

PARTICLES IN RUBBER CONTACTS

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In many contacts free particles influence the contact behaviour of the system. Further, fixed particles can build the counterpart of the contact. This paper focuses on the influence of particles on rubber contacts. Examples of applications are tires on road or off-road, grinding of rubber parts, seals in mining or seals for watergates.

Tyres on asphalt road contact small particles of the asphalt with typical size of e.g. up to 8 mm (SMA 0/8) and on concrete road with small sand particles of the concrete. The contact of the viscoelastic tread rubber to the road particles defines the main performance of the tyre, e.g. traction, friction and wear. Therefore, the rubber and particle properties have to be described to understand the contact characteristics, like the hysteresis and adhesion friction [1,2]. In off-road application, like a tractor tyre on soil [3], the range of particles size and shape, the interaction between particles and tyre as well as between different particles are more complex.

Seals are often used to prevent dirt, water or particles to come into the gearbox or the bearing. The shape and material of the seal and the contact is important for sealing against particles. Further, seals are applied in watergates and have contact to water with particles. These particles often have smooth edges and are less abrasive. In the contact these particles can separate both contact partners and reduce the friction due to a rolling behaviour in the contact. This change strongly the tribological properties of the contact.

The paper focuses on experimental, analytical and numerical investigations of the contact mechanics of rubber parts with particles.

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