

Slips, trips, and falls in manufacturing

Slips, trips, and falls put workers at risk of sprains, strains, bruises, concussions, and fractures. In severe cases, falls can lead to death or permanent disability.

Each year, close to 1,000 workers in manufacturing suffer fall injuries. These injuries cost B.C. businesses 49,000 lost workdays and more than \$22 million in claim costs.

Falls often result from slipping or tripping. While falls are extremely common, they are one of the most preventable types of workplace injury.

Under section 4.39 of the Occupational Health and Safety Regulation, employers must ensure that floors, platforms, ramps, stairs, and walkways available for use by workers are maintained in a state of good repair and kept free of slipping and tripping hazards.

How slips and trips happen

Slips happen when there is not enough grip or traction between the footwear and the walking surface. This lack of traction often results from substances on the walking surface, such as water, ice, oil, grease, dust, and debris. These substances may come from work processes, spills, weather, leaks, or mopping. Loose rugs or mats, floors with varying traction, and inadequate footwear can also cause slips.

Trips happen when people lose their balance after their feet collide with objects or they miss a step when going up or down stairs. Examples of tripping hazards include changes in elevation; damaged or worn carpets, rugs, and mats; uneven pavement; cluttered walkways; unsecured cables or extension cords; poor lighting; unmarked steps or curbs; and obstructed views. Wearing the wrong size or type of footwear or not picking up your feet completely when walking can also lead to trips and falls.

Slip and trip hazards may also be present in outdoor areas such as parking lots, yards, and exterior walkways where ice, snow, rain, raised curbs, and unmarked obstacles can contribute to falls.

The following are some examples where workers have been injured by falls:

- A winery worker slipped on a wet staircase and fell to the ground. The resulting ankle fracture took almost a year to heal.
- A woodworking shop worker tripped on an extension cord and fell against the corner of a wooden cabinet on the floor, resulting in a head injury. The injury took almost a year to heal.
- A worker in a plastic processing plant tripped on a loose tie strap and fell. The resulting wrist fracture took 8 months to heal.

Identifying hazards and assessing the risks

As an employer, you should identify all the slip and trip hazards in your workplace, which includes your parking lot, yards, and outdoor access areas. To identify hazards, do the following:

- Inspect the workplace regularly with your joint health and safety committee.
- Put in place processes to let workers voice their health and safety concerns.
- Analyze fall injuries and near-miss incidents.

You should also inspect for slip and trip hazards when changing equipment, processes, or the layout of your workplace.

After identifying the hazards, the next step is to assess the level of risk that each hazard poses

to workers. This allows you to prioritize which hazards to control first.

As you assess each slip and trip hazard, you should consider the following questions:

- How many workers are exposed to the hazard?
The higher the number, the higher the risk.
- How severe could a fall injury be? For example, a fall can be more serious if it occurs near hot, sharp, or moving objects, or at a height.
- How long are workers exposed to the hazard?
The longer the exposure, the higher the risk.
- How frequent is the exposure? If workers are exposed to the hazard many times each shift, it usually carries more risk.

Controlling the risks

Once you've identified the hazards and assessed the risks, the next step is to implement risk controls. Select controls according to the hierarchy of controls (see diagram below), from most effective to least effective.

Elimination or substitution

Design out the hazard

The best options for controlling slip and trip hazards are to eliminate them at the design stage or substitute them with something less hazardous. Examples

of eliminating or substituting slip and trip hazards include the following:

