Slips, trips and falls (STFs) are a primary concern of many facilities, and for good reason. According to the US Department of Labor, roughly 25% of reported claims per year are the result of a slip, trip or fall, making it one of the most frequently reported injuries. Further, over 17% of all disabling injuries are the result of a fall, and STFs cause 15% of all accidental deaths, second only to automobile accidents.

Environments within food and beverage processing facilities pose increased risks of STF events, due to floors that stay consistently moist, wet or greasy during typical operations, as well as the frequent spillage of powdered ingredients that can create slick surfaces. The presence of slip-resistant flooring can help. However, the profile of the floor surface must be carefully balanced with the food industry’s imperative to thoroughly clean and decontaminate. What do the scientific and regulatory communities advise when it comes to slip-resistance?

**Defining the Problem and Causes**

What may seem like simple common sense to the lay person actually involves some carefully thought-out definitions for safety, risk and legal professionals. How are slips, trips and falls classified and what are some identifiable causes?

Slip, trip and fall accidents can be defined as follows:

- **Slip**: A loss of balance caused by too little traction between footwear and walking/working surface.
- **Trip**: A loss of balance caused by the foot or lower leg hitting an obstacle, or an unexpected step down, while the upper body continues moving.
- **Fall**: A drop or descent under the force of gravity as the result of a loss of balance frequently caused by a slip or trip. Same-level falls are those that occur on the same walking or working level. Elevated falls are falls to a level below the walking or working level.

While human factors can be at the root of some of these accidents, such as failing eyesight, overexertion, poor physical shape, fatigue, age, stress, alcohol, drugs or medications, bad judgment, or improper footwear, there are also many hazards within the facility that can contribute to STF accidents. The National Institute for Occupational Safety and Health’s (NIOSH) top hazards are:

- **Contaminants on the Floor**: Condensation, Water, Oil, Grease, Powders
- **Walking Surface Irregularities**: Cracks, Uneven Surfaces
- **Inadequate Lighting**
- **Stairs and Handrails**
- **Stepstools and Ladders**
professionals, and architects can also be called upon to implement STF protocols in their workplace designs. Many organizations, including OSHA, NIOSH, the National Safety Council (NSC), and others have published information, standards, and guidelines on incorporating safety in the design of work places and work processes. These publications contain detailed discussions and recommendations covering a broad range of safety topics focused on lowering incidences of STF accidents in the workplace.

Slip-resistant floor surfacing can be another very effective way to help reduce slip and fall hazards in slippery, wet or greasy food plant environments.

Scientific Measurement of Slip Resistance

The standard method currently used to measure slip resistance involves determining the Coefficient of Friction (COF), that is, the resistance of an object as it is dragged across a floor tile or sample of the floor surface.

In the U.S. today, the Horizontal Dynamometer Pull-Meter is the most frequently used device for measuring COF. In accordance with ASTM C-1028, a weighted board with a rubber attachment simulating the bottom of a shoe is dragged along the surface of the test sample. The COF is measured by dividing the lateral force of pulling on the spring weight by the vertical force of the weight on the sled. The supposition is the more pressure that’s required to pull the weight, the more slip resistance that exists on the tile surface.
While seemingly straightforward, ASTM C-1028 has limitations. The manual nature of the test leaves room for user error and in fact, differing results can often be derived from repeated testing of the same material. Additionally, as of this writing, there is no official consensus regarding the amount of resistance that qualifies as “slip inhibiting”, either generally or for any given industry or environmental condition. Alternative surface friction tests do exist in the U.S. and internationally, but none has yet been approved by the ASTM.

**Regulatory Agencies on Slip Resistance**

Without reliable measurement, the scientific and engineering communities have shied away from officially prescribing levels of “safe” levels of slip resistance. OSHA, the regulatory arm of the Americans with Disabilities Act (ADA) and other U.S. agencies have therefore concluded they do not have a basis on which to build useful standards. As a result, all slip-resistance requirements for facility traffic surfaces have now been phased out.

Yet, corporations’ Human Resources and Legal Departments demand that reasonable safety measures be implemented in the high slip and fall risk environments found in food and beverage plants. Absent regulatory thresholds, how can managers know what traffic surfaces are best for the many different activities taking place throughout their facilities? And what flooring options combine the best safety, along with durability, clean-ability and high life cycle value?

**Slip-Resistant Floor Surfacing and Optimal Sanitation**

Slip-resistant floor surfacing is a USDA and FDA compliant, fluid-applied polymer resinous floor coating system incorporating various levels of grit to create a customized slip-inhibiting traffic surface. Texture levels can be varied throughout the facility, while allowing for a consistent aesthetic throughout. Food and beverage plants can specify a higher level of slip resistance in traffic areas only, while keeping all other surfaces smooth for optimal sanitation.

Integral cove bases and proper slope to floor drains are standard features of resinous floor surfacing installation in food facilities. Anti-microbial resinous flooring systems are also available in slip-resistant finishes capable of withstanding exposure to chemicals, extreme pH, power washing and temperature cycling for food and beverage plant applications.

In the absence of slip-resistance regulation, solutions-oriented flooring system manufacturers have developed a practical, low-risk selection process to help managers and designers choose the best levels of slip resistance for food plants. Factory certified contractors can install a trial floor area with a range of slip-inhibiting textures that can be utilized and tested by employees, visitors and maintenance personnel over a period of 4-8 weeks. Users’ opinions can then inform project managers’ purchasing decisions as to the optimal skid-resistant floor surface for the various traffic areas within the facility.

With its broad selection of decorative and utilitarian looks, high performance and versatile application, slip-resistant resinous flooring systems have the capacity to provide whole facility flooring solutions, furnishing comprehensive protection, outstanding aesthetics and easy, low cost maintenance throughout. Few flooring systems can make that claim, spotlighting slip-resistant, anti-microbial resinous floor surfacing as a smart, high value option for food and beverage facilities.