause of a slip or trip. This is especially true if one category is easier to remedy. Be sure to consider all the categories equally. Otherwise, slips or trips may continue despite preventive measures that have been put in place.

Near misses

A near miss is when an incident almost happens (e.g., when someone stumbles or slips but there's no fall and no injury). Near misses should always be reported and recorded. That's because they provide valuable information about conditions that may cause a serious fall in the future.

Reporting a near-miss event doesn't need to be complicated. It may be enough to summarize what happened — along with where, when, and how it occurred — and to conduct an inspection of the area. These records will help you to determine trends. They'll also help you identify the risks that are most serious and should be dealt with first. For more information on near-miss reporting, see the "Near-miss report form" on page 97.

Leveraging an existing occupational health and safety program

Most employers in B.C. already have an occupational health and safety (OHS) program. In many cases, an existing program can be modified to address slip and trip prevention.

The following sections include some samples that show how employers could incorporate slip and trip risk controls into their existing OHS programs. Every workplace has different slip and trip hazards, so the samples are meant as starting points for employers to customize for use in their operations. The samples were written with small employers in mind.

What is an OHS program?

An OHS program is a plan of action to prevent injuries and illness at work. It's required by law in most Canadian jurisdictions, including B.C. OHS programs and safety management systems can help employers meet legal requirements and create safe and healthy workplaces. The number of workers in a workplace and the risk of injury in an industry determine how formal the program needs to be.

Roles and responsibilities

List the tasks assigned to your staff relating to housekeeping, footwear inspections, winter preparations, cleaning, and more.

Sample roles and responsibilities plan

Process	Owner	Responsibilities
Housekeeping	Supervisor 1	<ul style="list-style-type: none"> Set the housekeeping standards for work areas. Check that the housekeeping standards are being met on a weekly basis.
Footwear inspection	Supervisor 2	<ul style="list-style-type: none"> Be the point of contact with the footwear supplier. Determine footwear requirements and coordinate footwear trials. Do weekly footwear inspections.
Winter preparation	Supervisor 3	<ul style="list-style-type: none"> Be the point of contact with the snow-removal contractor. Communicate weather alerts to staff. Inspect the parking lot and exterior walkways for ice and snow.
Cleaning	Supervisor 4	<ul style="list-style-type: none"> Be the point of contact for cleaning contractors and cleaning staff. Review cleaning procedures and confirm the cleaning routine is followed. Train staff in how to report and clean up spills. Ensure spill kits and cleanup supplies are sufficient and available to workers.
General	All supervisors	<ul style="list-style-type: none"> Provide feedback to staff on safe and unsafe work practices. Inspect work areas for slip and trip hazards and fix them. Monitor housekeeping and provide feedback to workers.
	All staff	<ul style="list-style-type: none"> Keep individual work areas well arranged and meeting housekeeping standards. Follow safe work practices. Report and clean up spills. Wear the prescribed footwear.

Workplace floor-cleaning routine

List the cleaning contractor's name, its worker-training programs, performance-tracking metrics, the workplace-cleaning frequency, and the products used. This routine can also be used for in-house cleaning staff. For more information, see "Cleaning" on page 38.

Sample floor-cleaning routine

Contractor information

Cleaning contractor: Safe Cleaners Inc.

Contact: John Smith, cell 604.555.5555, office 604.555.5555

Contractor training list

All training is to be done during new-hire orientation and then annually.

Training topics should include the following:

- Hazardous products in the workplace
- Workplace layout and pedestrian safety
- Emergency plan
- Spill response plan
- Safe work practices for scrubbing machines
- Safe work practices for working alone

Contractor performance metrics

Metric	Target
Orientation and annual training compliance rate	100%
Cleaning-routine compliance rate	100%
Unsafe practices observed in the workplace	0%
Housekeeping compliance scores for cleaning-equipment storage rooms	100%

Note: The cleaning contractor's manager will send a metrics report every month with the results and action items.

Cleaning routine and methods

Location	Frequency	Method
Office area	<ul style="list-style-type: none"> • Daily cleaning (7 a.m.) • Deep cleaning every first Monday of the month 	<p>Daily:</p> <ul style="list-style-type: none"> • Pick up trash and vacuum carpets. <p>Monthly:</p> <ul style="list-style-type: none"> • Wash carpets using a scrubbing machine. • Cleaning detergent: green multi-cleaner, 30 mL (1 oz.) per litre (4 cups) of water.
Production floor	<ul style="list-style-type: none"> • Twice-a-day cleaning: morning (8 a.m.) and evening (6 p.m.) • Deep cleaning every second Monday of the month 	<p>Twice a day:</p> <ul style="list-style-type: none"> • Pick up dust using a dusting mop, wash floors using a string mop, and rinse with water and a clean mop. • Cleaning detergent: yellow multi-cleaner, 60 mL (2 oz.) per litre (4 cups) of water. <p>Monthly:</p> <ul style="list-style-type: none"> • Scrub floors using a scrubbing machine. • Cleaning detergent: scrubber multi-cleaner, 30 mL (1 oz.) per litre (4 cups) of water.
Storage areas	<ul style="list-style-type: none"> • Twice-a-day cleaning: morning (9 a.m.) and evening (7 p.m.) • Deep cleaning every third Monday of the month 	<p>Twice a day:</p> <ul style="list-style-type: none"> • Pick up dust using a dusting mop, wash floors using a string mop, and rinse with water and a clean mop. • Cleaning detergent: white multi-cleaner, 30 mL (1 oz.) per litre (4 cups) of water. <p>Monthly:</p> <ul style="list-style-type: none"> • Scrub floors using a scrubbing machine. • Cleaning detergent: scrubber multi-cleaner, 30 mL (1 oz.) per litre (4 cups) of water.

Housekeeping policy

Describe housekeeping in the workplace, including standards and inspection plans.
For more information, see “Housekeeping” on page 41.

