



C53 Effect of Test-Surface Texture on Slip Resistance in Walkway-Safety Tribometry Testing

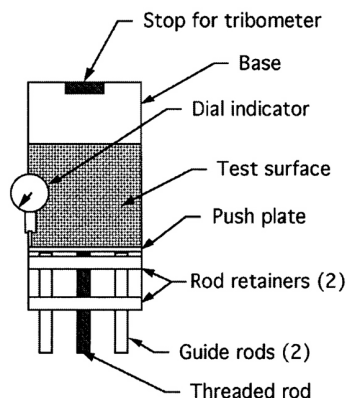
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After attending this presentation, attendees will understand how surface texture impacts walkway-safety tribometry testing, and strategies to minimize the effect of surface-texture caused variation. A test apparatus designed to systematically advance the test surface is discussed, and its use in characterizing frictional variation with test-foot position is explored for a given test sample.

This presentation will impact the forensic community and/or humanity by contributing to the body of knowledge of Walkway-Safety Tribometry. The question of what type of test surface is 'smooth enough' to give consistent results without explicitly accounting for the surface pattern or variation is unsettled. This paper sheds light upon that issue.

The measurement of the slip resistance between the test foot and test surface using walkway-safety tribometric instruments (WSTs) plays a significant role in evaluating whether or not a surface and/or shoebottom material is safe under a given set of conditions. It is important that any test conducted reasonably approximate conditions encountered by pedestrians. One potential factor that could affect tribometric results is texture in the shoe bottom or on the floor surface, compared with their analogs in testing: the test foot and the test surface. The impact of texture might increase or might decrease the safety of the pedestrian relative to what the test shows. For example, texture in the shoe or floor might enhance drainage of liquid contaminants, making the pedestrian safer than what would be expected from tests; texture might, because of scale effects, cause mechanical interlocking between the test foot and test surface, indicating a slip-resistance value higher than a pedestrian would realistically encounter. The effect of surface texture on slip resistance has not been systematically explored.

We have developed a simple apparatus to systematically explore the relationship between test-foot position and friction. It consists, as shown in the plan view, of a plywood base to which a metal tribometer stop and two rod retainers have been fastened. Three rods pass through the retainers: one threaded rod in the center and two guide rods (to prevent the assembly from 'walking.'). The guide rods are rigidly fixed to the push plate; the threaded rod is allowed to bear against the push plate. The position of the push plate is advanced by turning the threaded rod, and indicated by a dial indicator.



In one test (many more will be presented at the meeting), a dotpattern floor was tested using a Slip-Test Portable Inclined Articulated Strut Tribometer (PIAST). Two test positions were utilized: Position A where the trailing edge of the 'heel-weighted' test foot struck between the sets of dots, and; Position B, where the training edge of the test foot struck across the rear set of raised dots. The following results were obtained (See Table 1):

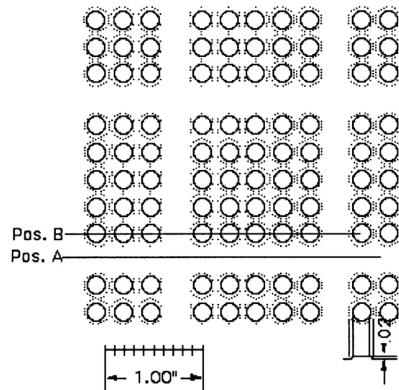
Table 1: Test results

	Position A	Position B
Sample size	10	10
Mean Slip Resistance	0.811	0.833
Standard Deviation	0.010	0.015



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A two-Family F Test on the standard deviations revealed no significant differences ($p = 0.13$). A two-Family t-test on the means (equal variances) revealed the two positions to have generated significantly different results ($p < 0.001$). In plain English, the position of the test foot as it struck the surface had a small, but real, effect on the test results, and, at least for this surface, should be explicitly accounted for in the test design.



Walkway-Safety Tribometry, Surface Texture, Slip and Fall