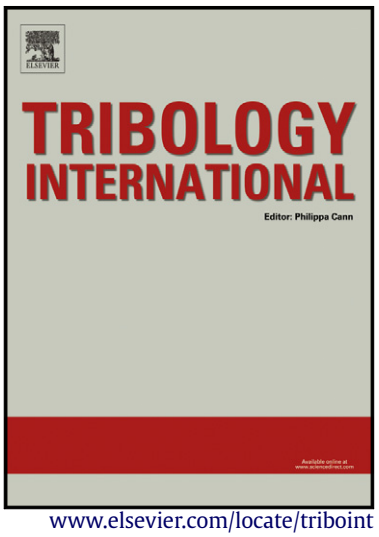

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On the boundary conditions in multi-phase flow through the piston ring-cylinder liner conjunction

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Abstract

Prediction of load capacity and friction depend on the assumed boundary conditions. The inlet comprises swirl and counter flows, admitting only a portion of the inward flow into the conjunctional gap. At the contact exit, the lubricant film ruptures with multi-phase flow through a cavitation region. Therefore, the boundary conditions affect the load carrying capacity and friction. A Navier-Stokes solution of multi-phase flow, including vapour transport is presented, with determined realistic boundary conditions.

The evaluated boundaries agree with potential flow analysis satisfying compatibility conditions, not hitherto reported in literature. The investigation is extended to the determination of optimum compression ring contacting geometry.

Keywords: mixed multi-phase regime of lubrication, Boundary conditions, zero reverse inlet boundary, cavitation, friction, ring-liner conjunction