Sample housekeeping policy

Location	Housekeeping standards	Housekeeping inspection plan
Office area	<ul style="list-style-type: none">• Extension cords are safely secured.• All aisles are clear of obstacles.• All floors are clear of spills.	Office area housekeeping standards will be inspected every Friday. The report will be reviewed with the area supervisor and the joint health and safety committee.
Production floor	<ul style="list-style-type: none">• All tools are placed in their designated locations.• All walkways are clear of obstacles.• All floors are clear of spills.• All waste is placed in the designated bins.	Production floor housekeeping standards will be inspected every Wednesday. The report will be reviewed with the area supervisor and the joint health and safety committee.
Storage areas	<ul style="list-style-type: none">• All tools are placed in their designated locations.• All walkways are clear of obstacles.• All floors are clear of spills.• All waste is placed in the designated bins.	Housekeeping standards for storage areas will be inspected every Wednesday. The report will be reviewed with the area supervisor and the joint health and safety committee.

Footwear policy

Describe the footwear requirements in the workplace, including features, care recommendations, and inspections. For more information, see “Footwear” on page 50.

Sample footwear policy

Location	Footwear required	Care and inspection plan
Office area	<ul style="list-style-type: none"> Closed-toe footwear. 	<ul style="list-style-type: none"> Not applicable.
Production floor	<ul style="list-style-type: none"> Puncture- and impact-protection footwear. CSA green triangle marking. Slip resistant with a minimum coefficient of friction in wet floor conditions of 0.5. 	<ul style="list-style-type: none"> All production floor and storage area staff should clean the soles of their footwear at least once a week or when the sole treads clog up. Footwear should be replaced if any worn-down area on the sole is larger than the flat end of a AA battery (about 1.5 cm or ½ in.). The soles, condition, and size of footwear will be inspected once a month. During the morning huddle, managers should confirm that all workers are using safety footwear.
Storage areas	<ul style="list-style-type: none"> Slip resistant with a minimum coefficient of friction in wet floor conditions of 0.5. 	
Exterior areas	<ul style="list-style-type: none"> Puncture- and impact-protection footwear. CSA green triangle marking. Slip resistant with a minimum coefficient of friction in wet conditions of 0.5. In case of snow or ice, all staff must wear ice cleats. 	

Workplace practices

List the workplace practices. Practices are the rules that govern how (or the *manner* in which) a workplace approaches tasks and processes. For more information, see “Work procedures and practices” on page 54.

Sample workplace practices list

- No cellphone use on the production floor.
- Don't take shortcuts. Use designated pathways.
- Walk. Don't run.
- Use handrails.
- Slow down and be cautious on uneven surfaces, in cluttered areas, and on wet floors.
- Report spills and clean up small spills.

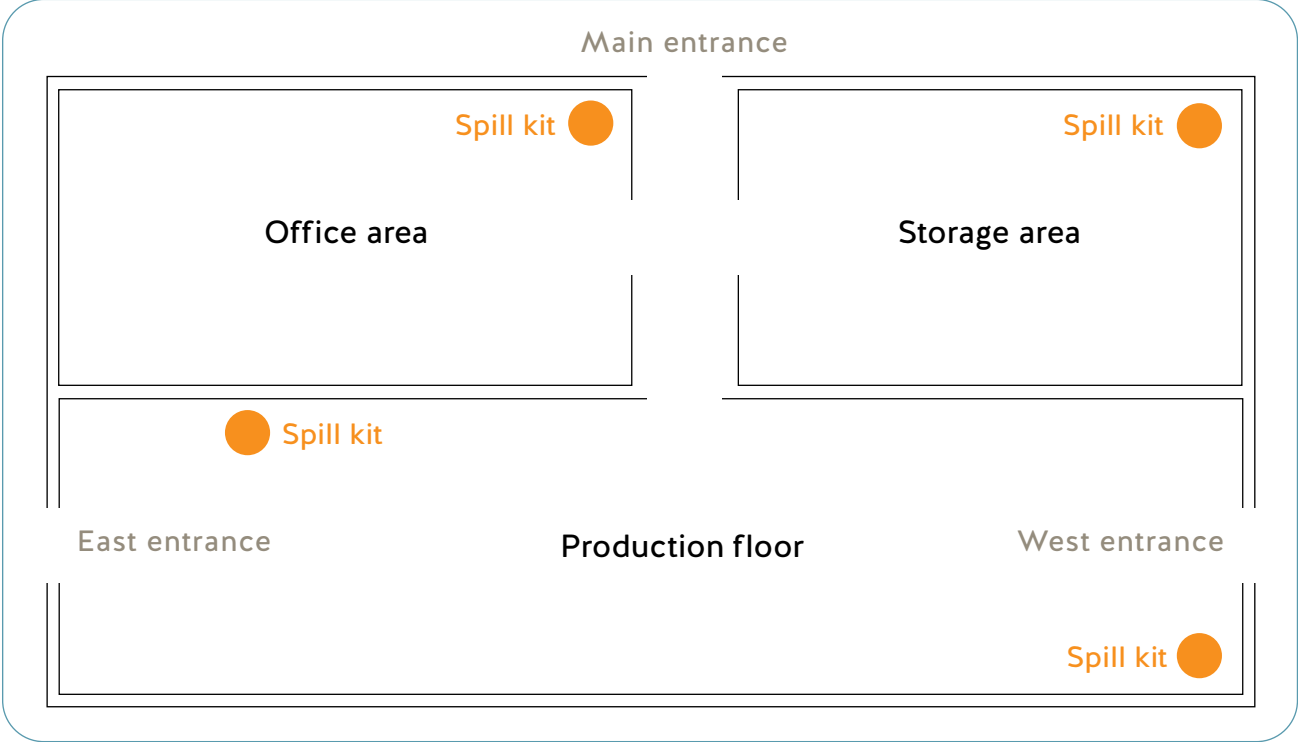
Spill response protocol

List the steps to take when a spill happens. Include the locations of spill response kits, instructions for notifying cleaning staff, and how to prevent workers from accessing contaminated areas. For more information, see “Cleaning ABCs” on page 39.

