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YOUR FLOORS AND FALLS

By Carey Mitchell, President of CR Mitchell, LLC

Slips and trips are the most common cause of injury at work, this issue hangs over every building owner. On average, they cause over a third of all major injuries and over 40% of all reported injuries to members of the public. Statistics suggest that most of these accidents are slips which occur when floor surfaces are contaminated with some sort of foreign substance such as water, tracked in contamination like oils and grease or in the winter, residue from ice melt pellets. Even dry soil particulate such as sand, grit or dirt can contribute to hard surface flooring being prone to create slips and falls. Paramount in every commercial facility, regardless of what it is and no matter the size, is the safety of those walking in the space.

As a building owner or facilities manager, you receive information, warnings, and offers of products to help mitigate risk. Most of these products do indeed improve slip resistance on floors. So, you spent a lot of time and effort to specify and install flooring materials that supposedly reduce the risk of slips. You have looked at flooring maintenance products and practices to further reduce the risks. You've tried to make sure you're maintaining the floors properly – hopefully you are and you've employed devices to mitigate the intrusion of substances that could contribute to or cause slips and falls but slips still happen.

The Occupational Safety and Health Administration, **OSHA**, is expected to issue new regulations on **walkway safety** in August. Currently included in the draft is language that will require that ***all walkways in buildings be tested annually for slip resistance***.

Most slips occur when floors are contaminated by foreign materials, including water, drinks, food, sand, oily stuff tracked in from parking lots, and combinations of these; but plain, simple water is involved in the majority of slip and fall incidents. One fact is indisputable – a floor's slip resistance does not improve with contamination. And the personal injury lawyers love it.

Let's understand a few of the issues involved in slip and fall incidents.

What causes a slip? When the force required to move a shoe horizontally is less than the force exerted by gravity on the foot, a slip may occur because the *friction* between the shoe and floor has been overcome. Friction, stated a bit more technically, is the *resistance to movement* of a surface, a shoe sole in our case, across another surface - the floor. It is stated as *Coefficient of Friction (COF)*; the ratio of horizontal force to vertical force. *Slip resistance* is the common term. When COF is low, slips occur. When COF is high, slips do not occur.

Since we instinctively understand that slips on dry surfaces are less common, we must also consider the COF when the surface is wet, or from the technical perspective, contaminated.

We also understand that virtually no slips occur while a person is standing still. Measuring COF from a fixed position results in a measurement called Static (not moving) Coefficient of Friction (SCOF). This is a relatively easy measurement but the number is of little value since it rarely relates to real life incidents. The measurement of friction while a foot is moving is termed *Dynamic Coefficient of Friction (DCOF)* and is the measurement that we are interested in.

Measuring the COF of a moving foot has presented huge technical challenges over the years, as most instruments developed have shortcomings; some are not portable and are used in the lab only, some cannot measure friction on wet surfaces, etc.

One device has been developed that solves the problems of previous instruments; it is portable, it can measure friction on wet surfaces, it is easily calibrated, and it creates a digital record. It is called the ***BOT-3000***, for binary output tribometer. (Now we have another term, *tribometry*, which is the science of measuring friction.) The BOT-3000 has become so well accepted that the test methodology has been accepted by the American National Standards Institute (ANSI), a division of the US Department of Commerce, and is designated as ANSI B101.3. This method is similar to another older method, ANSI 137.1, but the water used for the wet test mode contains twice the

