

**PUBLIC ALLIANCE INSURANCE
COVERAGE FUND**

**SUPERVISOR'S GUIDE
TO...**

**SLIPS, TRIPS, &
FALLS-SAME LEVEL**

Slip, trip and fall accidents from the same level are the dominant controllable loss type in our municipalities today. Controllable is the key word for they can be reduced if proper planning, procedures and tools are used. It is not an easy task, but one that is within our capability.

Slip, trip and fall accidents from the same level are the second leading problem in the FIRST Responder Joint Insurance Fund. This is not surprising considering the traffic in municipal buildings and other areas made accessible to the public on a daily basis. Being the center of the community means a lot of people visit on a regular basis. Whether we are talking about employees or guests, it will always be our job to ensure that they have safe surfaces on which to walk.

Common Thoughts About Slips, Trips and Falls

1. Not considered a real problem unless someone falls from a roof or a ladder.

FACT: Nationally, slips, trips and falls from the same level account for approximately \$400 million dollars in losses each year.

2. Fixing hazards that produce falls is not usually high on the list of things to do.

FACT: Falls account for about 20% of the accidents and should be a priority when it comes to repair work.

3. Falls are considered to be the fault of high heels or other frivolous footwear.

FACT: Of the total number of falls studied, females accounted for 41% while men accounted for 59%.

4. We think that only old people fall.

FACT: People 21 years old or younger account for approximately 47% of all falls while people 65 and older account for only 20% of all falls. However, older citizens take longer to heal.

5. Most think that young workers fall when they are careless.

FACT: 90% of the people who fall are not very old, but 95% of the dollar costs come from people who are not very young.

6. We think most falls are not serious.

FACT: Slips, trips and falls account for 23% of all the dollar losses from accidents in the United States. In 1994 alone, 13, 300 people died from falls.

7. We believe that falls don't happen in our areas.

FACT: The third highest per capita cost of accidents comes from restaurant operations and the fifth highest comes from clerical operations.

8. Most consider falls to be either embarrassing or funny.

FACT: In 1989, the following types of injuries were attributed to slips, trips and falls from the same level: 39,000 strains, 44,000 contusions, 27,000 sprains, 8,000 fractures, 7,000 lacerations, 600 dislocations, 300 concussions and 200 crushing injuries.

9. Snow and ice are blamed for most falls.

FACT: Statistics in this area show that February is the worst month for slips, trips and falls with other winter months not far behind. However, statistics are national and include parts of the nation that do not experience snow and ice on a regular basis, if at all.

National Statistics

Statistics collected by the U.S. Consumer Products Safety Commission on injuries associated with slips, trips and falls indicate that 1,693,175 hospital-related cases were recorded in 1992.

The majority of these injuries occurred when individuals walked upon or used:

- **Sidewalks**
- **Staircases**
- **Balconies**
- **Ramps**
- **Parking Lots**

Hazardous conditions that contribute to these accidents are:

- **Slippery surfaces**
- **Uneven surfaces**
- **Debris in walkways**
- **Inadequate lighting**
- **Missing handrails on staircases or ramps**
- **Poor maintenance of surfaces**
- **Adverse weather conditions**

What Is A Slip?

The dictionary defines a slip as a sudden, involuntary slide...to lose one's foothold. The result of this event can be nothing or a serious incident. It is our job to ensure that the surfaces in our districts are not the culprit. How do we do that? The first step is to understand exactly what happens during such an event.

1. Most slips start with the heel of a shoe since the heel strikes the floor first when walking. The first event in a slip is the "heel strike." It is an impact phenomenon.
2. The second is the "micro-slip" which is undetected by the individual.
3. The "slip" is next and that is when the individual becomes aware of losing their traction and begins taking corrective action.
4. The fourth event is the "slide" which is the uncontrolled forward movement that leads to a fall.