Sample spill response protocol

Spill type & size	Who to contact	What to do
Minor water spill (less than 1 litre/4 cups)	Not applicable.	<ul style="list-style-type: none">• Absorb the water using paper towels from the nearest washroom.• Don't attempt to clean up the spill if there is 1 litre (4 cups) or more of water or you are unsure of what the spill is.
Minor non-water liquid spill (less than 1 litre/4 cups)	Contact cleaning staff at extension 112 or radio channel 4.	<ul style="list-style-type: none">• Block access to the area using caution tape, and place a wet-floor sign to alert others.• Follow up with cleaning personnel to ensure cleanup is done.
Large spill (1 litre/4 cups or more)	Contact your supervisor and cleaning staff at extension 112 or radio channel 4.	<ul style="list-style-type: none">• Contain the spill using the absorbent pads located in the spill kits.• Block access to the area using caution tape, and place a wet-floor sign to alert others.• Follow up with cleaning personnel to ensure cleanup is done.

Sample spill kit location map



Weather plan

Outline your plan for when weather conditions — snow, ice, slush, and rain — create temporary slip and trip hazards. For more information, see “Weather” on page 47.

Sample weather plan

Task	Contact	Procedure
De-icing and anti-icing	<ul style="list-style-type: none"> Company name: Snow Removal Inc. Contact name: John Doe Telephone: 778.555.4444 Emergency contact number: 778.555.2222 	<ul style="list-style-type: none"> Snow removal and anti-icing chemical application will be done every day at 7 p.m. All parking lot areas and building entrances will be inspected for ice and snow at 6 a.m. and 4 p.m. The snow-removal contractor has a lead response time of one hour. Additional snow removal and anti-icing application will be done if there is more than 2.5 cm (1 in.) of snow at the parking lot and building entrances. Plowed snow will be stored at the east corner section of the parking lot. Four parking spaces at the east corner will be blocked from use during this period.
Weather communication	<ul style="list-style-type: none"> Consult weather.gc.ca to get weather alerts. Consult drivebc.ca to get alerts on driving conditions. 	<ul style="list-style-type: none"> Weather conditions and alerts will be posted on a daily basis at the main entrance and on the lunchroom bulletin boards. Supervisors will do a group huddle at 2 p.m. every day to communicate weather alerts during winter.
Winter footwear recommendations	<ul style="list-style-type: none"> Not applicable. 	<ul style="list-style-type: none"> All workers performing tasks outside the building must wear ice cleats. All workers should refrain from wearing high heels or smooth-sole shoes when walking in the parking lot area.

Orientation and training plan

Provide a brief description of the orientation new workers and supervisors receive to learn about safe work practices that prevent slips and trips.

Sample orientation and training plan

Training module	Training topics	Training frequency
Introduction to slip and trip prevention	<ul style="list-style-type: none"> • Why preventing slips and trips is important for your health and wellness • How to spot a slip or trip hazard • Safe work practices that must be followed to prevent slips and trips • How to report a spill • Housekeeping standards 	<ul style="list-style-type: none"> • During new-hire orientation. • During annual training. This training should include lessons learned from the most recent slip and trip injuries and updated recommendations to prevent future incidents.
Slip and trip prevention during winter	<ul style="list-style-type: none"> • Slip and trip hazards during the winter • Winter weather footwear recommendations at work and off the job • How to prepare for the weather conditions using the weather report • How to report ice or snow in the parking lot or at building entrances • Safe work practices to be followed during winter 	<ul style="list-style-type: none"> • Annually in late November or December.
Slip and trip prevention training for supervisors	<ul style="list-style-type: none"> • How to spot slip and trip hazards in the workplace • How to perform a housekeeping audit • How to provide feedback when workers perform safe or unsafe practices 	<ul style="list-style-type: none"> • During new-supervisor orientation. • During annual training. This training should include a review of statistics showing the areas where most slip and trip injuries happen and the recommendations that follow.

Slip and trip incident investigation

List key questions to ask when investigating slips and trips in the workplace. (For more information, see “Investigating slips, trips, and falls” on page 59.)

Sample questions to ask during slip and trip incident investigations

Factor	Questions to ask
Workplace environment	What were the light levels at the time of the incident? Note any glare or dark areas.
	What were the noise levels? Note any unusual loud noises.
	Was snow or ice present?
Workplace layout	Was the slip or trip hazard highlighted using a high-contrast colour?
	Was rainwater pooling inside the building at the time of the incident?
	Are there floor-level changes of more than 1 cm ($\frac{3}{8}$ in.) where the incident occurred?
Footwear	What make, model, and size of footwear was the injured worker wearing? What was the condition of the soles and the level of cleanliness?
Flooring	What were the type and coefficient of friction of the flooring where the incident occurred?
	What were the flooring conditions (cracked, raised, worn, damaged, etc.) where the incident occurred?
Housekeeping	What was the date of the last housekeeping inspection, and what were the results?
	Were any slip or trip hazards found where the incident happened?
	If any slip or trip hazards were found, have these been addressed in the housekeeping standards?
Cleaning	What was the date and time the floor was last cleaned?
	Is there any evidence of soap residue, grease, or other contaminants on the floor?
Contamination	Were there any spills on the floor where the incident happened?
	What types of contaminants were found on the floor?
	Where did the contaminants come from?
Work procedures and practices	Were phones or other distractions involved in the incident?
	Was the worker rushing? If yes, why?
	Were any other workplace procedures or practices not being followed when the incident happened?

