Preventing Slip, Trip, and Fall Accidents

CHUBB®

A Guide for Theater and Performing Arts Centers

Chubb Risk Consulting

Slips, trips and falls are a leading source of accidents for theaters and performing arts centers. These incidents can result in substantial liability to the venue operators and a tarnished reputation amongst patrons and even the media. Making sure that your organization has comprehensive protocols and practices in place to address these vulnerabilities is an imperative part of any risk management program.

Operators of live entertainment venues face a variety of challenges on a daily basis. Challenges can include show changes, vendor management and of course, moving a large number of patrons in and out of the facility in short periods of time, both before and after a show or event. These high-flow traffic situations stress even the most well-managed facilities and front of house staff.

Chubb has created this resource to help venue operators take steps to reduce their liability and improve their visitor experience. Most of the information it contained was derived from Chubb's loss history and risk consulting best practices. However, please note that this guide is no substitute for legal advice from an expert in slip, trip, and fall risk consulting.

Slip, trip, and fall incidents have significant hidden costs, such as lost productivity, increased administrative activity, and potential negative publicity within the community

Indoors

Flooring Selection

While recognizing that many performance venues are historical in nature and protecting their historical integrity must be part of the risk control decision process, the choice of flooring materials and treatments is one of the most important decisions in preventing slip, trip, and fall accidents. Many factors go into the selection process including cost, aesthetics, maintenance requirements and what activities are taking place. With these factors in mind, time should be taken up front to thoroughly evaluate the advantages and disadvantages of different flooring materials, whether the project involves new construction or is a renovation.

Research studies of how people walk show how even slight elevation changes can result in a trip. Best practices indicate elevation changes of up to 1/4-inch can be left untreated. Changes between 1/4-inch and 1/2-inch should be beveled with a slope of 1:2 (rise:run) and changes greater than 1/2-inch should be accomplished be means of a ramp. Source: ASTM 1637, NFPA 101-7.1.6.2, ADA Stds for Accessible Design, Part 303.

How well a floor surface performs under its expected environmental conditions is another important consideration. A best practice is to compare samples of different flooring under the expected conditions using a properly validated, calibrated and maintained slip meter used by a trained and qualified person and operated in accordance with the manufacturer's instructions. For example, flooring that could become wet with water should be tested under similar wet conditions. Using the same slip meter and conditions is the best way to compare several different types of flooring. Two standards that can be referenced by qualified slip and fall risk engineers include ANSI 137.1 and ANSI B101.1.

The location of the flooring material being installed should also be considered. It is important to review the manufacturer's ratings and warnings to ensure that a flooring material is used in a compatible environment. For example, the slip-resistant rating and qualities of any material used near entrance/exit doors should be reviewed to ensure it will function with minimal maintenance under wet and snowy conditions and maintain a high slip resistance. Materials that have lower ratings under wet conditions may not be a good choice for this area. Floor surface materials in public food areas/courts, or in employee break rooms and kitchenette areas should provide high traction ratings under both wet and greasy conditions. Ramps should not be coated with slippery sealants or waxes.

Many performance venues are focused on "going green" with an eye towards sustainability. Green building standards such as the United States Green Building Council (USGBC) and their LEED certification program have a credit in the environmental quality category that specifically focuses on entrance way contaminant control. When achieving this credit option, it is important that it doesn't create an unintended consequence in terms of reducing your entranceway's slip resistance.

Floor Maintenance

Improper floor maintenance is another element that can lead to slip- and-fall accidents. Flooring is typically damaged during normal wear, through settling of the building structure, or by physical damage such as dropping or dragging heavy objects. Floor protection and condition reviews should be a formal component of the exhibit installation and removal plans. Failure to quickly identify and repair these deficiencies can lead to injuries.

