Slips and trips
Slip resistant flooring

Introduction

Selecting an appropriate level of slip resistance when specifying a new floor saves a fortune in management and incident costs throughout the life of a building.

When selecting a floor, you need to understand the level of slip resistance it offers. All flooring will provide good slip resistance when clean and dry. Where floors get contaminated during normal use, the level of slip resistance in contaminated conditions needs to be understood.

You need to consider the contaminants that are likely to get on the floor, examples include:

- Oil and grease on kitchen floors.
- Water at building entrances.
- Body fats in barefoot areas, such as changing rooms or bathrooms.
- Dusts and powders in manufacturing areas.

Even small amounts of these contaminants (e.g. wet footprints at an entrance) can increase the risk of slipping to dangerous levels so you need to think realistically about the condition of your floor at different times.

Enhanced slip resistance is achieved by increasing the friction between the foot and the floor, to give underfoot protection in areas where spillages can occur. This friction increase is obtained through the combination of safety aggregates and particles within the floor such as quartz, aluminium oxide, recycled natural aggregates, and silicon carbide. When a contaminant such as water enters the floor area, this creates a 'squeeze film' between foot and floor.

A particle-based safety flooring will provide enough roughness to break through this squeeze film and ensure foot-to-floor contact.

Which test should i use?

New floors which are slippery when wet are unlikely to become less slippery over their lifespan.

The grip offered by slip resistant floors can change for several reasons (normally for the worse), for example:

- As a result of the installation process.
- Wear from foot traffic and cleaning.
- Surface contamination due to poor cleaning.

The best way to measure the slip resistance of flooring in different conditions is to test it with the pendulum test. The pendulum correctly reproduces the way we walk and therefore accurately quantifies the risk of a slip when a person walks on the surface. Importantly the pendulum test gives valid information when testing contaminated floors, something that other commonly used floor slip tests do not.

Different rubber materials are available for the pendulum that simulate shod and barefoot pedestrians. Make sure you have test results which are relevant to your installation. For floors in barefoot areas this is likely to mean results from both rubbers.

Which test should i be wary of?

A common way of testing the slip resistance of flooring which is used by many manufacturers is a ramp test, where an operator walks on a surface, increasing the angle until they slip.

This method can produce useful results but has some limitations as a floor test:

- The test conditions are not representative of the conditions in which most slips happen.
- The test can only be conducted in the laboratory, making it impossible to measure the slip resistance of installed flooring without removing it for testing.
- The results are presented in a way that can be misleading (R9 - R13 for the shod test, A - C for the barefoot test).

The most common test method for resilient floors in both Canada and the U.S. is ASTM 2047 which uses the James Machine. This test uses a stationary object and tests the force required to pull it over the floor. This is expressed as the Static Coefficient of Friction (SCOF).

The Pendulum test method in North America is published as ASTM E303. It is the method of choice in the UK and Europe and is now a recognized standard for measuring pedestrian slip resistance in 49 countries, making it the the most widely recognized test method globally. Where possible, this the method QBE would recommend.

Setting a specification

As part of your flooring selection process you need to consider where enhanced slip resistance will be necessary and in what conditions. Set a realistic minimum level of slip resistance you require.

Not all areas will need to have excellent slip resistance when contaminated, consider:

- What contaminants will get on the floor?
- How often the floor is likely to get contaminated?
- What other controls do you have in place for preventing slips?

In-situ floors, such as resin floors containing aggregate, are produced on site. If you specify slip resistant in-situ floors they will usually contain sand or grit to give them good slip resistance when contaminated. It is very important that these floors are installed carefully so that the distribution of the sand or grit is uniform. If it is not uniform the slip resistance will vary widely, this can lead to serious problems in use as people move across a surface where the slip resistance is changing.

Moving from an area of high slip resistance to one of lower slip resistance will increase the chances of a slip occurring. Moving from an area of lower slip resistance to higher slip resistance may increase the likelihood of a trip or a stumble.

In terms of safety floor credentials, all products specified to provide slip resistance in wet conditions should meet EN 13845, the European standard for particle-based safety flooring. Product claims that show conformance to other flooring standards, such as EN ISO 10581/10582, EN 649, EN 548, EN 12199, and EN 1817, mean the flooring is not classified as a true slip-resistant surface, and therefore is not a safety floor.

Profiled flooring

It is frequently assumed that flooring with a raised pattern or profile, such as metal chequer plate will offer good slip resistance, but this is often not true. You will normally only get a benefit if your footwear happens to interlock with the surface which depends on your shoe, the floor and where you place your foot. Where you don't get the interlock the level of grip will depend on how rough the floor is, and many profiled floors have a smooth finish which is slippery when wet. Slips are often seen on this type of floor.

Other design considerations

Think about where in the building the floor will be laid. It may be in a clean dry area but what other parts of the building are next to it (e.g. a serving area next to a kitchen, a corridor next to a wet room). When moving between different areas, e.g. at entrances, other design features may need to be considered such as matting.

Sloping surfaces will need to offer more grip than level floors to prevent slips. Even shallow slopes, such as those used in swimming pools or showers for drainage, will increase the level of grip you need to walk on them safely. However, the drainage they offer will not leave the floor dry.

Many installed floors can be modified to improve their slip resistance. There are many types of floor slip resistance treatments, some of which have health and safety considerations of their own. Installing a suitable slip resistant floor in the first place is the preferred solution than installing a slippery floor and having to treat it.

Example of profiled flooring

Example of profiled flooring

Remember that avoiding slipping accidents will be much easier with a floor that is not slippery when contaminated, so careful selection can save a lot of time and money!

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