Reducing Risk with Safer Floors

A Balancing Act For The Facility Manager

By Rex O’Rourke
Application Engineering Specialist
Commercial Solutions Division
3M Australia
Introduction

Facility managers are responsible for the strategic and operational management of buildings and facilities in public and private companies. They ensure the effective and efficient operation of the facility and create and maintain safe and productive environments for occupants. This includes the important responsibility of ensuring that facilities meet health and safety requirements and comply with local regulations. Safety compliance is a broad and complex topic so this paper aims to focus on floor safety to assist facility managers better understand and reduce risks in this area.

Unsafe floor conditions and lack of awareness of risks and hazards are the key factors that generally lead to slip, trip and fall accidents. To help prevent such accidents it is essential for facility managers to implement floor safety policies. However, if the policies and solutions do not meet local regulations and standards, they are not reinforced by trained employees or the implemented solutions do not effectively control the hazard then that policy means very little and will unlikely hold up in a legal situation. Ineffective floor safety strategies are continuing to be costly to both workers and company owners.

Unsafe floors in commercial buildings present a safety and liability risk for Australian businesses estimated to cost the economy billions of dollars in workers’ compensation, lost productivity and public liability insurance claims per annum.¹

The Work Health and Safety Regulations 2011 states:

“floors and other surfaces are designed, installed and maintained to allow work to be carried out without risk to health and safety”

<table>
<thead>
<tr>
<th>Mechanism</th>
<th>Total Cost ($million)</th>
<th>Distribution %</th>
<th>Unit Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Injury</td>
<td>Disease</td>
<td>Total</td>
</tr>
<tr>
<td>Fall, trips and slips of a person</td>
<td>6,400</td>
<td>2,300</td>
<td>8,700</td>
</tr>
<tr>
<td>Hitting objects</td>
<td>2,700</td>
<td>700</td>
<td>3,400</td>
</tr>
<tr>
<td>Being hit by objects</td>
<td>5,000</td>
<td>1,200</td>
<td>6,200</td>
</tr>
<tr>
<td>Sound and pressure</td>
<td>300</td>
<td>3,000</td>
<td>3,300</td>
</tr>
<tr>
<td>Body Stressing</td>
<td>10,900</td>
<td>14,300</td>
<td>25,200</td>
</tr>
<tr>
<td>Heat, radiation and electricity</td>
<td>900</td>
<td>400</td>
<td>1,300</td>
</tr>
<tr>
<td>Chemicals and other substances</td>
<td>600</td>
<td>1,100</td>
<td>1,700</td>
</tr>
<tr>
<td>Biological factors</td>
<td>100</td>
<td>800</td>
<td>900</td>
</tr>
<tr>
<td>Mental stress</td>
<td>800</td>
<td>4,500</td>
<td>5,300</td>
</tr>
<tr>
<td>Other and unspecified mechanisms</td>
<td>3,100</td>
<td>1,600</td>
<td>4,700</td>
</tr>
<tr>
<td>Australia</td>
<td>700</td>
<td>29,900</td>
<td>30,600</td>
</tr>
</tbody>
</table>

¹ Units are rounded to the nearest $100 million

The cost of work-related injury and illness for Australian employers, workers and the community, 2008-09, Safe Work Australia

Based on these statistics, there appears to be further opportunity to improve floor safety initiatives as these are not effectively eliminating slip, trip and fall hazards. As a result, standards organisations and legislative authorities such as Australian Standards and Building Codes of Australia have reviewed and improved regulations and guidelines to reduce the number of incidents. To help prevent devastating injuries and ensuing lawsuits, facility managers must implement comprehensive programs based on these guidelines that take into account all slip, trip and fall hazards including floor type, slip resistance, matting placement, cleaning methods and maintenance frequency. While designing these solutions facility managers also need to consider building aesthetics, cost and sustainability.
Facility managers face the unenviable challenge of striking a balance between reducing this safety and liability risk, and at the same time, implementing sustainable flooring solutions that both maintain building aesthetics and reduce operational costs.

There is a considerable amount of information to take into consideration including Acts, Regulations, Codes and Standards when managing the safety of floors. Facility Managers also need to be aware of how to identify hazards, available solutions and correct implementation. This White Paper sets out to help clarify what can be a confusing area to deal with.