Improper cleaning and finishing techniques by janitorial personnel can turn floors into slip and fall hazards. To prevent unintended consequences, application of any floor cleaner or wax should be conducted in accordance with the manufacturer's recommendations and with a high slip resistance in mind. When wax is necessary, care should be taken to use a high traction nonslip wax, as many wax products can reduce the slip-resistant rating of a floor. Furthermore, many floor waxes are not designed for high-speed buffing, which can further reduce the floor's slip resistance. It is critical to ensure that a floor wax is compatible with the flooring material being maintained and to carefully follow the application instructions.

Displays

At times, performance venues will have lobby exhibits or other display items for attendees to view or even interact with. Exhibit plans, displays, especially those with elevations involved should be designed primarily with the visitor experience and safety in mind. Adequate provisions for visitor traffic flow, crowds and clustering, strollers and wheelchairs, sight-lines, and object protection should be provided. To prevent visitors from touching objects that are openly displayed it is common practice to maintain a 3-4 feet of separation space. Elements used to prevent visitors from touching objects can include permanent railing or barriers, stanchions or raised platforms. Consideration should be given to ensure that these barriers do not create trip and fall hazards. Raised platforms should be at sufficient height and of contrasting color with the floor that they are visually discernible. Permanent railing and barriers should 42 inches above the floor. Temporary barriers such as stanchions should be at least 24 inches in height. Regular inspection to ensure the stability of stanchions should be documented whether they are affixed to the floor for free standing.

Displays such as pools or fountains will naturally result in water being spilled on the floor. Consideration should be given to providing walk off mats, slip resistance flooring and conducting regular inspections during hours of operation. CCTV coverage in areas where water is part of an exhibit or building aesthetics is a good practice. See the section on inclement weather for more suggestions.

Staircases

Injuries on staircases are a major source of trip and fall accidents. A number of factors contribute to these types of accidents, including:

- Irregular steps
- Busy floor patterns
- Poor illumination
- Poor maintenance
- Slippery steps
- Improperly positioned, absent, or broken handrails
- Doors that open directly onto stairs
- Articles left on stairs
- Broken or eroded treads
- Loose floor covering
- A step in an unexpected place
- Distracting views.

Contact the local building authority for building codes regarding staircases to ensure that your building is in compliance.

Escalators

When not operating, escalator steps do not generally meet the standard step geometry for stairs, which would increase the exposure for a slip, trip or fall. Do not allow escalators to be used as stairs when not working.

Elevators

Elevator thresholds should be level with the elevator carriage at each level and be slip resistant.

Outdoors

Walkways

The most important characteristic of walkways is that they must be smooth without being slippery. Walkways may crack due to settling surfaces, storm damage, or the action of tree roots.

Walkways should be level wherever possible, well-maintained and free of debris. In geographies with an autumn season regular attention should be given at the time of year to tree covered walkways due to heavy leaf shedding. Walkways should also be pitched enough to provide proper drainage so that puddles and ice do not collect on them, and be properly illuminated at night. In the event you find that your external walkways are too slippery, chemical treatments and other coatings are available that will increase the slip resistance of these surfaces.

Historically significant walkways

Walkways may be constructed of historically significant materials such as cobblestones that can create a trip and fall hazard. Although you may not be able to replace the material, consideration should be given to other elements such as increased lighting, providing alternative pathways, warning signage or posting staff in these areas.

Ramps

Slip, trip, and fall accidents commonly occur on ramps, which are used to allow access by those unable to easily negotiate steps. Ramps may need higher levels of slip resistance due to environmental factors and the increased slope. This can be accomplished by use of brushed concrete, cross cleats (cuts by a concrete saw), friction strips, and nonslip paints or coatings. Generally, wheelchairs can navigate a slope of 7° or less without excessive effort. Ramps with a slope of less than 4° may be difficult to detect visually and can surprise a pedestrian, especially when handrails are absent.

