

Materials Characterization & Failure Analysis Laboratory

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FROM Charles R. Anderson, Ph.D.

SUBJ Static Coefficient of Friction Measurements on a Ceramic Tile with SKID SAFE Water Based Sealer/Finish

Summary

The principal results of the static coefficient of friction measurements are:

- The dry SKID SAFE water based sealer/finish on the ceramic tile provides a static coefficient of friction value of 0.778, well above the ASTM D2047 requirement of 0.5 for a safe walking surface.
- The wet SKID SAFE water based sealer/finish on the ceramic tile provided an even higher static coefficient of friction of 0.896.
- The lowest of 8 measurements on the dry surface was 0.56.
- The lowest of the 8 measurements made on the wet ceramic tiles was 0.69.

Samples and Background

Two ceramic tiles were received on 6 June 2016 for static coefficient of friction measurements against the criteria established in ASTM D2047 that the minimum value of the static coefficient of friction for safe walking surfaces is 0.5.

The tiles are shown below:

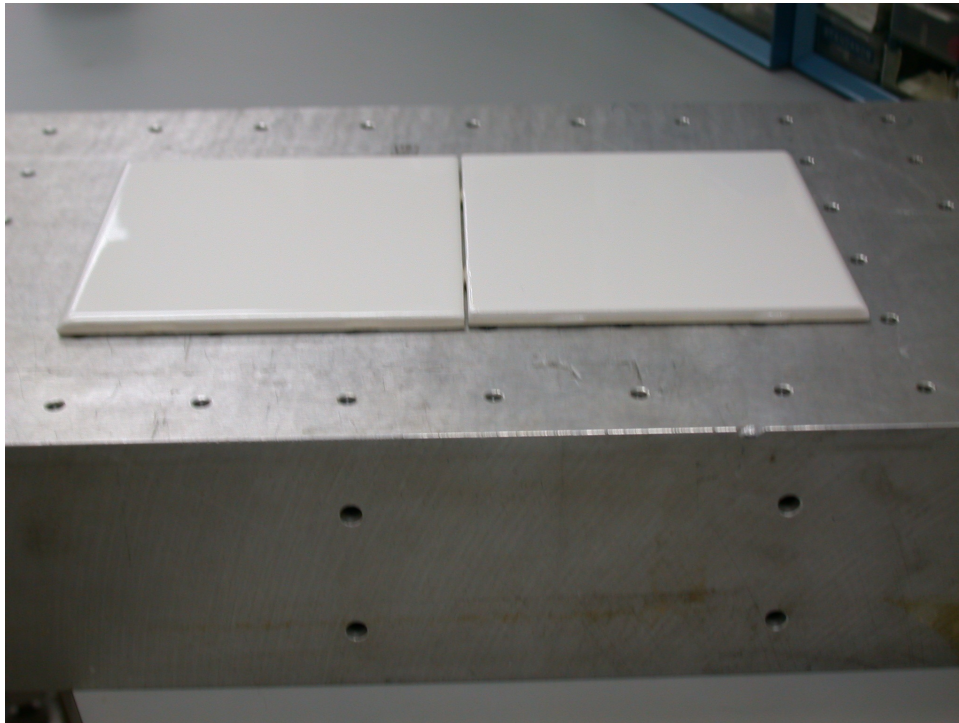


Fig. 1. The SKID SAFE water based sealer/finished tiles tested are shown above. The tiles measure 6 inches by 6 inches.

Static Coefficient of Friction Measurements

Static coefficient of friction measurements were made on the ceramic tiles as-received and on the surface when wet. The static coefficient of friction measurements were made with an American Slip Meter ASM 825A Digital Meter using Neolite feet or sensors. The testing was performed in accordance with ASTM C1028-07 with the exception that a 50 pound sled was not used and the ASM 825A meter was used under the manufacturer's instructions. Due to the size of the tiles, two feet rested on one tile and one foot rested on the other. We also made two measurements for each orthogonal direction of pull instead of only one measurement for each orthogonal direction. The calibration of the meter was checked before measurements began and six times thereafter. When making the wet surface measurements, one scientist handled the sled, while the other prepared to apply the steady pulling force the moment the sled was placed in contact with the surface. This was done to minimize the effects of squeezing the water out from under the sensor feet.

Table 1. The static coefficient of friction measurements on the SKID SAFE water based sealer/finish coated ceramic tile in each of four orthogonal directions on the tile.

Condition	South	West	North	East	Average
Dry As-Received	1.13	0.90	0.56	0.72	
	0.78	0.69	0.61	0.83	0.778
Wet with Distilled Water	0.72	0.69	0.76	0.96	
	0.97	0.98	0.96	1.13	0.896

Under both dry and wet conditions, the ceramic tile surface easily surpassed the ASTM D2047 requirement for a safe walking surface of a static coefficient of friction measurement of 0.5 or more. Not only were the averages of the measurements greater than 0.5, but the lowest of the 16 measurements made was 0.56. The lowest of the 8 measurements when dry was 0.56 and the lowest of 8 measurements when wet was 0.69.