**Legal Framework**

Providing a healthy and safe workplace or facility is a legal obligation. In addition, effective management of health and safety procedures makes good business sense. Successful programs generally lead to decreased costs, improved productivity, higher morale and better employee/customer relations. The Work Health and Safety Act 2011 (WHS Act) is designed to assist managers and employees to understand their health and safety duties and rights in the workplace.

The Work Health and Safety Act 2011 came into effect in January 2012. It replaced the Occupational Health and Safety Act 1991. The main objective of this Act is to provide for a balanced and nationally consistent framework to secure the health and safety of workers and workplaces by protecting workers and other persons against harm to their health, safety and welfare through the elimination or minimisation of risks arising from work or from specified types of substances or plant.

**What does the WHS legislation consist of?**

The Work Health and Safety Act 2011 consists of a few parts. These are:
- Acts (Laws);
- Regulations; and
- Codes of Practice

The WHS Act provides a legal framework for health and safety management in all workplaces and allows for flexibility in the choice of risk controls. Regulations set out more detailed legal requirements for the management of various health and safety hazards and issues outlined in the Act. Codes of practice provide advice on how to meet regulatory requirements. Codes are not legally enforceable, but they can be used in courts as evidence that legal requirements have or have not been met.

**Who is held responsible under the Act?**

The Act clearly outlines duties for all workplace parties including employers, employees, self-employed persons, persons who manage or control workplaces, designers of buildings and structures, manufacturers and suppliers of plant and substances and installers of equipment used in the workplace.
It provides a framework that must be followed for employers and employees to work together to make decisions about health and safety.

**How does the Act apply to floor safety?**

The Work Health and Safety Act 2011 states: floors and other surfaces are designed, installed and maintained to allow work to be carried out without risk to health and safety (Chapt3, Divi 2, 40 (c)).

This means that floors should be inspected regularly and maintained to eliminate slip and trip hazards. Common examples of hazards include trailing cables, uneven edges or broken surfaces, gratings or covers, loose mats or carpet tiles. Floor surfaces require sufficient grip to prevent slipping, especially in areas that may become wet or contaminated. Cleaning methods should also take account the potential for slips, which may be increased by the use of some cleaning agents.

In order to manage these hazards and risks under the WHS regulations, a duty holder should follow these codes of practice:

- Identify potential hazards that could give rise to the risk. Level of exposure of people to a hazard eg. uneven or slippery floors.
- Eliminate the risk so far as is reasonably feasible. Matting in wet areas, traction tape on ramps, spill response.
- If it is not feasible to eliminate the risk – minimise the risk as much as possible by implementing control measures in accordance with the hierarchy of control. Hazard warning tapes, barricades, and signage.
- Maintain the implemented control measure so that it remains effective. Safer Floors Program, trained employees.
- Review, and if necessary revise, risk control measures to maintain a work environment that is without risks to health and safety. Documented safety procedures, record keeping etc.

(Source: Managing the risk of falls at the workplace – code of practice 2011)

Facility managers are employed in a range of sectors and industries that will have varying safety requirements. Through these new guidelines, facility managers can successfully determine their facility’s risk and plan accordingly to reduce accidents and costly lawsuits.

People conducting a business or undertaking (this includes facility managers and employees) must manage the health and safety risks associated with slips and trips by eliminating the risk so far as is reasonably practicable, and if that is not reasonably practicable, minimising the risk so far as is reasonably practicable. Significant penalties are available in the regulations to be applied by the courts in instances where non-compliance is proven. These can be up to $6,000 for an individual and $30,000 for a business.
A duty of care also exists to the Public using the facility. Slips and trips account for the largest proportion of liability claims for public places such as shopping centres.

**Applicable Standards**

Further to the WHS Act facility managers will need to rely on Australian Standards to ensure suitable safety solutions are implemented. With the intention to reduce slip-and-fall incidents and injury rates, safety groups and standards committees have updated some floor-safety standards. For example, The Building Code of Australia (BCA) now quantifies slip resistance and includes reference to slip resistance testing standards. Through these updated regulations, facility managers can identify risks at their facilities and plan accordingly to reduce accidents and costly litigation.