Having a well-managed slip, trip, and fall prevention program makes good business sense

Parking Lots
Slip, trip, and fall exposures can be mitigated in parking lots by making sure that:

- The surface is regular and smooth
- Speed bumps, which are tripping hazards, are eliminated. (If speed bumps are necessary, make sure they are properly designed–see next section)
- Safe, conspicuously marked access routes are provided for pedestrians
- Illumination is adequate

Parking lots should be included in any formal slip, trip and fall inspection program, to determine condition and schedule maintenance. An adequate budget should be maintained for parking lot repair and maintenance.

In an effort to go green, some performance venues are installing pervious paving to allow water to penetrate into the ground, thus reducing the amount of water runoff. As with other green building options, you want to make sure adding these features doesn't create additional risk in terms of slips and falls.

Speed Bumps and Wheel Stops

Speed bumps, if necessary, should be located in areas that are not in the direct walkway of pedestrians. They should be painted a bright color (such as safety yellow) with slip-resistant paints. They should be designed so that a flat, three-foot walking area is provided at both ends.

Wheel stops present tripping hazards, usually because they are out of sight at the time the driver exits the vehicle. When possible, the use of wheel stops should be eliminated by good parking lot design and engineering. They are a particular hazard to individuals with disabilities. If they must be used, paint them a bright color, and also ensure that they are positioned in such a way to prevent parked vehicles from extending into the pedestrian walkway.

Conducting a Hazard Analysis

Taking control of slip, trip, and fall hazards, like any other systemic problem, requires a methodical and coordinated process. Fully document the process to ensure management control and to demonstrate management's commitment to eliminating this hazard.

A good starting point in a safety program is to conduct a complete hazard analysis of the workplace. The elements of a hazard analysis include:

- Identifying the type of floor in each area to ensure that it is compatible with the environment in which it resides
- Reviewing maintenance procedures for floors, staircases, walkways, parking areas, etc.
- Observing the overall physical condition of walking surfaces to ensure they are not damaged by routine use or foundation settlement
- Identifying changes in levels of walk surfaces or in the type of flooring materials along walkways
- Analyzing prior claim and incident reports. These may contain actual accidents, near misses, and/or maintenance records that point to areas that have already resulted in injuries.

The information derived from the hazard analysis can provide the information needed to develop the following ongoing accident- prevention activities.

Self Inspections
Inspections should not be limited strictly to the front of the house, as the production companies that use your venue also have an expectation of safety. In fact, they often take for granted working in well-maintained facilities that allow for the production employees and performers to get the job done, whether it's load-in/load-out, lighting and rigging or conducting the onstage performance itself. Therefore, daily review of the onstage and backstage areas is a prudent practice as well.

This practice of formal daily inspections will hopefully not only result in better facility conditions, but also provide a tool for local and corporate management to oversee employee activities and venue condition trends.

Maintenance Protocol
All walking surfaces should be maintained on a regular schedule. It is important, however, to realize that maintenance procedures themselves can cause slip, trip, and fall accidents. For example, a poorly trained custodian may not know that specific types of flooring require specific types of care, as discussed in the previous section on floor maintenance. Continually monitor maintenance procedures followed by janitorial staff, whether they are your staff, contract personnel, or personnel employed by building management.

Inclement Weather Precautions
Develop precautions and assign them to specific employees to enact under certain poor weather conditions. One important precaution is the placement of walk-off mats at all entrance doors.

The Carpet & Rug Institute's "Carpet Maintenance Guidelines" states that extending mats 6' - 15' inside the entrance will trap 80% of the soil and moisture from the first five or 6 steps.

As a rule of thumb, footprints or water prints should not be seen on the floor beyond the last mat. Mats should be secure and in good condition with no curling or buckling at the edges. Any mat that is not in good condition or does not lay flat should immediately be removed from service. During heavy rainstorms, they should be inspected regularly to verify they haven't become saturated, thus rendering them ineffective.

Mats are made of a variety of materials, including rubber, polypropylene, and carpet to help remove water and dirt from shoes. The color of the mats should contrast with the color of the flooring, and mat edges should taper down to the floor for a smooth transition to the floor's surface. Under severe conditions, consider posting a staff member at each entrance to warn employees and attendees entering the venue about the slipping hazard and to manually mop any excess water that may accumulate.

