

Slip: A sliding motion where the foot (shoe) loses traction with the floor surface resulting in a loss of balance.

Safety Footwear intended for the ice is a common piece of personal protective equipment that arena workers wear while performing on-ice duties. It is recommended that a job hazard assessment is conducted for on ice arena personnel prior to selecting safety footwear or any other protective equipment. By working with your JHSC along with affected staff and performing a job hazard analysis you will be demonstrating due diligence and making every effort to protect the safety of facility workers. The Joint Health & Safety Committee should determine the level of risk associated with potential slips and fall injuries in each facility, evaluate the level of risk, and determine (if deemed necessary), the appropriate form of protective equipment to be worn, considering the nature of the work being carried out.

The use of any Personal Protective Equipment (PPE) requires research to ensure that the right piece of equipment is selected for the intended task. Once selected, workers must have adequate training provided to ensure proper and safe use of the piece of equipment.

Is there a need for Anti-Slip Footwear for arena staff?

The ORFA recommends that decisions regarding the use of personal protective equipment be included in Joint Health and Safety Committee (JHSC) discussions. It is important that JHSC or Workers Health and Safety Representative review PPE policies and procedures. The review by the JHSC may include:

- ✓ A review of workplace incident and accident reports;
- ✓ Reviewing all tasks that may involve working on ice (shovelling walkways etc.);
- ✓ Discussing the need directly with workers; and
Reviewing equipment operational manuals

Duties of Employers

25. (1) An employer shall ensure that,

- (a) the equipment, materials and protective devices as prescribed are provided;
- (b) the equipment, materials and protective devices provided by the employer are maintained in good condition;

(c) the measures and procedures prescribed are carried out in the workplace;

(d) the equipment, materials and protective devices provided by the employer are used as prescribed;

Purchasing a “one size fits all anti-slip footwear” and hanging them in the back of the facility as a worker PPE “option” provides little byway of actual worker protection. Select the right device, provide training on how to properly use and maintain the device and monitor its use.

Work environment factors that may affect slip-resistance include the following:

- (a) type of flooring material;
- (b) surface smoothness of flooring;
- (c) a dry, wet , or contaminated surface;
- (d) the type of liquid on a wet surface;
- (e) the temperature of the floor; and
- (f) the temperature of the air.

Smooth or wet flooring surfaces are usually more slippery. Lower temperatures can affect the sole material by making it harder and less slip-resisting.

Most manufacturers and distributors will provide advice on the appropriate application of slip resisting footwear. Manufacturers may apply these slip resistance criteria to both protective footwear and non-protective footwear (ie footwear not having other protective features.)

Ice Creepers

Most arena workers are familiar with the “ice creeper” which is attached to the safety boot. These attachments can be defined as a spike or spikes used to help prevent slipping while working on the ice surface.

Although ice creepers or cleats are not “mandatory” they are considered to be an acceptable choice to help protect workers from slips and fall injuries while performing work on the ice. Choosing this form of PPE should be considered when conducting a Job Hazard Analysis. As always, Section 25 of the OHS Act must be considered:

There is no doubt that anti-slip foot protection can provide a higher level of safety for workers on the ice, however, they may not be safe for all applications. In fact, some

facility workers have found that their risk of slipping and falling can increase when wearing the ice creeper. Since the creeper is designed for use on the ice, workers often find that once they step off of the ice onto another surface they lose their footing.

A sole material effective for one type of flooring material may not be as effective in a different work environment.

Workers should also be aware that when using the ice creeper during tasks such as edging will require the removal of snow from the bottom of feet (produced from the edging process). The effectiveness of the cleat will be significantly reduced with any build up of snow or slush.

The ORFA recommends that ice cleats be used together with a quality pair of CSA approved safety boots.

