

Proper Flooring: Slips, Trips, & Falls

INTERIOR CONSIDERATIONS

Your choice of flooring should be a high priority during planning for new construction or renovations as it can reduce your long term STF claims cost.

Consult with flooring experts to determine the safest surface for the various areas of your building. Make sure they are aware of the environment that the floor will be used in and your concerns for slip resistance. Special consideration should be given to the areas just inside the entry doors for high use locations. Local conditions may cause rain or snow to be tracked in and contaminate the surface potentially reducing the slip resistance value and increasing slipperiness. Do not overlook loading areas, where delivery drivers may slip and fall.

The “slipperiness” of a floor is measured by its coefficient of friction (COF). The “static” COF is usually measured by a device called a tribometer that drags, pushes, or strikes the floor with a shoe material of known characteristics. Some common ranges for static COF are given below.

A static COF of 0.5 (dry) is generally accepted as the minimum value for a surface to be considered “slip resistant” for able-bodied individuals. Some people will be able to safely walk on a dry surface with a COF less than 0.5. The COF of most walking surface materials decreases significantly (about 50%) when it is wet or otherwise contaminated. The Americans with Disabilities Act (ADA) recommends a static COF of 0.6 for flat surfaces and 0.8 for ramps. The walking surface should meet these performance characteristics when wet.

Floor finishes and cleaning methods can also contribute to slippery conditions. If soaps or strippers are used on a floor instead of clear water extra care must be taken to be sure that no residue remains behind. Mops should be cleaned after each use. Only non-slip floor finishes should be used. Buffing should generally be avoided—check your flooring and floor finish manufacturers’ instructions for details.

Consult with your floor maintenance contractor or your in-house maintenance director to be sure they are aware of the STF potential for the various areas around your facility. Also, determine if they have chosen the most appropriate floor maintenance products to provide a good slip resistant surface. Purchasing protocols change frequently so it is best to have written preferences for floor waxes and sealers, otherwise someone in the supply ordering process may elect to try a cheaper product which may not provide the slip resistance qualities you were planning.

Stairs, ramps and other changes in elevation inside your building pose a significant fall potential. These should be given special consideration whenever you are designing new construction or remodeling an existing facility. Elevation changes or irregularities in a floor surface as small as ¼ inch may contribute to a fall. Reasonable efforts should be made to identify and correct any defects such as wrinkled carpets, broken tiles, misaligned expansion joints and curled edges on walk-off mats used at entryways.

You should consult with your vendor for the most appropriate walk-off mat for your specific

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application. Mats must be monitored and replaced at the first sign of wear, such as curling of the corners or damage to the beveled edges.

During inclement weather the floors adjacent to the mats must be monitored, so any escaping water can be mopped and dried.

For new construction of stairs and ramps, your architect will determine the appropriate tread size, riser height and railings based on your local building codes. This also holds true for remodeling. For existing buildings with stairs, ramps and other changes in elevation, it is important that they are properly illuminated and well maintained. Stair treads, coverings and railings should be inspected to be sure they are not loose or worn. Changes in elevation should be highlighted by construction materials of contrasting color.

Negotiating stairs and ramps is further complicated for certain individuals due to their lack of depth perception. Elderly visitors often experience this malady as it is a natural part of the aging process. To help bring attention to elevation changes, as in stairs, the steps should be a different color than the landings. The simple color change helps identify the change. Single color, or mono-color, floor color choices should be avoided as they can help hide these elevation changes.

Wet floor signs should be used whenever moisture is present from weather, spills or maintenance. Signs should supplement, not replace, proper mopping and drying procedures. When signs are used, they should be tall enough to be easily seen and not pose a tripping hazard.

EXTERIOR CONSIDERATIONS

The same care and attention given to walking surfaces inside the building must be afforded to the exterior surfaces that you own or are

responsible for maintaining. This includes your parking lots, sidewalks, loading docks and the area immediately outside your entry doors.

When considering new construction or renovations, these areas should be discussed with the architect prior to the start of construction. At existing facilities these areas must receive constant attention.