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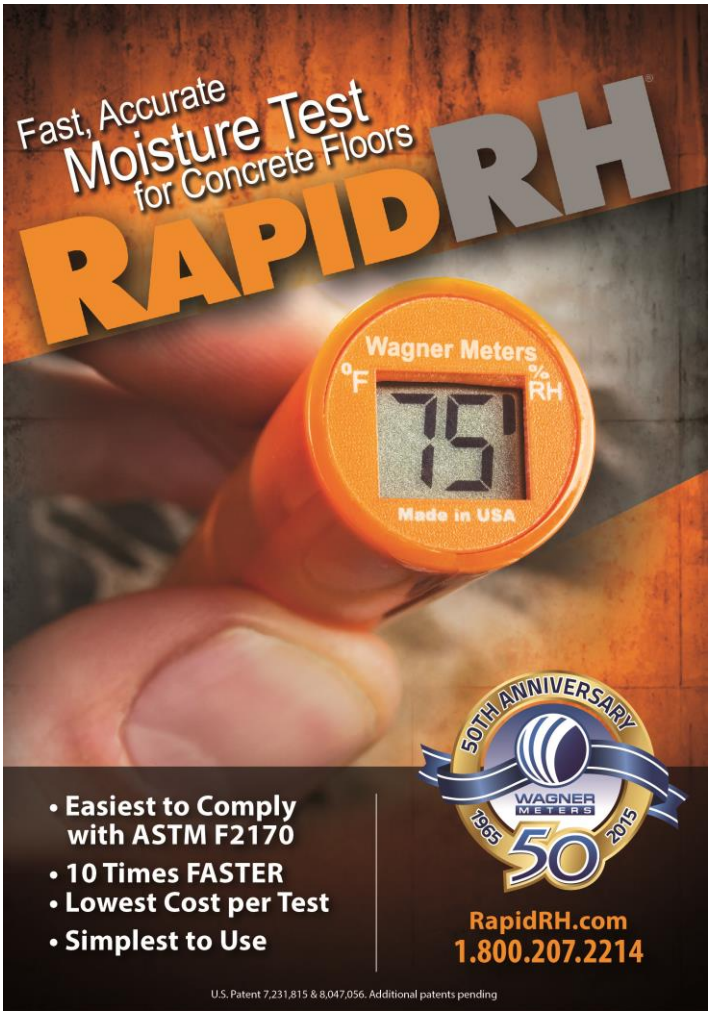
amount of detergent as the older method. This yields a much more realistic simulation of real life. As logic would suggest, the additional detergent makes it a bit more stringent than the older method.

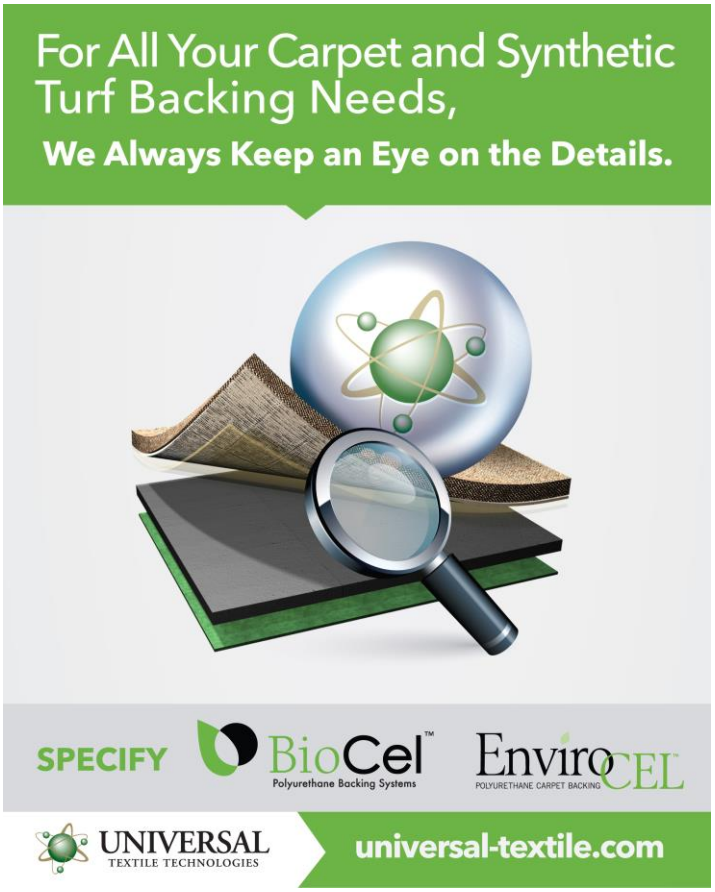
PREVENTION

As a building owner/manager, flooring product specifier, flooring contractor, maintainer or safety manager, where do you go from here? First, know your floors. Sure, you have purchased what is marketed as the best flooring material for the application. Is the DCOF (Dynamic Coefficient of Friction) on the newly installed floor the same as what was listed on the spec sheet? Has any treatment been applied that might change the DCOF? Has any maintenance product or procedure affected the DCOF? If any of these are unknown, a problem may be lurking, ready to attack at any time. Winter weather brings plenty of opportunities for slips into the building.