Slippery floors in commercial buildings continue to be a liability for facility managers. Depending on the flooring application, different levels of slip resistance are necessary. HB 197 – An Introductory Guide to the Slip Resistance of Pedestrian Surface Materials (published by Standards Australia and the CSIRO), provides some recommendations on the minimum level of slip resistance required for common locations and types of application. It is important to determine the minimum slip resistance required for specified areas to ensure compliance. The three approved standards for measuring slip resistance are outlined below.

**AS4586-2013: Slip Resistance Classification of New Pedestrian Surface Materials.**

The Standard is referenced if a new building or expansion is being constructed. The Standard’s objective is to provide users and specifiers of pedestrian flooring materials such as architects, engineers, facility managers and manufacturers with means for classifying such materials according to their slip resistance for use in their selection. This Standard may also be applicable when selecting a coating or film to be applied to the floor surface. The supplier should be able to provide this information.

Four methods are described for measuring the slip resistance of surfaces.

(a) Wet pendulum test method.
(b) Dry floor friction test method.
(c) Wet-barefoot inclining platform test method.
(d) Oil-wet inclining platform test method.

Methods (a) and (b) can be conducted in the laboratory or on site.

Methods (c) and (d) are methods to be carried out in a laboratory.

Methods (a) and (b) are suitable for testing tiles, pavers, concrete, timber, steel, carpet, resinous coatings etc. on floors, entrances, stairs and ramps. The inclining platform methods, (c) and (d) are
suitable for testing gratings, heavily profiled surfaces, tactile indicators, rock, bush-hammered surfaces and resilient surfaces.


This Standard provides methods of measuring slip resistance of existing surfaces in wet and dry conditions. This can include for evaluation of sealers, polishes and etchants that modify the characteristics of the surface.

Two methods are described for measuring the slip resistance of surfaces.
(a) Wet pendulum test method.
(b) Dry floor friction test method.

These methods are the same as those described in AS4586-2014.


The handbook provides a guide to the aforementioned Standards, what parts of the National Construction Codes (NCC) - which includes Building Codes of Australia Volumes 1 and 2 - that require slip ratings and how to meet these requirements. The Handbook also provides guidance on the appropriate slip resistance in some other common applications not covered by the NCC, the criteria for verifying compliance with slip resistance specifications, and design for slip resistance of sloping surfaces.

Whilst the Standards set out the measurement methods to be employed to determine the slip-resistance classification of a surface, the Handbook, HB 198:2014 may be the most useful to the facility manager. It outlines the Classifications used for the four test methods.

The Wet Pendulum Test method is likely the most prevalent method for evaluation of new and existing floors that may be at some time wet and present a potential slip hazard. The method provides a measure with a dimensionless unit, the British Pendulum Number (BPN). The BPN is applied to provide a Classification number with P0 being the least slip-resistant and P5 the most slip resistant.

Classifications that are deemed to satisfy the building applications in the NCC are found in Table 3A of the Handbook. These relate to stair treads, stairway landings and ramps. Classifications range from P3 to P5 depending on the application.
These Standards may have implications for businesses that do not have safe floor programs in place, because they offer advantages for complainants and prosecutors in slip-and-fall claims. If facility managers do not show due diligence in implementing a program to protect workers and patrons from a slip-and-fall accident, it is easier for prosecutors to demonstrate negligence.

Table 3B (on page 8) from the handbook is a useful reference to determine the classification for applications that are not included in the NCC. These include Hotels, Offices, Public Buildings, Schools, Kindergartens, Supermarkets and Shopping Centres, Hospitals and Aged Care Facilities and other areas.

In supermarkets and shopping centres, toilets facilities, fast food outlets, buffet food servery areas, food courts and fast food dining areas, fresh fruit and vegetable areas, shop entries with external entrances and separate shops – wet eg. a florists in shopping centres all attract a Classification of P3.

Supermarket aisles, except fresh food areas and dry separate shops, are required to meet a classification of P1, which is a reflection of the lower risk of a slip in a dry surface. However, this test is still conducted wet.

There are floor treatments that improve slip resistance of floors generally by increasing the surface roughness of the flooring. The main floor treatments are sand blasting or grinding, chemical etching, coatings and using floor mats or adhesive anti-slip strips.