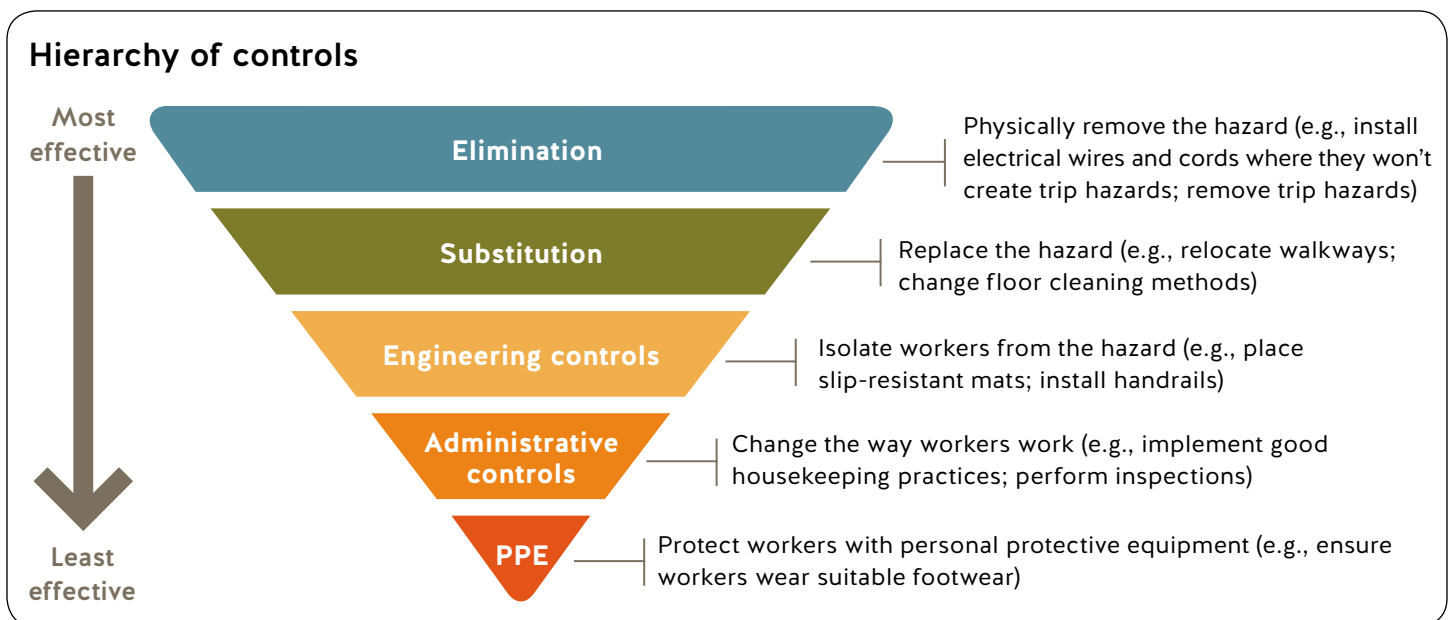
- Install electrical wires, cords, and hoses where they won't create tripping hazards. For example, install overhead retractable cords and additional power outlets, or change the location of outlets if needed.
- Avoid the use of extension cords for stationary equipment. Consider hardwiring the equipment instead.
- Relocate walkways to avoid high-risk areas such as equipment drainage points or uncovered exterior walkways where rainwater or snow accumulates.

Engineering controls

Install slip-resistant floors or coverings

Most types of floors are relatively slip resistant when dry. However, any contaminants (such as water, dusts, oils, or solvents) can greatly reduce the slip resistance. Do the following to control the risk:

- Install slip-resistant floors or floor coverings that match the contaminants in your workplace. The slip resistance of these products should be tested using methods defined by a reputable third-party standards organization such as ASTM, ANSI, or ISO. Suppliers should be able to provide comparative data on the slip-resistant properties of a range of products under both dry and wet or contaminated conditions.



- For existing floors, apply slip-resistant coatings or strips, or texturize the floors to increase slip resistance on slippery areas.
- In areas where floors are constantly wet or contaminated, place thick, slip-resistant mats with bevelled edges and holes that allow oils and other fluids to drain away from the working surface.
- Provide water-absorbent entrance mats so workers can dry their shoes when it's raining.
- Install covers, drip pans, containers, or containment rooms to prevent the release of contaminants from equipment to the floor.