The majority of work that is performed in a facility environment will require the use of approved safety footwear. Approved footwear will hold the CSA "Green Patch Triangle". This patch indicates that the sole puncture protection with a Grade 1 protective toe to withstand impacts up to 125 Joules is in place. Comparable to a 22.7 kg (50 lb) weight dropped from 0.6 m. Sole puncture protection is designed to withstand a force of not less than 1200 Newton's (270 lbs) and resist cracking after being subjected to 1.5 million flexes.

The standard for safety footwear protection in Canada is **CSA Standard Z195-09, Protective Footwear** which is now expanded to include slip-resistant (or slip-resisting) footwear. If a protective footwear product is certified as or claims to be CSA compliant, its metatarsal guards and its slip-resistant soles must be tested to the updated Standard.



Selecting the Right Footwear – Beyond Slip Resistance

Selecting the right footwear should not be based on price alone. Although the use of ice cleats might provide additional anti-slip protection, workers must first start by choosing the right safety boot. Safety boots should include ankle protection and the best sole for the work being performed.

Tasks such as edging require adequate ankle protection (8-10in. boot) in case an edger blade or dasherboard screw

dislodges and becomes a projectile. Different sole compounds and tread designs create different coefficients of friction and will therefore grip better than others.

Coefficient of friction (COF), describes the ratio of the force of friction between two bodies and the force pressing them together. The coefficient of friction depends on the materials used; for example, ice on steel has a low coefficient of friction, while rubber on pavement has a high coefficient of friction. Coefficients of friction range from near zero to greater than one.

Facility workers are exposed to a variety of work environments during a typical shift. Moving from a warm to a cold environment, using floor cleaning chemicals to entering mechanical rooms that may have oil or grease present on the floor. An additional consideration is how long a facility worker is actually on their feet during a typical shift and the impact of poor safety boot selection. Considering your personal arch selection needs is an important part of the purchasing process. Arch problems will also cause pain in the knee and calf area as the tendons and ligaments reach to the lower leg.

How Far Does a Facility Worker Walk Each Shift?

Some facility workers have measured the steps they take while at work using a pedometer. Some have indicated that an average 8-hour shift has them walk 5-7 miles (8-10km). Poor footwear selection can result in or contribute to back pain or long term back problems. Ankle injuries can occur when a worker fails to properly tie their footwear. Did you know that blisters that occur while at work that may have been caused by poor footwear selection are actually a reportable workplace injury?

Big box stores may provide good value but are you really selecting the best boot possible for your personal short and long-term health? Hip replacements, knee replacements and general quality of life upon retirement will be based upon the decisions you make when you are young.



Understanding the Coefficient of Friction

The force that allows you to walk without slipping is commonly referred to as "traction." Experience shows that dry concrete sidewalks have good traction, while icy surfaces or freshly waxed floors can have low traction.

Technically, traction is measured as the "coefficient of friction" (COF). The coefficient of friction depends on two things: the quality and condition of the walking surface

and the soles of your shoes. A higher coefficient of friction means more friction, and therefore more traction.

To prevent slips and falls, a high coefficient of friction (COF) between the shoe and walking surface is needed. On icy, wet or oily surfaces, the COF can be as low as 0.10 with shoes that are not slip resistant. A COF of 0.40 to 0.50 or more is needed for excellent traction. To put these figures in perspective, a brushed concrete surface and a rubber heel will often show a COF greater than 1.0. Leather soles on a wet smooth surface, such as ceramic tile or ice, may have a COF as low as 0.10.

Shoes with soft rubber soles and heels with rubber cleats provide a high coefficient of friction (COF).

Behaviour that Lead to Falls

In addition to wearing the wrong footwear, there are specific behaviour that can lead to slips, trips, and falls. Walking too fast or running can pose a significant risk for fall injuries. In normal walking, the most force is exerted when the heel strikes the ground, but in fast walking or running, more force is on the heel of the front foot which pushes harder off the sole of the rear foot; thus, *a greater COF is required to prevent slips and falls*. Rapid changes in walking direction create a similar risk.