Stairs, ramps and other changes in elevation should be highlighted for increased visibility. Caution signs can be posted near entry and exit doors reminding visitors that they will need to “step up” or “step down” as they enter or exit the building, if appropriate.

Changes in elevation that are not highlighted by construction materials of contrasting colors should be highlighted with slip-resistant, “high contrast” paint. This also applies to other obstructions such as speed bumps, and the perimeter of drainage grates where pedestrians might walk.

All stairs and ramps should be equipped with the appropriate code-required railings. Your code may call for any steps with more than 3 risers to be equipped with handrails. Also, it is not uncommon for steps over 88” wide be required to have a center handrail. All handrails and hardware must be maintained in good condition with no loose or damaged parts.

Exterior surfaces should be maintained in good condition with all debris promptly removed. All cracks, holes and uneven areas more than about 1/2” high or wide should be repaired.

New damage that appears over the winter should be repaired as soon as the weather permits. The exterior should be periodically evaluated after nightfall to observe the available lighting (and heavy shadows) for fall prevention and security purposes.

Surface Material	COF – Dry and Unpolished	COF – Wet
Clay tiles (carborundum sanded finish)	> 0.75	> 0.75
Clay tiles (textured)	> 0.75	0.40 to < 0.75
Clay tiles (smooth)	> 0.75	0.20 to < 0.40
Carpet	> 0.75	0.40 to < 0.75
PVC (with nonslip granules)	> 0.75	0.40 to < 0.75
PVC (plain)	> 0.75	0.20 to < 0.40
Mastic asphalt	0.40 to < 0.75	0.40 to < 0.75
Vinyl asbestos tile	0.40 to < 0.75	< 0.40
Linoleum (untextured)	0.40 to < 0.75	0.20 to < 0.40
Concrete (untextured)	0.40 to < 0.75	0.20 to < 0.40
Terrazzo	0.40 to < 0.75	0.20 to < 0.40
Rubber	> 0.75	< 0.20

If snow occurs in your area, maintenance directors will need to plan in advance with maintenance personnel or contractors on when and how frequently to clear it.

Once the storm has subsided, personnel must return to these areas to treat the surfaces to prevent the formation of ice. They will also need to clear by hand those areas that could not be cleared initially, including spaces between cars after the cars have been moved.

A reasonable person should expect to encounter ice and snow on walking surfaces during and immediately after a winter weather event. It is up to your maintenance crews and contractors to review these areas in the hours and days after the storm, to be certain that all surfaces have been cleared and remain clear.

Ice may also accumulate due to blocked or poorly positioned downspouts or drainage grates, or from failure to completely remove fallen snow which turns to ice from repeated thaw and freeze cycles.

Areas that are shaded by buildings, parked cars or other objects will take longer to clear of ice. Any sand or salt that is applied must be swept up once the area is dry, to avoid creating a slipping hazard.

A WORD ABOUT THE AMERICANS WITH DISABILITIES ACT

Compliance with the Americans with Disabilities Act (ADA) is required for all businesses that serve the public. These buildings must be made accessible to people with disabilities.

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New buildings, and portions of buildings being altered, must be brought into full compliance with the ADA in most all cases. Regarding existing buildings, the following excerpt is from the ADA Guide for Small Businesses:

Existing facilities are not exempted by “grandfather provisions” that are often used by building code officials. If you own or operate a business that serves the public you must remove physical “barriers” where it is “readily achievable,” which means easily accomplished without much difficulty or expense.

The “readily achievable” requirement is based on the size and resources of the business. So, larger businesses with more resources are expected to take a more active role in removing barriers than small businesses.

The ADA also recognizes that economic conditions vary. When a business has resources to remove barriers, it is expected to do so; but when profits are down, barrier removal may be reduced or delayed.

Barrier removal is an ongoing obligation—you are expected to remove barriers in the future as resources become available.