The type of floor substrate has an impact on choices for floor protection and floor safety. Hard floors such as marble, granite, terrazzo and concrete will require a different approach to soft floors.
such as Linoleum and vinyl. The substrate also impacts flooring slip resistance.

Facility type and use also has a major impact on floor protection and safety choices. The demands placed on flooring in a high traffic shopping centre for example will vary greatly to that of a city office tower or apartment block. Consider what level of protection is required to help prevent daily scuffing, staining and wear patterns as a result of both foot traffic numbers and types of traffic such as shopping trolleys, box trolleys, gurneys and high heels shoes.

### Table 3B: Wet Pendulum Test or Oil-Wet Inclining Platform Classifications for Applications Where the NCC Does Not Require Slip Resistance

<table>
<thead>
<tr>
<th>Location</th>
<th>Wet pendulum test</th>
<th>Oil-wet inclining platform test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>External Pavements and Ramps</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External ramps including sloping driveways, footpaths etc. steeper than 1 in 14</td>
<td>P5</td>
<td>R12</td>
</tr>
<tr>
<td>External ramps including sloping driveways, footpaths, etc., under 1:14, external sales areas (e.g. markets), external carpark areas, external colonnades, walkways, pedestrian crossings, balconies, verandas, carparks, driveways, courtyards and roof decks</td>
<td>P4</td>
<td>R11</td>
</tr>
<tr>
<td>Undercover car parks</td>
<td>P3</td>
<td>R10</td>
</tr>
<tr>
<td><strong>Hotels, Offices, Public Buildings, Schools and Kindergartens</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entries and access areas including hotels, offices, public buildings, schools, kindergartens, common areas of public buildings, internal lift lobbies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wet area</td>
<td>P3</td>
<td>R10</td>
</tr>
<tr>
<td>Transitional area</td>
<td>P2</td>
<td>R9</td>
</tr>
<tr>
<td>Dry area</td>
<td>P1 (see Note 3)</td>
<td>R9</td>
</tr>
<tr>
<td>Toilet facilities in offices, hotels and shopping centres</td>
<td>P3</td>
<td>R10</td>
</tr>
<tr>
<td>Hotel apartment bathrooms, en suites and toilets</td>
<td>P2</td>
<td>A</td>
</tr>
<tr>
<td>Hotel apartment kitchens and laundries</td>
<td>P2</td>
<td>R9</td>
</tr>
<tr>
<td><strong>Supermarkets and Shopping Centres</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fast food outlets, buffet food servery areas, food courts and fast food dining areas in shopping centres</td>
<td>P3</td>
<td>R10</td>
</tr>
<tr>
<td>Shop and supermarket fresh fruit and vegetable areas</td>
<td>P3</td>
<td>R10</td>
</tr>
<tr>
<td>Shop entry areas with external entrances</td>
<td>P3</td>
<td>R10</td>
</tr>
<tr>
<td>Supermarket aisles (except fresh food areas)</td>
<td>P1 (see Note 3)</td>
<td>R9</td>
</tr>
<tr>
<td>Other separate shops inside shopping centres</td>
<td>P3</td>
<td>R10</td>
</tr>
<tr>
<td>Other separate shops inside shopping centres</td>
<td>P1 (see Note 3)</td>
<td>R9</td>
</tr>
<tr>
<td><strong>Loading Docks, Commercial Kitchens, Cold Stores, Serving Areas</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loading docks under cover and commercial kitchens</td>
<td>P5</td>
<td>R12</td>
</tr>
<tr>
<td>Serving areas behind bars in public hotels and clubs, cold stores and freezers</td>
<td>P4</td>
<td>R11</td>
</tr>
<tr>
<td><strong>Swimming Pools and Sporting Facilities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swimming pool ramps and stairs leading to water</td>
<td>P5</td>
<td>C</td>
</tr>
<tr>
<td>Swimming pool surrounds and communal shower rooms</td>
<td>P4</td>
<td>B</td>
</tr>
<tr>
<td>Communal changing rooms</td>
<td>P3</td>
<td>A</td>
</tr>
<tr>
<td>Undercover concourse areas of sports stadiums</td>
<td>P3</td>
<td>R10</td>
</tr>
<tr>
<td><strong>Hospitals and Aged Care Facilities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bathrooms and en suites in hospitals and aged care facilities</td>
<td>P3</td>
<td>B</td>
</tr>
<tr>
<td>Wards and corridors in hospital and aged care facilities</td>
<td>P2</td>
<td>R9</td>
</tr>
</tbody>
</table>
Within any facility there are distinguishable areas such as entranceways and lift corridors, which bear the brunt of foot traffic. These high traffic areas also tend to be transition areas where there is a greater likelihood of slips, trips and falls as a result of changes in floor surface or exposure to the elements resulting in wet or dirty foot traffic. Given the associated liability risks, facility managers need to strike a balance between flooring protection, aesthetics and importantly, meeting floor safety standards.