Anyone can fall, but the risk of falling becomes greater with age. As workers age stability and balance is affected and more falls can occur without having prevention measures in place.

Other problems that can lead to slips, trips and falls are:

- distractions;
- not watching where one is going;
- carrying materials that obstruct view;
- wearing sunglasses in low-light areas;
- failure to use handrails or the pull handle on an ice resurfacer;
- improper mount/dismount procedure on the ice surface or in the storage area

This and other behaviour can lead to falls, injuries, or even death.

Sure Footing – Don't Jump

When mounting or dismounting the ice resurfacer use the proper 3-point contact method.

The Three-Point System means that three of your four limbs are in contact with the ladder or vehicle at all times, either one hand and two feet, or two hands and one foot;

*only one limb is in motion at any one time; always step down backward, **never "jump" or "fall" down forward.***

Learning How to Fall

Naturally, the goal is not to slip, trip or fall but the possibility of a fall still exists.

Staying safe on ice:

- Wear proper footwear
- Walk slowly
- Take small steps
- Be aware of footing
- Keep both hands free
- Use ice cleats
- Consider use of head protection

Falls happen - When falling, the objective is to have as many square inches of your body make contact with the surface as possible, thus, spreading out the impact of the fall.

- Tuck your chin in, turn your head, and throw an arm up. It is better to land on your arm than on your head.
- While falling, twist or roll your body to the side. It is better to land on your buttocks and side than on your back.
- Keep your wrists, elbows and knees bent.
- Do not try to break a fall with your hands or elbows.

Report, record and thoroughly investigate all slips, trips and falls, with or without injury; take corrective action immediately to prevent similar incidents from occurring.

Consideration should also be given to special event staff (volunteer or other) and government representatives who may be conducting facility inspections on the ice surface as part of their job.

Other Areas at Risk for Slips and Falls

Although the focus of this document is specific to the ice surface, other high-risk areas can often be found in a recreation environment. Pool decks, washroom areas and floor areas receiving general maintenance will contain water; while mechanical rooms may have oil or refrigerants on the floor. Exterior building areas may also pose a slip and fall risk for maintenance personnel. Poorly designed ice rinks may have refrigerant pipes that extend past the dashboards creating a slippery area. Remove water and/or other liquids immediately once detected and if the cause of the leakage is structural, arrange for repairs of the roof or leaking pipes.

Is Foot Protection the Only PPE to Consider?

Foot protection is just one piece of personal protective equipment to protect workers. Other standard PPE includes:

- Head protection
- Hearing protectors
- Eye protection
- Respiratory protection
- Skin protection
- Hand protection
- Body protection
- Safety footwear

Consider the need for these items when conducting a Job Hazard Analysis for arena attendants.

Safety Tip: Installation of protective netting around the dasherboard system in ice arenas is another practical measure to protect those who work and play in these environments.

Controlling Hazards with PPE

Where a hazard is identified, try to control that hazard at the source or between the source and the worker. Before turning to PPE, consider the following:

- eliminate the hazard through engineering controls at the source, this could mean having to modify or replace equipment
- substitute hazardous materials or substances with less or non-hazardous alternatives
- redesign the work process (e.g. modify sequence of tasks to improve safety)
- isolate the hazardous agent (e.g. designated room or local ventilation)
- develop administrative controls (e.g. limit the time exposed to the hazard)

Recommended Reading

CSA Standard - Z195 - Protective Footwear

2009 edition of CSA-Z195 expanded the scope of the Standard to include slip-resistant (or slip-resisting) footwear. A test procedure based on a European standard has been agreed to by the footwear industry, and requirements have been set for the communication (labelling) of slip-resistance performance data on all safety footwear claiming to be “slip resistant”, “slip resisting”, or “anti-slip”.

CSA Standard Z195.1 Protective Footwear User Guideline

Head Protection for On Ice Arena Personnel

<http://orfa.com>

“Plan Your Work – Work You Plan”

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