



Winter Footwear Guidebook

One way to keep employees safe is by helping them prevent slips and falls on ice and snow. The best way to do so is by making sure they're wearing the proper gear — especially footwear — to combat the weather winter can bring.

What you put on your feet during the winter months can be a lifesaver. Although no shoe type, brand or manufacturer can guarantee elimination of slip and falls, proper footwear is still a key element in reducing these exposures.



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Ice and Snow Safety

Snow and ice storms, which often include dangerous sheets of ice and banks of snow, can transform parking lots, steps and sidewalks into precarious situations for employees to navigate through. Choosing the right type of footwear to address these scenarios can dramatically reduce the chance of a slip and fall injury.

According to OSHA, slips, trips and falls constitute the majority of workplace accidents. They cause many types of debilitating injuries and time away from work.

Major Contributing Factors Causing Slips & Falls Include:

- Improper footwear for winter walking conditions
- Walking or running too fast for the conditions
- Poor walking surface conditions
- Inadequate removal of snow and salt
- Poor lighting or visibility
- Lack of handrails
- Carrying laptops or other materials

When Walking Over Ice and Snow, Remember to:

- Choose the right type of footwear for winter walking conditions.
- Look for slip hazards and scan the path of travel.
- Maintain a focus on the slip and fall exposures when walking.
- Take shorter, slower steps, keeping the feet shoulder-width apart.

Footwear for Health Care, Trucking, Schools and Manufacturing

Slip and fall injuries are more common in certain types of industries because of the exposures presented. As such, specific types of footwear and pull-on treads are now available for employees working in the health care, schools, trucking and manufacturing sectors. The soles of the footwear are designed with unique materials to maximize traction, or coefficient of friction, for the working conditions of the job and work environment.

Written Footwear Protection Programs

In an effort to reduce the costs of slip and fall injuries, many companies have developed written footwear or foot protection policies to provide guidelines for employees in the selection and use of footwear made specific for their industry and job duties.

Mobile Shoe Vendors

Companies considering a shoe program have the option of using the services of a mobile shoe vendor. These companies will work with management to identify the types of shoes compatible with the work environment and offer the best degree of slip resistance for the job. These companies will stock a selection of shoes within a mobile van and come directly to company locations. Employees can be quickly sized and fit right inside the mobile van.



Traveling on Business

Employees traveling on business or working off-premises are often subjected to precarious walking conditions when they reach their final destinations. Therefore, it's important to choose the proper type of footwear.

- Consider wearing a shoe cover or snow boot and changing into dress shoes at the customer location.
- Avoid wearing high heels outdoors.
- Select a parking area close to your customer's facility and choose a spot where snow removal and salting has been completed.
- Take care when exiting a vehicle and hang onto the door when checking the surface for slippery areas.
- Walk slowly, taking shorter steps to maintain balance.
- Choose the best path of travel by scanning the area in front of you.
- Avoid cutting through landscaping and using makeshift paths.
- Use a cart to pull a laptop case and materials as this will lower your center of gravity and provide improved balance.

Suggestions for Reducing Slip and Fall Injuries at the Workplace

- Create a slip and fall campaign for your company.
- Have periodic safety contests that create employee awareness.
- Implement a footwear/foot protection program.
- Regularly inspect and maintain parking lots, sidewalks and entrances.

- Promptly remove accumulation of snow and ice in parking lots and walkways.
- Apply salt or other surface treatments as needed and maintain salt supplies at entrances.
- Develop procedures for monitoring weather conditions and alerting employees.
- Create awareness using orange safety cones, signs, window clings, posters, etc.

Friction and Footwear

The walking process utilizes both kinetic and potential energy; for this process to occur smoothly, we need friction between our foot and the walking surface. And we need that friction to propel us forward in a specific direction. As the amount of friction decreases, our stride is typically reduced. This reduction in stride is created in an effort to ensure balance and that we keep our feet under our body — reducing the chance of a slip or fall.

What is a Coefficient of Friction?

The coefficient of friction (COF) is important to the process of walking. Both footwear and walking surfaces offer frictional resistance and the coefficient of friction is a number that represents the relationship of these two surfaces — the force applied between the two surfaces vertically (pressing force) and laterally (frictional force). This ratio is a measurement of traction.

- A higher coefficient of friction means more friction and therefore more traction.
- A lower coefficient of friction means less traction and a slippery surface.



So a high coefficient of friction is good, right? Not always. We've all experienced a time wearing tennis shoes or other footwear offering strong frictional properties on a walking surface of great frictional properties as well, like carpet or rubber matting. Most likely, the shoe doesn't slip on the walking surface and your foot abruptly stops, causing you to stumble and quicken your step to regain your balance.

How Do You Choose the Right Shoe for the Job?

Wearing the right shoe will go a long way in preventing a potential slip and fall.