Upon installation, the floor should be checked for DCOF to assure that it is very close to the specified value. This important measurement is the beginning of a baseline data set upon which to build a record of responsible floor management. Once significant maintenance procedures and products have been in use for a while the testing should be repeated; this may become mandatory if it is included in the OSHA regulation. This record can be very persuasive when someone falls and the lawyers enter the scene, as it demonstrates due diligence in maintaining a safe building. In some cases, it may be sufficient to prevent a suit; regardless, it is critical information for defending a suit keep this and protecting your facility.

The ANSI 137.1 standard, which is incorporated into the International Building Code, mentions a *minimum wet DCOF of 0.42*. Meeting this minimum may not be sufficient to protect you as many factors may render this value too low. The ANSI B101.3 test with *twice* the amount of detergent in the wetting solution is considerably more stringent, even though the number is the same. A floor that delivers the 0.42 DCOF when tested by this method is one that does not keep you awake at night.



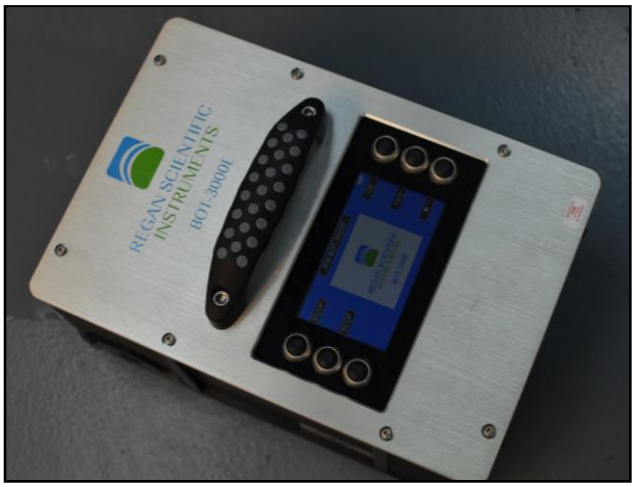


Manufacturers Data

Most slip resistance information provided by flooring manufacturers is produced from as-supplied products prior to installation. The slip resistance of flooring materials can change significantly for many reasons, whether due to the normal installation process, such as installing grout on a ceramic floor to burnishing, polishing,soiling during the construction or renovation project and residues left from construction. In addition, inappropriate maintenance or longer-term wear also change the slip resistance of flooring. Information quoted by flooring manufacturers for Coefficient of Friction should clearly specify which was measured – static or dynamic COF, and the specific test method that was used. The test data required should relate to the floor when installed and when it is being used as intended with any contamination and other influences present during normal use.

The BOT-3000 Test Instrument

The BOT-3000 allows testing of both SCOF and DCOF using the same instrument. It also tests for COF wet and dry. It is used for the ANSI A137.1 *and* ANSI B101.3 tests, and thus is capable of delivering a comprehensive assessment of your floor. Basically, the instrument powers itself across the floor with a "foot" covered with shoe material pulled underneath. A force gauge measures the resistance and records the DCOF, while a tiny TV camera documents every bump. Typically the minimum for a facility is five tests per building with variables depending on overall square footage.



LGM and Associates through our association with, Professional Testing Laboratories is currently the only -accredited laboratory in the world by the U.S. Department of Commerce, National Institute of Standards and Technology for this test. Professional Testing Laboratory performs over a thousand different test methods for thousands of customers located in the U.S., Canada, Europe, Asia, Australia and South America (ASTM, ISO, DIN, EN, etc.). PTL's primary focus is on all types of floor covering, R & D, performance and compliance testing. Additional industries served include the artificial turf manufacturers with on-site FIFA testing, airlines, automobile, vacuum and cleaning chemicals.

LGM and PTL now offer nationwide testing using the **BOT-3000 both in the lab and *in the field***. Contact LGM for additional information or to schedule testing or to learn more about this subject.

About the author: Carey Mitchell was formerly the Director of Technical Services for Shaw Industries for 35 years. He is now an associate of LGM and Associates Technical Flooring Services.

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