Details on the ADA can be found at <http://www.ada.gov/>. Some of the requirements of the ADA that impact slip and fall prevention for both the disabled and non-disabled population include:

- Limit objects protruding into walkways & passageways.
- Floor and ground surfaces must be firm and stable – heavily padded carpets, cobblestones and similar surfaces are more difficult to travel on.
- Carpet pile height is limited to ½”, carpets/rugs must be attached to the floor, and exposed edges must have edge trim as specified in the standard.
- Floor and ground surfaces must be slip-resistant; a static coefficient of friction of 0.6 is recommended for flat surfaces and 0.8 for ramps.

- Cross slope is limited to 1:50. Cross slope is the slope from left to right, i.e. perpendicular to the direction of travel.
- Changes in elevation over ¼” must be smoothed out or beveled as described in the standard.
- Location, size and orientation of drain grates are limited.
- Curb ramps must be provided as specified in the standard.
- Slope of ramps is limited to 1:20, although exceptions can be made for existing construction for slopes as steep as 1:8 as detailed in the standard.
- Construction details are specified for stairs, ramps, handrails and railings.
- Elevators must be self-leveling to within ½” of the floor landing.
- Requirements are specified for the force needed to open doors, and the operating speed of automatic and power-assisted doors.
- Requirements are specified for grab bars in restrooms.

SELF-ASSESSMENT

A documented self-assessment program is one of your best defenses against slip and fall accidents. Self-assessment consists of identifying and correcting hazards through facility inspections and accident investigations.

Facility inspections should be conducted by a responsible person designated by management. The results should be forwarded to the appropriate manager for correction of hazards and follow-up on completed items.

The attached inspection form may be modified to meet your own needs. It should be completed in detail at least annually but more frequently if inclement weather, during high use periods, or if construction activities frequently change the hazards encountered by pedestrians.

It is important to note that periodic, formal inspections are not a substitute for continual, informal inspections of the facility by all employees.

Employees should be instructed that it is everyone's responsibility to ensure a safe operation, and that hazards they notice should be immediately corrected or reported to management.

Despite everyone's best efforts, accidents may occasionally occur. Proper investigation of accidents will help identify and eliminate their causes. Investigations should identify not only the immediate cause(s) of the accident, such as rain water on the floor, but also the root cause(s).

For instance, possible root causes for a slip on rain water might include use of inappropriate floor finishes, inadequate walk-off mats, or insufficient mopping. Corrective actions should then be implemented to address the root cause(s).

SOURCES

Bureau of Labor Statistics

Department of Justice ADA Title II

FindLaw for Small Business: "Slip and Fall Accidents—Overview" and "Conditions Leading to Indoor Slip and Fall Accidents"

Injury Facts - National Safety Council

Insurance Information Institute

New England ADA Center

Occupational Health and Safety: "'I Fell, Ergo I Slipped': Fact or Fantasy?"

Professional Safety: "Walkway Surface Safety & Traction in the Workplace: The Rest of the Equation"

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CONTACT US

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All "No" answers indicate a deficient condition and require a comment and/or corrective action.

Area of Inspection	Yes	No	N/A	Comment/corrective action	Initial when corrected
Interior					
Floors clear of spills, rain, debris, storage, other foreign objects					
Tiles, carpet, other floor coverings in good condition					
Entryway walk-off mats in good condition					
Confirm non-slip floor finish, or no finish applied					
Changes in elevation > ¼ inch smoothed out or beveled					
Path of travel clear of signs, displays, other foreign objects					
Stairs and ramps in good condition					
Handrails and railings in good condition					
Doors operate smoothly and easily					
Illumination adequate					
Adequate supplies on hand such as wet floor signs, mops, salt, sand, shovels					

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Area of Inspection	Yes	No	N/A	Comment/corrective action	Initial when corrected
Exterior					
Parking lots and sidewalks clear of debris, ice, snow					
Loading docks/areas clear of debris, ice, snow					
Concrete, asphalt, other ground coverings in good condition					
Changes in elevation > ½ inch smoothed out or beveled					
Stairs and ramps in good condition					
Handrails and railings in good condition					
Illumination adequate					
Landscape layout discourages informal cut-through paths and foot traffic					

Inspection Completed By _____

Date Completed _____