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Local friction at a rubber/glass multicontact interface ANTOINE CHATEAUMINOIS, DANH TOAN NGUYEN, CHRISTIAN FRETIGNY, ESPCI - PPMD Laboratory, YOHAN LE CHENADEC, MAUDE PORTIGLIATTI, Manufacture Francaise des Pneumatiques Michelin — When rubber is squeezed against a hard, rough surface contact only occurs at localized spots between surface asperities. Friction thus involves the shearing of a myriad of micro-contacts which are distributed over length scales ranging from micrometers down to nanometers. In order to get more insights into this widely debated problem, spatially resolved measurements of frictional stresses are much needed. We recently proposed a method to measure local friction of rubbers by means of a contact imaging approach. Silicon rubber substrates marked on their surface are prepared in order to measure the displacement field induced by the steady state friction of a glass lens. Then, the deconvolution of this displacement field provides a spatially resolved measurement of the actual shear stress and contact pressure distributions within the contact interface. As a result, the local friction law, i.e. the relationship between the actual shear stress and normal pressure, is obtained. The effect of roughness are analyzed from experiments using statistically rough surfaces differing in their roughness power density spectrum. Experimental results are discussed in the light of theoretical contact models for the friction of multi-contact interfaces.

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