Administrative controls

Carry out preventive maintenance

As an employer, you should perform workplace inspections to identify and fix conditions such as:

- Machinery, equipment, or processes that release contaminants onto the floor (for example, equipment that leaks fluids)
- Holes, potholes, missing tiles, or uneven paving on walkways



Use handrails on stairs. Report any tasks that prevent you from following this procedure.

- Broken stairs, ladders, work platforms, or handrails
- Worn-out slip-resistant coatings or strips
- Any concerns brought up by workers, such as poor lighting or raised carpet edges

There may be times when a hazard has been identified but can't be eliminated immediately. In these cases, implement interim plans such as temporarily relocating walkways or restricting access.

Establish and maintain housekeeping practices

Establishing good housekeeping practices is an important step in preventing fall injuries. Examples include the following:

- Designate and mark walkways, and keep them clear at all times. Make sure workers use designated walkways by role modelling and enforcing this behaviour. If walkways are marked, make sure the paint is slip resistant, and test it before applying it.
- Set standards and assign resources for ensuring all spills and debris are cleaned up promptly.
- Make sure all tools, equipment, and materials are stored in their designated locations. Start by defining a specific place for each item, and ensure all workers follow this standard.

Provide education and training

As an employer, you should have a system in place to educate, train, and supervise workers on the following:

- Understanding the significance and impact of slip and trip hazards
- Performing cleaning procedures relevant to their jobs
- Wearing and maintaining appropriate footwear
- Avoiding distractions such as using cellphones while walking
- Using handrails when going up or down stairs, and reporting any work activity that prevents following this procedure
- Slowing down when walking on uneven surfaces, through congested areas, or on wet floors

- Shortening their stride and angling their feet outwards when walking on frozen surfaces (“walk like a penguin”)
- Reporting spills or contaminants and/or cleaning them up immediately (“clean as you go”)

Personal protective equipment (PPE)

Ensure workers wear appropriate footwear

As an employer, you should determine the right type of footwear for workers to wear based on the slip and trip hazards in the workplace.

Not all safety footwear is slip resistant. The CSA Group standard for protective footwear requires all slip-resistant footwear manufacturers to include the “coefficient of friction” test results from a third-party laboratory. Higher coefficients of friction mean higher slip resistance under specified conditions.

Ask for the footwear manufacturer’s advice about the appropriate footwear for your workplace. The answer will depend on the types of contaminants present and the activities carried out in your workplace. Try before you buy if possible.

Below are some general recommendations for appropriate footwear for the most common workplace contaminants:

- **Liquids** — Footwear should have a close-packed, well-defined tread pattern in softer material, with deep treads on a flexible, flat sole.
- **Loose solids** — Footwear should have a more open, well-defined tread pattern with wider channels, deep cleats, and a flexible sole.
- **Ice** — Footwear should have spikes or studs that will “bite” into the ice (but may be slippery on other hard surfaces).

As an employer, you should perform footwear inspections to verify compliance with your footwear policy. Pay special attention to the footwear’s treads, and ensure they are replaced when worn down.

Investigate falls

All falls should be investigated, regardless of severity. Incident reports from near misses (when a worker fell but wasn’t injured or almost fell) are some of the best sources of information to prevent serious injuries. An investigation should explain why the incident happened by examining the following:

- Environmental conditions such as leaks, spills, clutter, power cords, etc.
- Work processes, housekeeping, preventive maintenance, inspections, communication, signage, and incident reporting
- Education and training of workers
- The hazard awareness, actions, and PPE (e.g., footwear) of the worker who fell
- Worker fatigue and fitness for duty (including factors such as the number of hours worked and any evidence of impairment)

Regulation requirements

- [Section 4.39, Slipping and tripping hazards](#)
- [Section 4.40, Wet floors](#)
- [Section 4.41, Waste material](#)

For more information

WorkSafeBC’s website has more information about reducing the risk of slips, trips, and falls. Visit [worksafebc.com/slips-trips-falls](https://www.worksafebc.com/slips-trips-falls) and [worksafebc.com/manufacturing](https://www.worksafebc.com/manufacturing).