

# SURFACE CONTACT THROUGH PRESSURE SENSITIVE BOUNDARY LAYERS

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## ABSTRACT

It is well established that a soft surface layer will attenuate peak Hertzian stresses in both single contacts as well as those between arrays of asperities. There is now increasing evidence, from AFM, SFA and other small scale experiments, that the boundary lubricant layers generated on component surfaces by commercial oil additives, such as ZDTP, are both comparatively thick (perhaps hundreds of nanometres) and possess effective moduli which are influenced by the values of local asperity pressure. Such layers might be thought to be 'smart'. The work described examines the effects that such sensitivities can have on the generation of local surface pressures and thus on the likelihood of continued subsurface plastic deformation and shakedown in situations of repeated contact. The implications for the initiation of scuffing failures in the cam and follower contacts in IC engines will be explored using both these models and experience from fired engine tests.

keywords: friction, boundary lubrication, elasticity, plasticity