- The outsole of the shoe is the area that's in contact with the walking surface. If the sole's properties and walking surface have a high enough coefficient of friction, good traction will be achieved between the two.
- Flat leather or plastic-soled shoes offer minimal slip resistance between the shoe and the walking surface; therefore, both would be poor choices in snow or ice.
- Soles carry both oily and slip-resistant properties, which are both important, especially if you encounter walking surfaces that may contain oils, greases or liquids.
- Some soles have flat surfaces, while others offer a tread design that can improve the traction between the walking surface and the sole, especially if the surface maybe slippery.
- The depth and spread of the treads are important, since too closely-patterned treads or treads with minimal depth will not allow liquids to be dispersed from the tread pattern and may create a potential hydroplaning effect between the sole and the walking surface.
- It's important to periodically inspect shoe tread for wear and replace shoes when significant wear is noted.

Are There Recommendations for Shoe Tread Patterns?

While there are no specific recommendations to a specific tread pattern, there are some guidelines. The Shoe and Allied Trade Research Associate (SATRA) Technology Centre, Ltd. has produced guidelines for slip-resistant sole design:

- Should have a raised tread pattern on the heel and sole with a leading edge in many different directions (crosshatch or similar design).
- Cleat width should be between 3 and 20 mm.
- Channel width should be at least 2 mm.
- Tread pattern should extend over the whole sole and heel area.
- Sole should have a flat, flexible bottom construction

— consider a low-density midsole that conforms to the ground and maximizes contact area.

- A square heel breast, which acts as leading edge, is recommended over a rounded edge.
- Studies have shown that greater heel height has been associated with a greater risk of fall — high-heel shoes are not recommended for walking in snow and ice.

How Do Flooring Materials Impact Friction?

The type of surface one must cross, as well as its coefficient of friction, greatly influences the possibility of slips and falls. Ultimately, the type of floor surface will determine the coefficient of friction between footwear and walking surface. Other things to keep in mind:

- Surfaces should be kept clean and dry, as they will offer better slip-resistant properties than floor surfaces covered in liquid.
- Adding liquid (water, oil, grease, etc.) will impact the coefficient of friction and lower its number.
- Floors should be inspected routinely and those whose surface becomes worn should be replaced or resurfaced, especially if they are in a pedestrian traffic area.
- Consider designated monitors in areas where floors may become wet with snow or water dragged in from outdoors, so appropriate signage can be placed and floors can be cleaned and dried in a timely fashion.
- Floors requiring specific maintenance, such as ceramic tile, terrazzo, and marble should be regularly cleaned and conditioned to keep them in the proper condition. Proper care and maintenance of your floor surfaces will ensure they possess the proper frictional properties to ensure safe passage by your employees across their surfaces.

What Actions Can Employers Take to Reduce Slip and Fall Accidents?

Recognizing that footwear and floor surfaces play a key role in slip and fall accidents, employers should develop specific plans and expectations for those who travel within their facilities or on their grounds. This starts with a good maintenance program of both internal and external walking surfaces:

- Parking lots, sidewalks and entryways should be kept free of snow and ice accumulation.
- Floor surfaces within the building should be cleaned and conditioned, per manufacturer recommendations.
- Routine inspections of floor surfaces should occur to identify those which need resurfacing or replacing.



- Expect employees to wear appropriate footwear, especially during inclement weather involving snow and ice.
 - Employees should wear appropriate boots or footwear that provides adequate slip resistance on snow and ice until they enter the building.
 - They can then change into footwear that provides them comfort and safety while working within the facility.
 - The reverse should occur when leaving the building.
- Employees subjected to slip/fall exposures within a facility should be expected to wear appropriate footwear. Employers should identify what that footwear is, and communicate and expect employees to wear it when working.

- Temporary barricades should be placed in areas to prevent employees from walking through landscaping or creating their own make-shift paths, which increases the likelihood of fall injuries. Many serious injuries take place when employees take the shortest route rather than traveling on designated walkways, which are plowed and salted properly.
- Permanently-installed Ice Alert or LED signs are also available to alert employees about conditions when they're entering the parking lot in the morning, or leaving the premises for lunch or at the end of the shift. Many LED signs are programmable so they can be used to communicate various messages at different times of the year.
- Outdoor heated floor mats can melt snow and ice before it accumulates and provide a walkway free of slip hazards. They come in different sizes and lengths to accommodate various types of walkways and steps, are portable, and can be removed in the spring.
- Indoor floor mats should also be placed within entrances to dry footwear, cover potentially slippery flooring, and pick up snow, ice and water deposited from footwear. Extra mats should be kept on hand to change out mats that have been saturated.

Hazard Signs and Equipment

Companies can reduce the chance of slips and falls by making use of outdoor safety cones, signs, heated walking mats and other equipment that alert employees to the dangers of ice and snow. Here are some key things you can do when faced with conditions that could cause injury, as well as sources for the safety equipment every business should keep on hand.

- When weather forecasts indicate conditions may include freezing rain or snowfall, facility personnel should place safety cones and temporary signs in position near entrances, sidewalks, steps and parking lots to make employees aware of slip and fall hazards.
- Designated personnel should make periodic inspections of the grounds early in the morning before employees arrive. Inspections should also be done periodically throughout the day to determine if ice has formed or snow has accumulated. Appropriate personnel may then need to be contacted to plow snow and apply salt or other surface treatments.

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