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DISCUSSION

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The authors are to be congratulated for having made a logical and valuable extension of their previous work. The determination of a minimum film thickness equation as a function of the ratio of dimensionless load to dimensionless speed for varying degrees of starvation was badly needed.

The discussers, however, would like to comment on the inlet boundary condition. In many cases, for small inlet film thicknesses, the pressure could be assumed to be ambiant or zero at the meniscus boundary even in the presence of a recirculation zone, as used by the authors. However, for large value of $\eta_0\ u/T$, where T is the surface tension of the fluid, negative pressures have been calculated near the moving surfaces in the inlet zone [27]. This negative pressure could produce cavitation and prevent the feeding process. In this last case the author's results would not be applicable. On the other hand the authors calculations are performed for a dimensionless film inlet of $0.001 < Hin < 1$. The upper values correspond to film thicknesses of the same order of magnitude as film length. In this case the hypothesis used for Reynolds equations are not satisfied [28]. In fact the pressure gradient across the film in the inlet zone must be taken into account. Nevertheless the pressure values found in the inlet zone are small compared to these noted in the center of the contact and the effect on the load could be quite small. Therefore when $Hin > 10^3\ H_0$ it is slightly difficult to talk about starved contact.

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Authors' Closure

The authors wish to thank Dr. Frene and Dr. Bonneau for their interesting comments. It is a most intriguing viewpoint that cavitation might be responsible for preventing the feeding process in the inlet for large values of $\eta_0 u/T$ since one normally does not expect cavitation to occur in a converging film. We are aware however that film thickness has been observed to reach a maximum value as $\eta_0\ u$ is increased (reference [25]). Further increase in $\eta_0\ u$ beyond this causes the film thickness to decrease drastically. The mechanism the discussers suggest may help explain this experimental observation. Be that as it may, we believe the discussers have raised a valid issue concerning the limitation of the range of values of $\eta_0\ u$ that can be used in applying our film thickness formulas. If one could use reference [25] to generalize, the film thickness formulas in this paper should not be used for $\eta_0\ u > .33$ Pa-m.