**Risk Management**

Prevention is the best form of protection and this is where developing a Health and Safety Risk Management program comes to the fore. When related to safer floors this can include design, floor material selection, floor coatings, cleaning and maintenance practices. However, in reality aesthetics and cost often take precedence where floor material selection is concerned.

Travertine, Marble and Terrazzo are visually appealing when polished and or coated, the ‘wet look’ being popular. However, when wet, the slipperiness of these materials may increase significantly and so too, the risk of a slip.

In areas where the floor is at risk of getting wet, such as centre entrances, food courts, fresh produce areas and floors below wash basins in toilets, risk management practices must be put in place. These can include training the cleaning team to clean up spills and water immediately, placing mats at entrances to remove contaminants, including water, etching the floor surface, applying an anti-slip coat, film or tape to the surface.

Below is a summary of suggested actions to help prevent slips and trips at work. Reproduced from “Preventing slips and trips at work, A brief guide” INDG225(rev2) 11/12.

Unclean and unsafe floors are a leading cause of slip-and-fall accidents. In addition to causing injury to employees and guests, slip, trip and fall accidents can cost a business thousands, or millions, of dollars in legal fees and settlements. According to Zurich Insurance, the average compensation and medical costs associated with slip-and-fall accidents are approximately AU$30K per case. Claims can also result in a public relations nightmare that negatively impacts the reputation of an organisation. To help prevent devastating injuries and subsequent lawsuits, facility managers need to implement a comprehensive program that takes into account all contributors to a slip and fall including floor type, matting placement, cleaning methods and maintenance frequency.
Stop floors becoming contaminated

- Use entrance matting
- Fix leaks from machinery or buildings
- Make sure plant and equipment are maintained
- Design tasks to minimise spillages.
- Plan pedestrian and vehicle routes to avoid contaminated areas

The facility and business type plays a critical role in the safety of a floor. Therefore, having tailored maintenance procedures is important in protecting employees and guests. Depending on foot traffic, a freshly cleaned floor can accumulate dirt, liquid and debris quickly. Build-up of these contaminants increases likelihood of slips and falls. Daily floor maintenance is vital to maintain a facility’s cleanliness and safety.

Once flooring is revitalised, matting solutions provide another way to reduce accidents by capturing dirt and water before it enters the facility. Strategically place mats within the facility to capture dirt and liquids and reduce slips and falls.

Assess best location for mats by identifying the floor zones where the mats will be most beneficial such as entrances, high-traffic corridors and productivity areas. Then select matting that is appropriate for each application and area. Entrance matting is the first line of defence against the treading of water, dirt and contaminants throughout the facility. Select mats that are classified as "High Traction" to reduce the risk of slips, trips and falls. Work area matting helps provide comfort and reduce fatigue, helping enhance productivity for employees who spend long hours on their feet. If the work environment includes dry floors with debris or wet floors from water or chemicals, work area matting can help avoid any potential slip and trip accidents in your facility.

While matting placement and type is important to improving safety, mat cleanliness and maintenance is also important. Ensure that matting is regularly laundered and replaced. Poorly maintained matting can curl or slit at the edges and increase chances of slip, trip and fall accidents. Also, heavily soiled matting can transfer contaminants to shoes spreading debris and water around the facility. Matting service providers can ensure matting stays clean and effective in reducing slip, trip and fall accidents.