Common Slipping Hazards

- **Wet floors, stairs, walkways**
 - Water
 - Oil or grease
 - Chemicals
- **Smooth floors, stairs, walkways**
 - Waxed, polished surface
 - Metal plate or cover
 - Tile, terrazzo, marble

What Is A Trip?

Tripping occurs when the foot, usually the leading foot, is arrested by an obstruction, preventing the center of gravity moving smoothly past the expected foot location point. The dictionary defines a trip as “a sudden impeding or catching of a person’s foot so as to throw them down...”

The key word here is “obstruction.” The most important characteristic of a walkway is that it be smooth without being slippery. A ridge of one-half inch or greater is enough to cause a trip. Sidewalks must be designed so that changes in direction, or unavoidable hazards, are clearly seen or anticipated by pedestrians. Sidewalks must also be well maintained and free of debris.

Tripping Hazards

- **Objects out of place**
- **Objects or materials in walkways**
- **Tools on floor**
- **Projecting parts of machines/equipment**
- **Equipment or materials on stairs**
- **Scrap or waste materials**
- **Pipe or conduit set near floor level**
- **Extension cords, power cables, air hose**
- **Uneven floor surface**
 - **Holes and depressions in floor**
 - **Projections - warped/loose boards**
 - **Broken floor surface**
 - **Uneven patches**
 - **Uncovered drains, pits**
 - **Bent floorboards or plates**
 - **Loose or poorly fitted grating**
 - **Sudden changes in pitch/elevation**
 - **Sagging or expanded floor support**

What Is A Misstep?

Simply stated, a misstep is when you put your foot down on a surface that you think will support you and it doesn’t. An example would be a grating that collapses under your weight.

What Is A Fall From The Same Level?

This is a classification of accident that is difficult for the average person to separate from a slip, trip or misstep. Many times people simply fall. They lose their balance or someone else causes them to fall. For the purposes of this guide, falls from the same level will include falls on staircases.

Here are some maintenance blunders:

- **Insufficient dilution of cleaning compounds**
- **Use of inappropriate detergents or floor finishing compounds**
- **Inadequate rinsing or burnishing**
- **Hard water scum**
- **Settled or tracked in dirt**

The following are the four major factors that contribute to slip and fall accidents:

1. The condition of the victim. Was the victim under the influence of drugs, alcohol or medication? Was the victim wearing his/her corrective lenses? Was he/she distracted by posters/displays, glare or emotional factors? Is the victim obese? Is there a medical problem with regard to balance?

2. The activity. Was the victim hurrying or rapidly changing direction, pushing a trolley or handcart? Was the victim carrying something that blocked his/her view? Was the victim talking with someone and not watching his/her path?

3. The footwear. Was the victim's footwear in good condition and suitable for the activity in which he/she was engaged? Did a strap or heel break at the time of the accident?

4. The floor. What was the condition of the floor at the time of the accident? Was it wet or dry? Were any tripping hazards in the victim's path?

A word about hydroplaning! Yes, it happens to those walking as well as those driving. Hydroplaning is a phenomenon long familiar to people who have driven too fast on wet roads, pilots who have landed planes in rainstorms, tire designers, and water skiers.

Workforce Limitations

Municipal budgets are tight and we have to learn to do more with less. That is a fact of life. There never seems to be enough staff to do all the jobs we are asked to do. Because of that, we must become better planners. Every entity should have a plan for the normal activities that take place during the year. That plan should control access to only those parts of the municipality that are absolutely necessary to the activity taking place. A pre-activity inspection of the areas accessible and the equipment that will be in use is essential.

What should you be Inspecting?