Glossary

Coefficient of friction (CoF)	The level of friction between the floor and a worker’s footwear (or bare feet at a swimming pool or yoga studio, for example). The CoF is most commonly reported on a scale from zero to one, with zero representing the lowest slip resistance, and one, the highest.
Contaminant	Any substance or object, wet or dry, that ends up on the floor or ground. Common workplace contaminants include water, oil, dust, soap residue, and trash. In the outdoors, things such as leaves on a sidewalk or loose gravel are contaminants.
Control	A remedy that eliminates or reduces a slip or trip risk.
Dynamic coefficient of friction (DCoF)	A measure of the coefficient of friction when one object is already moving against the other. The DCoF is a common measure of slip resistance.
Hazard	A situation or condition in the workplace that could cause someone to slip or trip. Common workplace hazards include electrical cords, equipment, and uneven walking surfaces.
Near miss	A slip or a trip that doesn’t result in an injury. For example, a worker slips but doesn’t fall when walking in the parking lot.
Practices	Rules that govern how (or the <i>manner</i> in which) a workplace approaches tasks and processes. Examples of practices include “No running” and “Eat only in the break room.”
Risk	The degree of danger posed by a hazard. Risk is sometimes determined by factoring the probability of an injury and the severity of the potential injury.
Slip	A loss of friction between a person’s bare foot or footwear and the walking surface, often because of a contaminant.
Slip resistance	A measure of the coefficient of friction between the walking surface and a person’s bare foot or footwear. Slip resistance can be measured against the walking surface or the footwear. Slip resistance can also be a measure of the roughness of a floor.
Static coefficient of friction (SCoF)	The minimum force required to get a static object to slide on a surface, divided by the forces pressing them together. SCoF is a common measure of slip resistance.
Trip	Unintentional contact between a person’s foot and an obstacle or uneven walking surface. Missing a step on stairs or a curb is also considered tripping.

Appendixes

Hazard identification checklist

Potential issue by location	Yes	No	Suggested actions	Action plan
Outdoor areas				
Are paths, steps, and fire escapes free of slip and trip hazards (buildup of leaves, wet grass, moss, mud, etc.)?			<ul style="list-style-type: none"> Set up or modify a regular cleaning schedule. Focus on high-transit areas first. 	
Are paths free from ice and snow buildup?			<ul style="list-style-type: none"> Temporarily close the area. Clean and place salt or sand. Set up or review your winter snow- and ice-removal plan. 	
Are changes in floor level on walkways (e.g., small slopes, curbs, or door thresholds) easy to see?			<ul style="list-style-type: none"> Highlight the hazards. Improve lighting and apply contrasting, eye-catching colour to changes in floor level (e.g., with non-slip paint or tape). 	
Are footpaths free of holes, potholes, and uneven paving?			<ul style="list-style-type: none"> Block access to the area as a temporary solution. Use barriers, and ensure they can't be moved easily. Highlight the hazards (e.g., improve lighting and apply eye-catching colours on the defective areas as a temporary solution). Carry out maintenance. Fill in holes, re-lay paving, and replace broken paving stones. 	
Are fire escapes free of slippery areas when wet?			<ul style="list-style-type: none"> Improve grip. Consider applying slip-resistant coatings or strips, or installing bolted, slip-resistant material covers. 	
Doorways				
Is the floor between the building threshold (entrance) and the entrance mats free of slippery areas when wet?			<ul style="list-style-type: none"> Improve grip. Consider extending mats or exterior paving, applying slip-resistant coatings or strips, or changing to more slip-resistant materials. 	

Potential issue by location	Yes	No	Suggested actions	Action plan
Are the entrance floors clean and free from water and other contaminants?			<ul style="list-style-type: none"> • Stop water from entering the building. Construct canopies over entrances, improve external drainage, and keep doors closed when you can. • Prevent water from spreading. Put in place large, absorbent entrance mats to dry shoes. • Remove water quickly. Review your cleaning system, and introduce dry mopping. Consider introducing heaters or underfloor heating to speed up drying time. • Improve grip. Consider installing slip-resistant flooring. 	
Is the area free of trip hazards (e.g., deliveries, trailing cables, other objects, or mats with curled edges)?			<ul style="list-style-type: none"> • Carry out housekeeping. Tidy up cables, and provide safe delivery-storage areas. Clear away boxes and equipment. Attach mat edges to the floor or replace mats if needed. 	
Corridors and offices				
Is the area free of any subtle changes in floor level (e.g., slopes, small steps, or abrupt changes from one flooring material to another)?			<ul style="list-style-type: none"> • Highlight hazards. Improve lighting, and use eye-catching colours on slopes and steps. Clearly highlight the change from one flooring material to another. 	
Are the floors free of contaminants such as liquids, food, food wrappers, dust, and condensation?			<ul style="list-style-type: none"> • Stop contamination from getting onto floors. Provide trash bins, fix leaks, and fit lids on containers. Close doors leading from working areas. • Prevent the spread of contamination. Install drip trays beneath plants, machines, and water coolers. • Remove contamination quickly. Review your cleaning routine. Spot-clean spills, dry mop large wet areas, and vacuum or brush up dry materials. 	

Potential issue by location	Yes	No	Suggested actions	Action plan
Is the flooring free of curled edges, cracked sections, or holes?			<ul style="list-style-type: none"> Carry out maintenance. Fix loose or cracked tiles and raised carpet edges. Fill in holes. Replace tiles and carpets if needed. 	
Is the slip-resistant floor coating or grip tape free of damage and wear?			<ul style="list-style-type: none"> Carry out maintenance. Replace damaged and worn coatings. Consider changing the type of flooring. 	
Are workstations, corridors, and walkways free of trip hazards (e.g., trailing cables, boxes, deliveries, equipment, or other objects)?			<ul style="list-style-type: none"> Carry out housekeeping. Keep walkways clear. Tidy away cables or use cable covers. Provide additional storage, and clear away boxes and equipment. 	
Are light levels adequate to see the floor surface clearly?			<ul style="list-style-type: none"> Improve lighting. Replace dead bulbs, swap in higher-intensity bulbs, or install additional lights. 	
Is light reflected from smooth flooring free of glare?			<ul style="list-style-type: none"> Improve lighting. Change the angle of lights. Install blinds, anti-glare fixtures, or glazing films. Consider removing floor surface shine (e.g., by removing wax from floors). 	
Stairs and ramps				
Are step nosings (the edges of steps) easy to see?			<ul style="list-style-type: none"> Check that lighting is sufficient to see step edges clearly. Highlight the very edge of the step with a nosing that has high visibility, a square edge, and a non-slip finish. For difficult-to-replace round-edged nosing, ensure non-slip edging wraps right around the edge of the nosing. 	
Are step nosings free of damage?				