Use the right cleaning methods

- Make sure that your cleaning method is effective for the type of floor you have
- Don’t introduce more slip or trip risks while cleaning is being done
- Leave smooth floors dry after cleaning or exclude pedestrians until the floor is dry
- Remove spillages promptly
- Have effective arrangements for both routine cleaning and dealing with spills
- Use the appropriate detergent mixed at the correct concentration

Cleaning and maintaining flooring properly is the most important factor...
impacting slip resistance, regardless of flooring type. Almost all slips happen when floors are wet or contaminated with water, oil, food debris or dust. If the floor has a smooth surface (like vinyl, ceramic tiles and varnished timber) even a tiny amount of contamination can present a potential slip hazard.

Effective cleaning revitalising a floor surface and helps prevent slips and falls. With restored floors, facility managers promote a positive image of the facility and demonstrate a commitment to cleanliness and safety. Control measures need to include management systems, contamination control by preventing contamination, choosing the right cleaning method, making sure cleaning does not introduce new slip risks and obstacle. All are necessary to prevent slips and trips.

Enhance the effectiveness of cleaning protocols by using quality equipment and cleaning tools. Examples include using microfiber mops to effectively remove particulates and liquids from all areas of the building, use the correct dosage of detergent to remove grease or oil contamination, use a dry mop to remove excess water after cleaning and ensure employees place proper signage throughout wet areas to warn guests and help eliminate accidents.

Timely response to spills is an important aspect of any slip, trip and fall mitigation program as well as any environmental protection program. Sorbents and spill control products help you keep your employees and work environment safe from unexpected spills, leaks, drips or other accidents. Sorbents are available in a range of formats from pad to rolls to address multiple applications including simple maintenance clean ups to major emergency spills.

Always be prepared to immediately respond to spills -
- Fully stocked and regularly maintained spill response kit
- Chemical spill response kit (appropriate sorbents)
- Spill procedures and training
- Personal protective equipment (PPE) is provided with kits
- Access the relevant Material Safety Data Sheets (MSDS) to ensure appropriate risk controls are in place. MSDS must be no more than five years old from date of issue
- Clean Up Equipment eg. Disposal bags, brooms, scoops etc.

Spill kits should be provided and be readily accessible in relevant locations at the workplace. Commercially available spill kits can be purchased or the workplace can create their own. It is important that spill kits are tailored to meet the specific needs of each location where chemicals are stored.

**Consider the flooring and work environment**

- Check for loose, damaged and worn flooring and replace as needed
- Floors likely to get wet or have spillages on them should be of a type that does not become unduly slippery
- Make sure lighting is sufficient and that slopes or steps are clearly visible
- Keep walkways and work areas clear of obstructions
Think about people and organisational factors

- Consider how work is organised and managed eg to avoid rushing, overcrowding, trailing cables
- Make sure employees are involved in the decisions that affect them, eg choice of PPE, footwear or a change in cleaning methods

Trips generally take place on damaged, uneven and badly laid floors or due to obstacles being left where people do not expect to find them.

Safety and good housekeeping go hand-in-hand. If the facility’s housekeeping programs are poor this may result in higher incidence of injuries, increasing insurance costs and regulatory citations.

To further help keep your workplace safe it is important to communicate safety messages using an unmistakeable method. Barricade tapes should be used for notification of restricted access to hazardous areas, manage access to work sites, warn pedestrian traffic or communicate a safety message. Bright coloured safety tapes can be used to mark out floor areas clearly where a floor hazard exists.

Wet seasons can bring an increase in slip and fall injuries in the workplace. Slips and subsequent falls occur due to a loss of traction between the shoe and walking surface. As presence of moisture can reduce the slip resistance of a floor surface it is important to prevent the risk factors associated with wet conditions particularly on stairs, ramps, loading docks, food preparation areas, bathrooms and equipment.

Anti-slip floor tape can help address some of the common causes of slips and falls in the workplace increases the friction between a person’s shoes and the floor’s surface. Using an anti-slip tape visually alerts pedestrians that a potential slip hazard is present and protects them against the hazard.