The Scene

- **What type of walkway surfaces do you have?**
- **Are there any transitions in walkway surfaces?**
- **If on a slope, descending or ascending?**
- **Are the surfaces in good physical condition?**
- **Are any surfaces contaminated?**
- **Are the surfaces was slippery?**
- **Are there any other dangerous conditions?**
- **Are there any signs warning of dangerous conditions?**
- **What are these surfaces like during Inclement weather?**

The Footwear

- **What type of footwear are your staff wearing?**
- **Are they in good condition?**
- **What is the heel material?**
- **What is the sole material?**
- **Do you think the footwear is adequate for their duties?**

Activities

- **What activities are your staff normally engaged in during the day?**
- **Will they have to hurry?**
- **Will they have to carry an object that will block their view?**
- **Will they have to push or pull anything?**

Inspections

You should know that there are no standards or guidelines for good practices in the area of prevention of slips. Even the National Safety Council and building codes throughout the nation are largely silent on anti-slip surfaces.

Exterior Surfaces – Driveways, parking lots, walkways, pathways, fields, tracks and grassy surfaces. Driveways and parking lots tend to be surfaced with asphalt while walkways are generally concrete. Playing fields are commonly grass although Astroturf is used occasionally. Each one of these surfaces must be inspected carefully.

Interior Surfaces – Corridors, offices, courts, and any other walking surface inside our buildings. A variety of materials are used here including wood, carpeting, terrazzo, tile, concrete, etc. Again, careful visual inspections are needed on a daily basis.

All of these materials have friction qualities when they are installed. Those qualities are lost over time from wear and by what we put on them. For instance, water spills from a water fountain, leakage from a refrigerator, or water tracked in from rain or snow can create a major hazard by either physical interaction with the floor polish, causing softening, or by modifying the coefficients of friction of the shoe material.

Where do these accidents occur?

According to the U.S. Consumer Products Safety Commission they occur:

- **Exterior Surfaces**
- **Parking Lots**
- **Interior Surfaces**
- **Visual Environment**
- **Walkways, Staircases,**
- **Balconies, Ramps**
- **Parking Lots**

Footwear In Your Entity

To prevent slips, intervention is necessary in two areas. The areas are interrelated, so dealing with only one may not be enough to prevent this type of incident.

FOOTWEAR – Heels and soles of the footwear being worn by the individual must create friction between them and the walking surface. Over a period of time and use, footwear will lose its frictional qualities.

There is little you can do about the footwear worn by the general public. You can control the type of footwear worn by your own people in the course of their duties. Standards should be in

place regarding the footwear these employees wear. Remember, the biggest percentage of accident costs stem from these operations.

LUBRICATION AT INTERFACE –

Like footwear, walking surfaces will lose their frictional qualities over a period of time and use. Contaminants can defeat the frictional interface of footwear and walking surfaces.

What should your people be allowed to wear?

It might be easier to start with what they should not wear. No one should be allowed to wear sandals on the job. Road crews and all field crews, and maintenance need sturdy, non-slip footwear in order to perform their tasks safely. High-top work shoes built to take rugged treatment are best in these areas. But be careful, not everything called a work shoe will measure up to the standard. Work shoes range in price from \$35 to over a \$100, depending on what they are made of and how strong they are stitched. There is a natural tendency for people to seek out bargains so, if you want them to have good footwear (work shoes) you have to get involved.

Outdoor Walkways

Sidewalks outside your buildings, or any protected area, are often cracked due to settling of surfaces, storm damage, or partially lifted from the action of tree roots. It is also essential for sidewalks to be pitched to provide proper drainage so that puddles do not collect on them. The best material for the surface of exterior sidewalks is concrete that is well maintained. Areas where steps or entrances to buildings are located should be properly illuminated.

Indoor Walks

Indoor flooring may be irregular due to the settling of the building structure, or damaged by having loads dropped on them. Indoor, or enclosed walks may be constructed of a variety of materials such as wood, tiles, stone, concrete or terrazzo. They may also be covered with carpets, tiles and other decorative materials. Surfaces coated with sealant or wax to enhance appearance may be slippery. However, a non-slip additive, such as sand, may be added to paint to reduce slipperiness.