Potential issue by location	Yes	No	Suggested actions	Action plan
Are handrails available?			<ul style="list-style-type: none"> • Provide a handrail on at least one side of the stairs. • Handrail heights should be between 86.5 and 107 cm (34 and 42 in.). • Recommendations for handrail shape, diameter, and distance from walls can be found in the BC Building Code. 	
Are handrails designed and installed so that people can comfortably and firmly grasp them (i.e., they can curl their fingers and thumb around part or all of the handrail)?				
Are the stair risers (the height of the steps) and tread runs (the horizontal distance or depth of each step) consistent throughout the flights of stairs?			<ul style="list-style-type: none"> • Highlight the problem (e.g., with a warning notice). • Correct the rise and run of the stairs so they are all of equal height and depth. 	
Are the stair treads free of slippery sections?			<ul style="list-style-type: none"> • Replace stair coverings with slip-resistant materials. • Thoroughly clean the stairs on a regular basis to remove contaminants. 	
Are ramps or slopes in or around the workplace easy to see?			<ul style="list-style-type: none"> • Highlight ramps with contrasting colours, and check lighting levels. • Improve grip. Consider installing slip-resistant flooring. 	

Potential issue by location	Yes	No	Suggested actions	Action plan
Work areas and work platforms				
As part of the work process, is contamination (fluids, solids, dust, debris, etc.) kept from reaching the floor?			<ul style="list-style-type: none"> • Stop contamination from getting onto the floor. Change the system of work. Improve the work area layout. Provide bins, dust extraction, and lids for containers. Reduce the quantity of product in containers. Fix leaking machinery. • Prevent contamination from spreading. Use drip trays and screens to stop splashes. Provide good floor drainage, high-lipped sinks, and sealing around machines. • Remove contamination quickly. Spot-clean spills, dry mop large wet areas, and vacuum or brush up dry materials. • Improve grip. Consider installing slip-resistant flooring. Ensure workers wear slip-resistant footwear. 	
<p>Is the floor free of slippery zones? Slippery zones may be created by any of the following:</p> <ul style="list-style-type: none"> • People (e.g., spilling liquids, overfilling containers, clearing waste from work surfaces onto the floor, or discarding debris onto the floor) • Machines (e.g., leaks, overspray, spills, or by-products) • Process (e.g., overflows, leaks, or by-products) 				
Is the floor free of condensation?			<ul style="list-style-type: none"> • Improve ventilation. Install and use air-extraction systems. • Insulate overhead pipework. • Improve grip. Consider installing slip-resistant flooring. Ensure workers wear slip-resistant footwear. 	
Is there a system in place to prevent condensation from forming on overhead pipework and dripping onto the floor?				
Is drainage preventing pooling of fluids on the floor?			<ul style="list-style-type: none"> • Install additional floor drainage. • Improve the floor drainage location, angle, or route. 	

Potential issue by location	Yes	No	Suggested actions	Action plan
Is the floor free of ice buildup in or around cold storage units?			<ul style="list-style-type: none"> Remove ice. Maintain doors. Check that doors close and seal properly. Replace seals and fix doors and frames as needed. Prevent humidity. For example, install automatic doors, curtains, and humidity controls. Consider supplying slip-resistant footwear designed for walking on frozen surfaces. 	
Are designated walkways easy to use and free of obstacles?			<ul style="list-style-type: none"> Create a clear and even walkway through the workplace. Perform housekeeping. Tidy up cables, and provide additional storage. Clear away clutter, boxes, and equipment, and safely store pallets. 	
Do walkways and flooring have intact, even surfaces?			<ul style="list-style-type: none"> Block access to the area as a temporary solution. Ensure barriers can't be easily moved. Highlight hazards. For example, improve lighting, and use eye-catching colour on defective areas as a temporary solution. Carry out maintenance. Fill in holes, and re-lay or replace defective flooring. 	
Are walkways and flooring free of holes or missing tiles?				
Is the flooring free of holes, raised edges, or cracked sections?			<ul style="list-style-type: none"> Firmly attach loose tiles and raised edges to the floor. Carry out maintenance. Replace flooring or damaged sections. 	

Potential issue by location	Yes	No	Suggested actions	Action plan
Are workstations free of tripping hazards such as boxes, deliveries, trailing cables, or other objects?			<ul style="list-style-type: none"> Define or review your housekeeping standards. Communicate the expectations to your staff. Eliminate barriers to compliance, such as lack of storage spaces or overflow areas. Carry out housekeeping. Keep walkways clear. Tidy up cables or use cable covers. Provide additional storage. Clear away boxes and equipment. 	
Are light levels high enough to see clearly?			<ul style="list-style-type: none"> Improve lighting. Swap in higher-intensity bulbs. Change the angle of lights. Install more lights. Install anti-glare grills. Consider removing floor surface shine. 	
Are lights placed in a manner that doesn't create glare?				
Is the floor dry?			<ul style="list-style-type: none"> Stop water from getting onto the floor. Replace shower curtains or screens. Install enough hand dryers close to sinks. Remove water quickly. Monitor regularly for pooling. Spot-clean, and dry mop wet areas. Improve floor drainage where possible. Improve grip. Consider installing slip-resistant flooring. 	
If the floor can't be kept dry, are there measures in place to reduce the risk of slipping?				
Are taps and pipes free of leaks?			<ul style="list-style-type: none"> Prevent contamination from spreading. Provide drip trays as a temporary solution. Carry out maintenance. Fix leaking taps and pipes. 	