The tapes have an adhesive backside allowing the products to be applied to most surfaces. They have an abrasive grit-like surface consisting of either aluminium oxide or silicon carbide that improves traction between the floor and an individual's shoes. Anti-slip products are suitable for a variety of workplace safety needs ranging from industrial environments to offices. Anti-slip tapes are one of the simplest solutions for increasing workplace safety and several grades are available to match the specific needs of an area. Available products for businesses range from commercial to industrial purposes. Brightly coloured or photo-luminescent treads are a great implementation option on stairwells and along egress corridors to prevent serious injuries resulting from poor visibility. Commercial grades are suitable for any location where spills, weather, or slippery shoes could cause an employee to lose their footing. Coarser industrial grades are available for manufacturing or construction environments.

Entrance Safety

3M’s new Safety-Walk™ Peelable Coating achieves P3! making wet, slippery entrances safer
The Challenge and Solutions

What is the current situation with floor surfaces? Most internal floor surfaces, especially hard surfaces such as stone, terrazzo and travertine are sealed or coated. The coating is usually polished to produce an attractive gloss. In many cases the slip resistance values of these surfaces are not known. Floor surfaces when polished and buffed may meet the dry test criteria (D1 or Coefficient of Friction > 0.4) but not the Wet Pendulum Test classification when wetted. This presents a challenge for the facility manager with compliance to the WHS Act to ensure a safe environment. There is a need to reduce the public liability risk and potential cost to the facility owners. Insurance companies are aware of rising liability costs and are working with their customers to reduce the risk of claims.

When risks are identified, such as in centre entrances, where water may be brought in, there are several options used to mitigate the risk and ensure a P3 rating.

Textured floor surfaces (eg acid-etched) or more commonly the use of carpet (textile floor coverings) or mats to dry the pedestrian’s footwear and capture contaminants may be employed. Some of the drawbacks to these solutions are; the surface may not look as aesthetically appealing as the remainder of the centre interior and present challenges in maintaining cleanliness. The raised edge of a mat may actually introduce a trip risk while mitigating a slip risk. The latter then requires a recess in the floor to keep the mat flush with the rest of the surface of the floor.

Facility managers are looking for new options that can meet the Slip Resistance Value (SRV) required and provide a gloss comparable to traditional floor coatings such as acrylics. In addition there is a demand to reduce the use of hazardous chemicals such as strippers and reduce the time and labour required to apply coatings to control operational costs.

New products are becoming available that provide improved slip resistance for generally dry areas - P1, P2 or D1 - whilst meeting these other needs. Coatings based on non-acrylic polymers with low VOC solvents are available on the market. These products require less coats - as few as two - dry quickly and once burnished provide a hard, scratch-resistant surface that simply requires cleaning with water or a neutral cleaner. Maintenance consists of buffing and when required recoating only in those areas where the gloss cannot be restored.

For areas where a higher SRV is required eg. P3 other products also with a liquid aqueous base are coming to the market. These have a textured surface, are clear and provide a relatively high gloss. Alternatively a slip-resistant film rather than a liquid could be applied. These could be suitable to apply in areas where any disruption to foot traffic has to be minimised eg. a 24/7 fast food establishment.

Yet other options may be for facility managers to consider distinguishing higher risk areas where a slip resistant product has been laid by colouring the coating. The transition in colour can alert the pedestrian to a change in risk and perhaps make them more vigilant and thus reduce the risk of a slip. Thin coatings or films mitigate the risk of a trip from a change in surface level.
Conclusion

Facility managers are faced with challenges in ensuring compliance with the National Construction Codes for slip resistance, Work Health and Safety Act 2011 and the need to mitigate the risk of Public liability costs. All the while, it is essential to maintain an aesthetically pleasing environment at a reasonable cost. Facility managers need to be familiar with the new codes and classifications in them, or, have competent advisors to enable them to meet these challenges.


The Standards Australia Handbook HB 198-2014 is a valuable resource that can guide the facility manager through the application of the Classifications obtained through the above Standards, the process of evaluating new flooring materials or the slip risk status of existing flooring.

New options are available or becoming available with regard to floor surface materials, coatings and films to help facilities meet the required SRV where currently they do not. These new options can provide slip risk mitigation and at the same time retain many of the desirable aesthetic qualities of traditional surfaces. In addition they can decrease risks to employee health through reduced need to use hazardous chemicals and manage operational costs by saving time and labour.

With time, high pedestrian traffic, cleaning systems, applied coatings and patterns of wear may affect the slip resistance properties of floor surfaces. Inspection and testing of the floor surface should be conducted at regular intervals as part of a continual maintenance program.