Employee Training
Train employees to identify and report all slip, trip, and fall hazards so the hazards can quickly be corrected. Due to constant change in the workplace environment, this is an important element of the program. Also, to avoid employee slip, trip and fall accidents, educate employees on the role that shoe selection plays, and encourage them to wear shoes that are compatible with the flooring surfaces in their areas.

Monitoring Results
Finally, monitor the results of the safety program. Review audit procedures for all of the activities noted above to ensure they are properly and consistently followed. Furthermore, implement and regularly review a thorough accident and incident investigation procedure to ensure that the actions being taken are indeed preventing slips and falls.

Conclusion
Due to the fact that severe slip, trip, and fall accidents occur frequently at many performance venues, it is reasonable to suggest that it may be only a matter of time until such an accident occurs at your venue without the proper precautions being taken. Given the potential for injury and liability, and the comparatively low cost of implementing a slip, trip, and fall prevention program, having a well-managed program makes good business sense.

Sample Checklist
A good, detailed checklist can help identify hazards and then translate them into work orders that can have the hazards quickly corrected. The following sample is offered to help illustrate how a checklist might look and be used to minimize slip, trip, and fall incidents; the actual checklist you use should be tailored to your particular venue. Follow the checklist routinely, at least weekly and daily during active productions. Any "No" answer should have an entry in the "Action/Comment" column.

Requirement	Yes	No	N/A	Action/Comment
Flooring and Stairs				
Entrance/Box Office floors in good condition? (No cracks, frayed carpet, debris, etc.)				
Are flooring surfaces inspected regularly?				
Are flawed flooring surfaces promptly repaired or replaced?				
Lobby floors in good condition?				
Are caution signs posted for all wet floors? (Are signs selected with large open bottoms to cover hazards, or are cones used to mark off hazardous areas?)				
Are the floor signs used above knee height, visible from 360 degrees, and located near areas that are subject to wetness?				
Auditorium floors in good condition? (No frayed carpet, debris, etc.)				
Is loose debris swept up?				
Are tracked-in water and spilled liquids mopped up?				
Is electrical wiring that runs across the floor secured with tape?				
Is water/condensation producing equipment in public and staff areas checked for leaks on a daily basis and repaired if needed?				
All floor transitions clearly identified?				
Are aisles clear?				
Is the carpet plain, not “busy”?				
Are all cover plates flush with the surrounding flooring?				
Restrooms				
Are restroom floors made of non-skid material?				
Hourly inspection documentation in place?				
Paper towel dispensers located to limit water on floor? (Hand dryers also if applicable)				
Identified personnel in place to clean up spills or debris during heavy use times? (pre/post show, intermission, etc.)				
Display Areas				
Do display barriers such as railings, stanchions or platforms create a trip and fall hazard?				
Do displays that use water or other fluid have walk off mats?				
Do display areas allow for adequate space for visitors to move around them?				
Are floors inspected after display installation and de-installation for slip, trip and fall hazards?				

Requirement	Yes	No	N/A	Action/Comment
Stairs and Balconies				
Are staircases, ramps, and landings well- illuminated?				
Stair & ramp railings secure & appropriately located?				
Signage posted to use railings when on ramps & stairs?				
All seats in good condition and function properly? (No seats stuck down, temporary seating in place & in good condition, etc.)				
Stairs treads in good condition? (Any deficiencies clearly marked and scheduled for repair)				
Balcony railings secured and in good condition?				
Food and Beverage				
Is there a table layout design and/or are table locations well-marked?				
Are aisle ways adequate and well maintained to expedite traffic flow and to minimize slips, trips and falls?				
Are employees designated to provide quick clean-up response to spilled foods or liquids?				
Is there an ongoing, formal, and documented inspection program of floors and furniture?				
Are there adequate waste receptacles for patron waste during high usage times, and are these receptacles regularly serviced to prevent spills and overflows?				
Cleaning Chemicals and Floor Finishes				
Are “high-risk” areas maintained using slip-resistant cleaners?				
Is non-skid floor wax used and applied in a thin coating?				
Is non-skid flooring and deck paint used where appropriate?				
Are maintenance employees trained to apply floor-finishing products correctly?				
Matting				
Are absorbent walk-off mats used at all doorways that lead to the outside?				
Are the mats changed frequently during inclement weather?				
Are mats in good condition?				
Do all the mats lie flat?				
Are thick mats constructed with beveled edges to minimize tripping?				
Are mats used with a nonslip backing?				
Are additional mats stored on site so that worn and wet mats can be replaced?				

