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THE INFLUENCE OF MICROPITTING ON THE FRICTION COEFFICIENT OF TWO LUBRICATED SURFACES - AN EXPERIMENTAL INVESTIGATION

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ABSTRACT
Micropitting is a common failure for gear made of hardened steel. Literature considers that micropitting modifies surface aspect and thus roughness [1]. In gear mesh the link between friction and roughness is also highlighted [2]. Yet, the direct correlation between the friction coefficient and micropitting still needs to be quantified. Twin-disk apparatus allows simulating gear lubricated contacts for specific positions of the line of action by adjusting load and slide-to-roll ratio.

The proposed approach is based on a two phase cycle: (i), a twin-disk fatigue test rig is used to generate micropitting on a specimen; (ii), another twin-disk machine is then used to measure the coefficient of friction generated by this specimen. Traction curves are derived from those measurements.

This cycle is repeated in order to increase micropitting magnitudes on a single specimen. After each cycle the mean roughness amplitude (Rq) and slope (Rdq) are estimated from the surface measurements. These parameters are used to numerically estimate the friction coefficient [2].

These repeated cycles should allow to experimentally quantifying the link between micropitting magnitude and friction coefficient of hardened steel in lubricated contact. This study aims also to investigate the capability of surface ratio to take into account micropitting magnitude in theoretical models which estimate the coefficient of friction.

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