1 The cost of work-related injury and illness for Australian employers, workers, and the community, 2008–09, Safe Work Australia.

2 Slips & Trips at the Workplace Fact Sheet, Safe Work Australia, Feb 2012
## APPENDIX ONE—3M products that support facility floor safety

<table>
<thead>
<tr>
<th>Product range</th>
<th>Product style / format</th>
<th>Product features and application</th>
<th>Application Image</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Safety-Walk™ Anti-slip Tapes</strong></td>
<td>Fine Resilient Non-mineral, fine-textured, slip resistant vinyl surface. Water-resistant, acrylate adhesive is ideal for wet conditions. Applications: showers, tubs and pools.</td>
<td>![Image]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Medium Resilient Non-mineral, medium textured, slip-resistant vinyl surface suitable for barefoot traffic. Applications: locker rooms, pools, watercraft, exercise equipment and conveyers.</td>
<td>![Image]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conformable Mineral coated, slip-resistant surface. Film backing conforms to irregular surfaces. Suitable for heavy shoe traffic. Application areas: stairs, ladders, loading ramps, platforms and irregular surfaces like tread plate.</td>
<td>![Image]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General Purpose Mineral-coated, slip-resistant surface with pressure-sensitive adhesive. For light to heavy shoe-traffic areas. Applications: Stairs, ramps, entrances, ladders, construction machinery and vehicles.</td>
<td>![Image]</td>
<td></td>
</tr>
<tr>
<td><strong>Safety-Walk™ Peelable Coating</strong></td>
<td>Floor Coating combining anti-slip properties with peelable removability Provides wet slip resistance (35+ BPN/P3) to the AS 4586-2013 Standard. Ideal for commercial building floors in high risk slippery areas such as entrance ways, service corridors, staff rooms bathroom access-ways and around bathroom washbasins.</td>
<td>![Image]</td>
<td></td>
</tr>
<tr>
<td><strong>Floor Protectors</strong></td>
<td>Scotchgard™ Resilient Vinyl Floor Protector Floor Protection is not a floor finish. It is a proprietary, non-yellowing, low odour hybrid formulation that protects and enhances floors' natural appearance. Just two coats produce a clean, bright appearance. Meets or exceeds ASTM-D-2047-4 COF 0.5.</td>
<td>![Image]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scotchgard™ Stone Floor Protector High performance floor surface hardener and protective clear coat for concrete, marble terrazzo and other porous stone surfaces. Produces a glossy, hard, dust repellent, chemical resistant surface with just two coats. Meets or exceeds ASTM-D-2047-4 COF 0.5.</td>
<td>![Image]</td>
<td></td>
</tr>
<tr>
<td><strong>Matting</strong></td>
<td>Carpet Mats Several ranges of carpet mat are available. They are ideal for entranceways to trap dirt, debris and water off shoes.</td>
<td>![Image]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Entrance and Scraper Mats Resilient vinyl loop construction traps, holds and hides dirt and sand, so the surface stays neat and clean. Foam backing reduces creeping and provides added foot comfort.</td>
<td>![Image]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Safety and Specialised Mats A wide variety of specialised safety mats are available to suit business facilities needs including wet area, anti-fatigue, z web, cushion, sticky/tacky, dome, checker plate and link mats.</td>
<td>![Image]</td>
<td></td>
</tr>
<tr>
<td><strong>Sorbents</strong></td>
<td>Oil &amp; Petroleum Sorbent is hydrophobic (repels water), so is ideal for absorbing Oil and Petroleum based fluids from places where water may be present. It has a high absorption capacity which minimises the amount of waste for disposal.</td>
<td>![Image]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chemical Chemical Sorbent is ideal for hazardous spill control. It is highly absorbent and suitable for a wide range of liquids, even aggressive acids and alkalis.</td>
<td>![Image]</td>
<td></td>
</tr>
<tr>
<td></td>
<td>General Purpose General Purpose Sorbents absorb almost any type of non-aggressive liquid. It is ideal for the control of accidental and routine leaks, drips and spills of oils, lubricants and other non-aggressive liquids commonly found in industry.</td>
<td>![Image]</td>
<td></td>
</tr>
</tbody>
</table>