Potential issue by location	Yes	No	Suggested actions	Action plan
Cleaning				
Are spills cleaned up in a timely manner?			<ul style="list-style-type: none"> • Create or review your spill response plan. • Ensure all workers are aware of the spill response plan. • Ensure spill cleanup equipment is readily available for use. • Review and improve your cleaning routine and schedule. 	
Are small spills wet mopped?			<ul style="list-style-type: none"> • Spot-clean small spills using absorbent cloths or paper towels. • Provide training, and then supervise. • Ensure spill cleanup equipment is readily available for use. 	
Are people kept off of floors that are being wet mopped or are still wet from mopping?			<ul style="list-style-type: none"> • Block access to smooth, wet floors. Use barriers to close off areas. • Wet mop outside of business hours when no one is around. • Reduce drying time. Dry mop floors with a clean and dry mop. 	
Is the floor free of slippery sections when wet?				
Are warning signs picked up after spills are cleaned up and the floor has dried?			<ul style="list-style-type: none"> • Remove cones and signs as soon as cleaning is complete and the floor is dry. Make sure your workers are aware of this guideline. • Provide training, and then supervise. 	
Does the floor look clean after it has just been cleaned?			<ul style="list-style-type: none"> • Check that the manufacturer's or supplier's cleaning instructions are being followed. • Review your floor-cleaning method. Alter it to suit the floor type. • Provide training on the new method, and then supervise. 	

Potential issue by location	Yes	No	Suggested actions	Action plan
Is the floor free of slippery areas after it has been cleaned and is dry?			<ul style="list-style-type: none"> • Thoroughly clean to remove buildup of polish, grease, etc. • Review and alter your floor-cleaning method. • Provide training on the new method, and then supervise. 	
Can cleaning-equipment cables or cords be seen crossing or blocking walkways and creating trip hazards?			<ul style="list-style-type: none"> • Coil up unused equipment cables. • Provide additional power sockets. • Use a power socket nearest to the area being cleaned. • Consider changing to battery-powered equipment. • Provide training on new cleaning methods, and then supervise. 	
Are trash bins and cleaning equipment arranged in a way that doesn't create tripping hazards?			<ul style="list-style-type: none"> • Provide training on awareness of trip hazards and how to avoid them, and then supervise. 	
Tasks				
Are tasks set up to avoid hazards such as obstructing workers' vision while using stairs, rushing workers, or distracting them while walking?			<ul style="list-style-type: none"> • Review and improve manual-handling and moving procedures. Solutions could include using dolly carts or installing conveyors. • Review and improve work activities with the goal of preventing obstructions, rushing, and distraction. For example, to prevent obstructing workers' vision, ensure workers aren't required to use the stairs while holding items. 	

Slip and trip mapping tool

The slip and trip mapping tool can help you identify where slips and trips occur in your workplace. You can use this information to help identify slip and trip hazards and prioritize your prevention efforts.

To use the mapping tool, do the following:

1. Draw a simple map of the area. The completed sample on the next page shows how the slip and trip mapping tool works. The map doesn't need to be a work of art, detailed, or even to scale, as long as it represents the workplace affected.
2. Mark all the slips and trips reported in the last 12 months (or any relevant period) with X's on the map. You can use the letter S to mark any serious injuries.
3. Talk to workers to identify any near misses, and add them to the map.
4. Find out from workers what's causing people to slip or trip in each area.

Any "hot spots" will quickly show up on the map. Once you've identified the problems and their causes, do the following:

1. Discuss them with management and the joint health and safety committee.
2. Decide what action needs to be taken.
3. Put in place effective control measures.
4. Monitor regularly to ensure the control measures are working.
5. Make sure to let workers know about the improvements.

Sample slip and trip mapping tool (completed)

Supervisor's name:	Date:	Workplace: Kitchen
Risk mapping diagram:		
Key	Hazard	Control measure
1	Loose paving (3 near misses) reported by delivery workers	<ul style="list-style-type: none"> • Repair slab
2	Spillages of fat and oil	<ul style="list-style-type: none"> • Regular cleaning • Ensure staff all wearing anti-slip footwear
3	Ice on floor; problem with door not closing	<ul style="list-style-type: none"> • Fix door catch to stop it staying open
4	Water on floor — overflowing sink	<ul style="list-style-type: none"> • Check system of work • Ensure staff wear proper footwear • New sink with high lip edge to be fitted next week
5	Trip – didn't see bag left on floor, lights not working	<ul style="list-style-type: none"> • Replace light bulb • Remind staff to keep room tidy and use lockers
6	Small leak of water from fridge near to servicing hatch	<ul style="list-style-type: none"> • Temporary fix and regularly check — put towel down immediately • Arrange for repair to fridge

Illustration based on a slip and trip mapping tool produced by the Union of Shop, Distributive and Allied Workers (U.K.). Adapted with permission.

Sample slip and trip mapping tool (blank)

Supervisor's name:		Date:	Workplace:
Risk mapping diagram:			
Key	Hazard	Control measure	

