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Effect of particulate contaminants on skid resistance

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Abstract

A multiannual research program was initiated in 2013 at IFSTTAR to investigate short-term variations of skid resistance due to particles deposited on the road surface; a synthesis of 5-year results is presented in this paper. The primary objective is to understand the lubrication mechanisms induced by the particles that reduce skid resistance. A test protocol, including a rain simulator, was developed to reproduce in laboratory the processes of particle build-up and wash-off. The testing program includes collection of particles for analyses of size distribution and mineralogical composition and friction measurements by means of a British Pendulum. Results, in terms of variations of the friction coefficient during a simulated cycle of dry period/rain/drying period, are presented. On a dry surface, the mass of particles present on the road surface is found to be a significant influential factor. On a wet surface, the viscosity of the mix between water and particles is of primary importance. The effects of the particle's size and concentration are presented and discussed. Explanations in terms of interactions between the particles and the surface microtexture are supported by microscopic observations.

Keywords: Particles; Skid resistance; Microscopic observations; microtexture