

Response to reviewer 1

Dear reviewer,

Thank you for taking the time to review our manuscript, and for your helpful comments which we will use to improve the quality of this paper. In addition, I must apologise that this response is only being provided now. I (EH) had my first baby arrive in October, and so have been delayed in providing a full response. We include your comments below in **blue**, followed by our responses in **black**.

The manuscript presents a review of Elastohydrodynamic (EHD) theory, starting from the very basic concepts to the application, assumptions and limitations of the theory. It is important to mention that this reviewer understands that the authors try to address the message to a community which might not be too familiar EHD. Thus the reviewer understands that some basic concepts need to stay in the present manuscript, otherwise a more synthetic manuscript could have been written.

Thank you for your understanding regarding the intended audience for this paper, and the implications of this with regards to the contents.

The reviewer is favourable to the publication of the manuscript but requires some minor revisions or at least the answer of some questions.

Revisions:

1. Equation (12): There are increasing voices (Vergne and Bair 2014) arguing that these models are too simplistic to capture the real behaviour of viscosity as a function of pressure and temperature. This is not mentioned in this section although the topic is somehow mentioned in the discussion section.

Thank you for pointing out this discrepancy. When revising the paper we will ensure to provide a discussion of the arguments surrounding viscosity models alongside where Equation 12 is introduced.

2. Equations (26-27): The work of (Habchi and Vergne: <https://doi.org/10.1007/s11249-021-01512-z>) shows significant deviations among the different authors mentioned here and experimental results for minimum film thickness. Perhaps the authors should comment this.

Thank you for bringing this recent paper to our attention. We agree that it should be included in our discussions. However, please note that it deals specifically with circular contacts ($k=1$). The poor performance of equations shown in the Habchi and Vergne paper are therefore specific to the circular case. In our paper we focus on the Masjedi and Khonsari equations, but due to their having been shown to perform well for cases of long elliptical contacts ($k>1$). We also point out in the manuscript that they perform less well than other equations in the circular case. Some of this general context is therefore already included in the manuscript, but the paper you highlight provides new and recent insights and so is relevant to include also.

3. In section: Grease Lubrication, two important references seem to be missing for the understanding of thickener contribution on the EHD film thickness: Nogi, (<https://doi.org/10.1080/10402004.2020.1778147>) and Morales-Espejel (Tribology International 74 (2014) 7–19), especially for slow rotating bearings.

Thank you for pointing out that these references are missing. We will make sure to introduce and discuss them properly in the revised manuscript.

4. In the Dynamic effects section, the reviewer remarks that starts-stops are not mentioned by the authors, in the targeted application they are multiple and very important, strictly speaking is not a dynamic effect but it is dynamic in nature. Some works have been written on EHL stopping or accelerating contacts with simple formulae.

This is an excellent point, we agree that start-stop events are very relevant to wind turbine bearing operation. We will identify appropriate papers which consider effects related to such events and expand the section on dynamic effects to include them.

Best regards,

Edward Hart
(on behalf of co-authors)