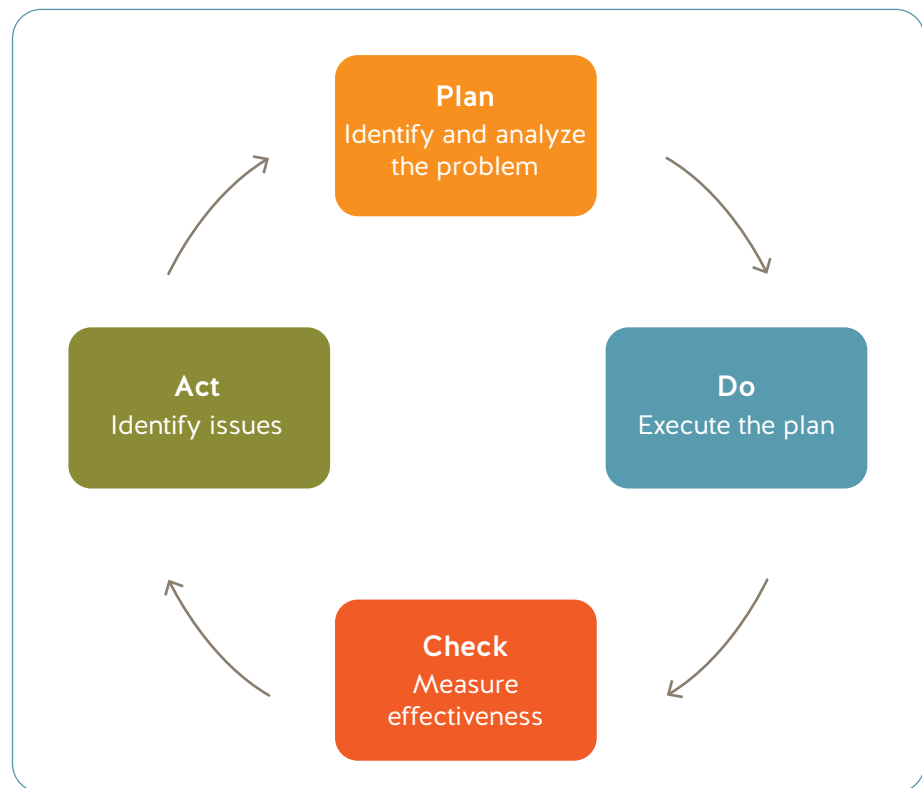
Coefficient of friction tests

Type of test	Description	Standards referenced	Comments
Pendulum test	<ul style="list-style-type: none"> The test is designed to replicate a pedestrian heel strike, the point at which most slips occur. The test works well in wet and dry conditions. 	<ul style="list-style-type: none"> ASTM E303-93 	<ul style="list-style-type: none"> It is the most widely used pedestrian slip-resistance test method worldwide. The test can be used in real workplace conditions. The results will be inaccurate if the test isn't set up and operated correctly.
BOT-3000E slip tester	<ul style="list-style-type: none"> This test involves automated testing using a motorized drag-sled meter. 	<ul style="list-style-type: none"> ANSI A326.3 ANSI B101.3 ANSI A137.1 	<ul style="list-style-type: none"> The test doesn't apply to barefoot areas, inclined floors, or outdoor flooring.
Variable-angle ramp	<ul style="list-style-type: none"> In this test, a flooring sample is slowly inclined on a variable-angle ramp until an operator standing on the sample slips on the surface. The results are presented as a scale running from R9 (the most slippery) to R13 (the least slippery). 	<ul style="list-style-type: none"> German Institute for Standardization (DIN) standard DIN 51130 	<ul style="list-style-type: none"> This test is considered to be the most realistic method in use today.
SlipAlert slip tester	<ul style="list-style-type: none"> This test involves a small, car-like tribometer (friction-measuring device) that's designed to mimic the readings of the pendulum test. 	<ul style="list-style-type: none"> British Standards Institute standard BS 8204-6:2008 	<ul style="list-style-type: none"> It is used for field testing.

Plan-Do-Check-Act

Many businesses use the Plan-Do-Check-Act (PDCA) model to control safety-related risks. First developed in the 1950s, PDCA is a method of continuous improvement in processes, products, or services. It's also a way of resolving safety risks in businesses.

PDCA involves systematically testing solutions, assessing results, and implementing those that work.



The Plan-Do-Check-Act model

The four phases of PDCA are as follows:

- **Plan.** Identify and analyze the problem or opportunity. Establish objectives and processes required to deliver the desired results.
- **Do.** Execute the plan. Start small and add complexity with each new cycle.
- **Check.** Check the result and measure effectiveness.
- **Act.** Review records from the Do and Check phases to identify issues. The root causes of the issues become the Plan phase of a new cycle.

A fundamental principle of PDCA is to improve a process by going through the cycle multiple times. Once a plan's effectiveness is confirmed (or ruled out) in the Check phase, going through the cycle again will improve your understanding of the problem. In the case of a slip or trip hazard, you get closer to eliminating the hazard with every repetition of the cycle.

Some workplaces have daily PDCA reviews of critical processes such as safety inspections, productivity, or quality. They usually perform these reviews using a PDCA board. On this board, they track key metrics, the plan for the day, and any needed adjustments.

It's a good idea to review your housekeeping plan using the PDCA cycle at least every week. The review shouldn't take more than 30 minutes.

Below is an example of how you can use the PDCA process to manage your housekeeping plan. This is only the first round of the process. You'll need to complete the cycle as frequently as possible during the first months of implementation.

Housekeeping PDCA example

Plan

Put in place an area-organization program and a housekeeping plan to reduce the risk of slips, trips, and falls in the workplace. The goal is to reduce the number of injuries from slips, trips, and falls in the workplace by 50% in the course of a year.

Do

All areas will do a cleanup day. Locations will be assigned and marked for all tools and materials. Pictures will be taken to show how areas should look when cleaned up.

Ensure the following:

- All areas complete their cleanup-day tasks.
- Items that haven't been used for more than six months are placed in the discard bin.
- All areas mark the locations of their storage, tools, packing materials, and waste.
- All areas post pictures showing how the areas should look when cleaned up.
- Monthly inspections are done to verify the areas stay clean and tidy.

Check

This step will be performed after all areas have been given some time to perform the tasks. For example, a meeting could be held with all department supervisors to do the following:

- Check the results of the cleanup day.
- Measure its effectiveness.
- Identify any delays or challenges.

Act

Based on the results from the Do and Check phases, the next step is to identify unresolved issues and determine their root causes. For example, you may determine that a department doesn't have enough resources to comply with the cleanup schedule. You can then address that in the Plan phase of the next cycle.

Next cycle

The cycle then goes on until the planned outcome is achieved. If the planned outcome isn't achieved, re-evaluate the action items set out in the Do phase, and keep going through the cycle. Even small amounts of progress should be considered successful, as each cycle brings you closer to the planned outcome.

