

Resumen 04

Analysis of the slip resistance of ceramic surfaces by different methods

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Ceramic tiles are extensively used in outdoor areas under humid / wet conditions. Therefore, the ceramic tiles must show certain characteristics that ensure the safety of the pedestrian when walking. This safety is measured indirectly by the coefficient of friction between the ceramic tiles and a standardized rubber. Currently, there are different methods for the determination of the slip resistance of ceramic surfaces, but none of them is globally accepted, making difficult to correctly specify products for different countries, especially in areas where greater slip resistance is desired. In this work, nine ceramic surfaces with different coatings – glossy, polished, natural surface, satin, silicone-coated and granulated – were evaluated. Four different methodologies to evaluate the slip resistance were used: Tortus method according to NBR 13818, BOT method according to ANSI A 137.1, British pendulum method according to AS 4586-2013 and Ramp method according to DIN 51130. Repeatability analyzes were performed after testing five times each of the nine surfaces under each of the four methods in the dry and wet conditions, resulting in 130 samples from each of the nine surfaces. A correlation analysis was also performed with sensorial evaluation of pedestrians with each of the nine surfaces. Among the evaluated methods, the Pendulum is the one that presents less variability in the majority of the tested surfaces, in the dry condition as well as in the humid condition. Tortus and BOT showed lower performance. The lower variability of the Pendulum method was confirmed because the coefficient of variation of this method was much lower than the others. Comparing the results obtained with the equipment / methods and the slip resistance in practical conditions (sensorial), the Pendulum was also the method that presented the best relationship, with Pearson coefficient of 0.946, along with the Ramp method that presented Pearson coefficient of 0.970. Regarding the methods, Tortus and BOT show the advantage of ease of operation with very little human interference, but they present high variability and little reproducibility of the actual conditions of use, besides presenting problems related to the stick-slip effect over the surfaces. The Pendulum has the advantage of high repeatability and high reproducibility of the real conditions, but it shows great human interference in the tests. The Ramp has the inconvenience of requiring a large sample area to perform the tests, besides having high human interference, but it shows high reproducibility of the real conditions of use.

Keywords: slip resistance; coefficient of friction; ceramic surface.