Requirement	Yes	No	N/A	Action/Comment
Parking Lots and Sidewalks				
Are remedial controls in place during winter months (where applicable) for ice melt and hand shovel?				
Are safe access routes well-marked?				
Are these areas free of ice, snow, and grease?				
Are these areas well-lit?				
Are receiving areas, ramps, stairs, and walkways in good condition and free of debris or contaminants (to include snow and ice)?				
Are parking lot dividers, curbs, and speed bumps well-marked?				
Are walking surfaces subject to wet or icy conditions coated with a rough, textured finish?				
Are automatic lawn sprinkler heads oriented so excess water doesn't puddle on walkways?				
Egress doors exit to smooth surfaced areas that are properly maintained? (Stairs in good condition if applicable, railings provided and secure, etc.)				
Are speed bumps painted using non-skid paints that contrast with the driving surfaces?				
Are wheel stops situated so they do not permit vehicles to extend into walkways and do not present a tripping hazard to pedestrians?				
Are bike racks situated so they do not cross pedestrian paths or create a slip and fall hazard?				
Are parking lots regularly checked for potholes, cracks, and depressions, and are they patched on a regular basis?				
Are islands identified with signs?				
Are parking lot lights checked nightly to identify bulbs that need replacing?				
Are catch basins cleaned on a regular schedule?				
Is snow removal done before employees report to work and before the venue opens to the public?				
Are curbs painted with contrasting colors?				
Does maintenance staff regularly remove leaves and debris?				
Staff Stationing and Response				
Trained personnel stationed & prepared to respond to spills?				
Are written slip/trip/fall-prevention and accident-handling policies posted on employee bulletin boards?				
All staff trained in incident response and reporting?				
Incident response report documents available for immediate use anywhere in the facility?				

Requirement	Yes	No	N/A	Action/Comment
Housekeeping Procedures				
Spill signs available to mark spills on non-carpeted floors?				
Are all passageways, storerooms, restrooms, and public areas kept clean, sanitary, orderly, dry, and free of protrusions (such as nails or splinters)?				
Is a rigid cleaning and mopping schedule in place to keep floors clean and dry?				
Are "Use Caution: Wet Floor" signs used when floors are being mopped?				
Have floor cleaning solutions been selected based on their compatibility with the floor surface and are applied according to manufacturer's instructions?				
Does someone keep a log of all cleanings/repairs? (A log should record products used, when and by whom tasks are performed, surfaces cleaned/repaired, and cleaning/repair procedures used.)				
Are mats used with a nonslip backing?				
Stage and Backstage				
Catwalks in good condition? (Railings & toe boards in place, surface in good condition, etc.)				
Fall protection tie off points identified and rated for at least 5000 lbs. per person tied off?				
Stage transitions clearly marked?				
Pit/hole protections in place? (If applicable)				
Stair railings in good condition & structurally sound?				
Stair treads in good condition & free of trip hazards?				
Miscellaneous				
Are awnings or blinds used to block the sun's rays in areas where sun glare inhibits a person's ability to see walking surfaces or obstacles?				
Are file drawers closed when not in use?				
Are there enough electrical outlets to eliminate the use of extension cords?				
Are electrical outlets installed where they do not pose a tripping hazard?				

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