The U.S. Consumer's Product Safety Commission has reported an estimated two million injuries and 1,000 deaths each year associated with stair falls. Many aspects of stairway design have been identified as important to safe stairway use. Those aspects are:

- **Steepness**
- **Step height and uniformity**
- **Step depth and width**
- **Tread overhang and configuration**
- **Lighting**
- **Vista (view)**
- **Approaches**
- **Landings**
- **Surface materials**
- **Handrails**

We have all used stairs thousands of times and we find some easy to climb and descend and others more difficult. Many times we have difficulty because of the layout of the stairs. People learn to walk on standard stairs and get into the habit of stepping a certain distance. Any variation of the stair is liable to cause a misstep.

Stair Rails & Handrails

If ever there was a factor that helped prevent countless accidents and their resulting injuries, it is the handrail on a set of stairs. Stair rails and handrails help us both ascending and descending. They let us catch ourselves if we misstep. But they only work if they are solid and of the right type. Here is a list of general requirements for stair rails and handrails:

- Every flight of stairs having four or more risers must be equipped with standard stair or hand railings.
- Winding or spiral stairways must be equipped with a handrail to prevent using areas where the tread width is less than 6 inches.
- Screens, mesh, intermediate vertical members, or equivalent intermediate structural members must be provided between the top rail and the stairway steps of the stair rail system.
- Screens or mesh, when used, must extend from the top rail to the stairway step, and along the opening between top rail supports.
- Midrails, when used, must be located midway between the top of the stair rail system and the stairway steps.
- Handrails and the top rails of stair rail systems must be capable of withstanding, without failure, at least 200 pounds of weight applied in any direction, at any point on the rail.
- The height of handrails must not be more than 34 inches or less than 30 inches from the upper surface of the handrail to the surface of the tread.
- Stair rail systems and handrails must be surfaced to prevent injuries such as punctures or lacerations and keep clothing from snagging.
- Handrails must provide an adequate handhold for people to grasp to prevent falls.
- The ends of stair rail systems and handrails must be constructed to prevent dangerous projections such as rails protruding beyond the end posts of the system.
- Unprotected sides and edges of stairway landings must be provided with standard 42 inch guardrail systems.

Vista & Lighting

Surprises are nice for some occasions, but never for negotiating a stairway. Changes in elevation need to be clearly seen by pedestrians. Lighting plays an important role in the prevention of falls on stairs. Make sure your stairs are easy to see as they are approached and make sure the lighting throughout travel remains adequate and consistent.

Tread Overhang & Configuration

Building codes for assembly and institutional buildings have been affected somewhat by recent efforts to ease architectural barriers for people with disabilities. For example, stair tread nosings are now being built without an abrupt projection. That is a benefit to everyone since projections cause trips.

Stairs Checklist:

- 1. Are all stairways free of objects that could cause a person to trip?**
- 2. Do all stairways have a firmly anchored handrail?**
- 3. Are all stairways well lighted?**
- 4. Are any stair coverings securely anchored?**

Ramps

A ramp is an inclined plane used as a walkway for pedestrians to move from one elevation to another without encountering obstructions, irregularities or discontinuous surfaces. Ramps are particularly useful for handicapped persons using wheelchairs. Ramps with less than four degrees of rise are sometimes difficult to visually detect and may not be apparent to pedestrians and this results in tripping. Therefore ramps are usually designed with a rise angle of between four and 15 degrees. Most building codes specify a maximum slope no greater than one unit vertical height and eight units horizontal. Where ramps are required for the physically handicapped, the maximum slope permitted by federal standards for new construction is a slope of 1:12.

Major building codes require that ramps be paved with non-slip surfaces. The surface should have antislip coefficient of 0.50 or greater under dry conditions. This objective may be attained by one of the following methods:

- Use of brushed concrete.
- Lines cut across the concrete (cross cleats).
- Installation of friction strips.
- Treatment of the surface with non-slip agents

Handrails are recommended for ramps having a slope greater than 1:15. At least one side of the ramp should be equipped with handrails. Ramps used by the handicapped should have rails on both sides. Handrails should be located 30 - 34 inches above the surface of the ramps and extend one foot beyond the top and bottom of the ramp.