5S implementation plan

5S refers to a set of five terms borrowed from Japanese that all begin with the letter *S* when transliterated. The equivalent terms in English also begin with an *S*. These five terms represent the five steps toward operational and process excellence. The five terms are as follows:

- **Sort.** Examine all the tools and materials in the work area, and determine whether they are needed or not. Remove all unnecessary items.
- **Store.** Organize all tools and materials, and assign a storage location to each item. Label the storage locations to find the items quickly when needed.
- **Shine.** Set standards for cleanliness. Clean up and remove all trash. Everything should be clean, tidy, and neatly put in its appropriate place. Cleanliness reduces workplace hazards and makes potential problems noticeable (e.g., equipment leaks, loose parts, missing guards, or loose paperwork).
- **Standardize.** Make sure you have a plan to keep areas clean and sorted on a daily basis. This helps ensure that keeping the workplace in optimal condition is a standard process. Establish schedules and set expectations for adherence.
- **Sustain.** Make 5S part of your workplace culture and common practices. As a result, everyone develops 5S as a habit. One of the best ways to do this is by integrating 5S methods into your performance management system.

Key requirements to set up a successful 5S program

Everyone — owners, managers, supervisors, and workers — should be involved. Having managers, supervisors, and owners doing cleanup activities helps to bring everyone together toward the same goal.

The 5S program is all about creating habits. The key is to do constant feedback and troubleshooting to create a culture in which everybody understands their role.

Although some money should be spent when implementing a 5S program, this isn't mandatory. Let your workers find solutions. Challenge your teams to find the most efficient and least expensive ways to keep the areas clean.

Step 1: Train your team and clean up

You can start implementing 5S by training your staff to understand the system. This may be followed up with a hands-on learning session with your team to ensure the concepts are understood and applied correctly.

In the hands-on session, workers should be ready to meet the first three 5S requirements shown below:

1. Take a picture of the current status of your workplace.
2. Sort to separate anything that's needed from what isn't needed. A good rule of thumb is that anything that hasn't been used in the last year should be discarded.
3. Organize the things you need so there's a place for everything and everything has a place. Use shadow boards, coloured tape, signs, and labels to mark where things go.
4. Clean the workplace and get rid of things that make it difficult to maintain cleanliness, such as boxes, cords, or cables. Store necessary items on shelves or in drawers. Cover cords and cables that are in use, or route them in such a way that they don't become tripping hazards.
5. Prepare an action plan for the items you aren't able to deal with that day but will be able to in the near future. This could include selling items you no longer use, donating them, recycling them, or throwing them away.
6. Take a second picture after the entire day's work, for review. Print and post this picture in an area where everybody can see it. This will be your standard from now on.

Step 2: Standardize

Two weeks later, employees should take a third picture and compare it to the standard picture that was taken after cleanup. If there's clutter in the area, ask your workers why, and help them problem solve any barriers they might have.

This process should be done every two weeks to verify if the areas are kept according to the standard, which means clean and free of clutter. It will take longer to clean up the first few times, but it will get easier.

Many organizations set up peer audits to check how the 5S principles are being met and to ensure the plan is moving forward. Work together to define ways to standardize and improve your 5S system over time. Organize cleaning schedules, define roles and responsibilities, and prepare written procedures or diagrams to help everyone remember what to do.

Step 3: Sustain

Two months later, check to see how your workplace looks and schedule another review. This time, look at any opportunities to simplify the cleaning tasks and improve the area layout. This will encourage your team to keep finding new ideas to keep areas clean and free of clutter. If you find during this review that the areas have gone back to cluttered and dirty conditions, set up a new cleanup day. And ask your employees what can be done differently to keep areas clean.

How to conduct a footwear trial

When selecting footwear, it's important to try the shoes you're interested in before buying them. Workers may not wear footwear if it's uncomfortable or impractical, no matter how effective it is.

Other parts of an effective footwear trial include the following:

- Determine which areas of your workplace have slip or trip hazards and the types of contamination found. Based on this information, you can determine the slip-resistance requirements for the footwear. Make sure you consider other potential hazards such as impacts, punctures, and electric shock.
- Select a group of workers who will test the footwear, as well as a second group of workers who will continue to wear their usual workplace footwear. (At the end of the trial, you'll compare the results from both groups.)
- Decide how many workers to include in the footwear trial. Ensure that at least 10% of workers get to do the trials. Aim to have an equal number of workers in both groups. You may need to adjust the number of workers involved depending on the resources available and the worker head count.
- Decide how long the trial should last. Aim for a minimum of six weeks.
- Discuss the trial with the two groups of workers. Provide clear information on the feedback you're looking for from workers.
- Monitor to ensure trial footwear is worn and cared for properly. Identify and deal with problems immediately. Gather worker feedback using a questionnaire. (See below for sample questions.) Keep records of any slips or trips.
- Gather all the data and analyze it. Compare the results from the two groups. The goal is to identify the types of footwear that:
 - Have the most positive feedback
 - Are involved in the fewest slips and trips
 - Are feasible to buy
- Communicate your findings to all workers, and include the selected footwear models in your footwear policy.

Examples of questions to include in your worker-feedback questionnaire include the following:

- What make and model of footwear did you wear?
- Did your footwear have enough grip on walking surfaces? Too much or too little?
- Did you slip or trip while wearing the footwear? Please provide details (e.g., what happened, when, where, why, and how many times).
- Did the footwear's treads clog with debris easily?
- Was the footwear easy to clean and maintain?
- Did the footwear fit well, and was it comfortable to wear throughout your shifts?
- Did the footwear show any signs of wearing out or deteriorating? If yes, how so?
- Do you have any other feedback you want to share about the footwear? Please write your comments in the space below.

Near-miss report form

Near-miss report form	
Location:	Time: Date:
Reported by:	Department:
Surface and weather conditions (if applicable):	
Near-miss description:	
Unsafe conditions:	
Recommended actions:	
Additional information:	

Notes
