

Relationship Between Measured Friction Coefficients and Two Tread Groove Design Parameters for Footwear Pads

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Abstract

The shoe sole geometrical design parameters are believed to be important factors affecting the coefficient of friction (COF) between the shoe/floor interface. This study is concerned with the relationship between the measured COF and the tread groove orientation and width on the footwear pad. Friction measurements using the Brungraber Mark II slipmeter were conducted. Six tread groove width/orientations designs on the footwear pads under 27 footwear material/floor/contamination conditions were tested. The results show that tread orientation and width affect the measured COF significantly. Wider grooved footwear pads result in higher COF values and footwear pads with tread grooves perpendicular to the friction measurement direction have higher COF values. A regression model using measured COF as the dependent variable and tread groove width, groove orientation, footwear material, floor, and contamination conditions as independent variables was established. The models are significant at $p < 0.0001$ with R^2 of 0.97, which may be used in predicting the COF at the shoe-floor interface.

Keyword : slipping and falling incidents; friction measurement; tread groove design; Brungraber Mark II slipmeter