Ramps and landings must have curbs, walls, railings and projecting surfaces that prevent people from falling off the ramp. Curbs should be a minimum of two inches high.

The width of ramps is similar to those recommended for corridors or stairs. Most building codes specify a minimum width of 36 inches. Landings on ramps should be provided at points of turning, entrance, exiting and at doors. The minimum length of the landing should be five feet except at the bottom landing where six is required.

Some building codes require that ramps be protected by overhead structures. Federal standards require that ramps be designed so that water or ice will not accumulate on the walking surfaces.

Parking Lots

A substantial number of slips, trips and falls occur in parking lots. Unfortunately most building codes do not address these problems, but rather concentrate on the hazards associated with large, multi-story parking structures.

What your parking lot should have:

- Regular, smooth surfaces
- Speed bumps that are properly designed
- Safe pedestrian access routes to parking lots that are conspicuously posted
- Adequate lighting

The surfaces of parking lots should be reasonably level, free of large potholes, cracks, and large irregularities. Asphalt paving is preferred over soil or stone surfaces.

If properly done, the spacing of parking spaces will promote better visibility for pedestrians and reduce damage to vehicles. We have all parked in garages where the main design consideration was to fit in as many vehicles as possible. When that is done it cuts down on the amount of area a person can view. That, in turn, can lead to problems other than just a slip or trip. Parking spaces should be wide enough that vehicle doors can be opened easily without striking an adjacent vehicle. This leads to easy traffic flow for pedestrians. They also see any defects in the surface of the parking lot and can avoid them.

Wheel stops, called curbs, bumpers, etc. are usually made of concrete and vary in size. Newer ones are smaller because many cars now have low front bumpers. Some drivers are like ferry boat captains who do not think they are docked until they strike the pilings.

Even low bumpers or wheel stops are a problem in parking lots. People trip over them as they walk through the lot. A good practice is not to have any bumpers at all. Sometimes there is an area adjacent to the lot that must be protected from damage. If you have a situation like that, they can be used. A better system is a vertical pole filled with concrete to protect areas. These poles should be painted yellow and high enough for a driver to see while parking. However, if you feel that you must use wheel stops, then paint them yellow so that they are easy to see.

Speed bumps located in driving areas may not be seen by pedestrians if they are not painted, but painting them can lead to another problem. Paint can be slippery when wet (rain or snow). They should be designed and installed so that a three-foot walking area is provided at each end.

Slips, trips and falls commonly occur when a ramp for the physically handicapped ends in a parking area that is not marked for such use. A car parked in front of the ramp may obscure the presence of the ramp. If "handicapped parking" is allowed in the area, the width of each stall should be increased to at least 12' 6" and the area in front of the ramp should be marked as a "No Parking" zone. All areas of parking lots must be sufficiently illuminated so that people can see and avoid obstacles. Be sure and include service ramps and adjacent walks in your lighting plan. Recommended lighting for the illumination of open parking areas of high pedestrian usage is 0.9 foot candle and for lesser used areas, 0.2 foot candle.

Swimming Pools

Slips are a common occurrence around swimming pools. We like the water in the pools rather than on the perimeter surface. Being realistic, we understand that diving and splashing puts water onto the pool apron. If the surface is a proper non-skid one, there is no problem. However, if the surface has not been properly installed and pitched, you can have what is commonly called "ponding." This is when water collects in an area because of poor drainage and you get a situation where it is deep enough to cause hydroplaning.

No running should be allowed in the pool area. Lifeguards are responsible for keeping this under control. Pools should not be used unless there is proper supervision!

Pools must be inspected before and after use to ensure there are no obstacles around the perimeter and no water collection on this surface. Equipment must be available in the area to remove any standing water that could cause a slip.

Keep the pool filled to its proper level. Overfilling will cause more water to be splashed up onto the pool's apron. Ensure that your drains are clear and are large enough to handle any water that finds its way to the pool perimeter. Be sure these drains are flush with the surface so that no tripping hazard is created.