Reviewer Blind Comments to Author

The submitted paper gives an overview of the current state of elastohydrodynamic lubrication theory, focusing on simplified descriptions for reaching a wider readership. The authors are encouraged to add further figures in order to support the overarching goal of reaching a wider (non-expert) readership. The complex processes taking place in an EHL contact (e.g. starvation) can be illustrated using existing images. In the current version the reader is challenged to use his power of imagination. While the depth of the explanations is nicely balanced, the review leaves most of the chapters open. Please consider adding clearer recommendations for the aimed readership. Furthermore, multiple equations are given without proper citation. Therefore, the authors should assess if all references had been included. Furthermore, the title is misleading. The overview does not clearly explain the applicability or the relevance of the individual approaches for the case "main-bearing". In the reviewer's opinion the title should be changed or the relevance of each approach (including the validity range) for main-bearing applications should be addressed.

Please consider also following points:

Introduction

- Could the authors please give an overview of other EHL-Reviews (e.g. doi:10.3390/lubricants8050051) and shortly comment the differences between the reviews and the need for a new one?

Surface separation and lubrication regimes

- No further comments

Reynolds equation and the EHL lubrication problem

- No further comments

Approximation in EHL modeling

- The authors state in paragraph 140 that *"the surface geometries close to the contact region roughly approximate a plane surface", p*lease revise. in the reviewer's opinion this chapter should address the use of a reduced *R*, in which the curvature of both contact bodies is consider in order to allow the use of the aforementioned simplification

Line and point contacts

- It seems that not all variables had been introduced. For example, Equation 15 is given without introducing the ellipse axis first
- Please add further information and/or references to the statement in paragraph 180 *"other approaches to theses types of equivalence have also been taken in the literature'"*

General characteristics of EHL contacts

- It is commonly known that the film thickness decreases in the area after the PETRUSEVICH-peak. The authors state, furthermore, that this occurs *"in both incompressible and compressible cases".* Could the authors please describe under which boundary conditions incompressible and compressible cases occur?
- In the case of compressible cases, the authors described that the film thickness is *"slightly"* reduced and the pressure pike *"dramatically".* Can the authors please quantify the expected decrease? Which case would be the reference case, incompressible behavior?
- Starting at paragraph 230 it becomes unclear whether side-leakage is being consider or not (according to paragraph 215 it is being ignored). Please revise
- Please consider adding further information to Figure 3, which would support the descriptions found in paragraphs 234 and 235

Dimensionless groupings and film thickness equations

- Please add references to the presented equations
- Please revise paragraph 275. It seems a bit misplaced
- Paragraph 280: Please try to give a clearer recommendation for the intended readership
- Please give further information regarding the validation strategy and validity range (e.g. oil types) of the reduced analysis given in equations 23 through 25. It is unclear how far this simplified approach can be used in real life applications.

Accuracy of film thickness equations

- Paragraph 350: The authors states that according to WEEHLER "*the current analytical equations must be considered as providing qualitative, rather than truly quantitative estimates of the film thickness "*. Could the authors please comment this statement? There are multiple publications (including in-situ film thickness measurements) that show that the analytical approach can give good results for a wide range of contact conditions, in particular if the oil properties are well known

Surface roughness interactions

- On paragraph 425 the authors state that when *"roughness increases, h_{min} increases..".* Could the authors comment on this? As described in the first chapters, the commonly used calculation methods for the film thickness do not consider the surface roughness. How does an increase in the surface roughness improves the film build-up?
- On paragraph 435 state that equations 32 and 33 are valid for lambda > 0.5. Please comment on how lambda (especially h_{min}) was calculated

Starvation

- Paragraph 360: There exist methods to determine the meniscus distance, see:
  - Nogi 2015 (https://doi.org/10.1115/1.4030203)
  - Fischer 2021a (10.1016/j.triboint.2021.106858)
  - Fischer 2021b (http://dx.doi.org/10.1088/1757-899X/1097/1/012007)

    - Chen 2022 (https://doi.org/10.1063/5.0068707)
- Paragraph 370 *"film reductions due to starvation depends on bearing operating parameters, especially speed"*: In the reviewer´s opinion further effects (e.g. viscosity and available Oil volume) also play an important role (see for example Fischer 2021b - http://dx.doi.org/10.1088/1757-899X/1097/1/012007)

Grease Lubrication

- Paragraph 475: I couldn't find the relationship h<cD in Kanazawa 2017. Please specify if this was published or if this is the author´s interpretation
- Paragraph 485 *"Contact replenishment occurs in grease lubricated bearings, but as a strictly local phenomenon":* In the reviewer's opinion this section is quite one-sided (only citing CEN and LUGT). Multiple authors have made significant contributions in this field in the last 50 years. Please consider citing: CANN, ASTRÖM, GONCALVES, FISCHER, POLL, KUHN, HUANG.

Discussion

- No further comments. Please consider the points above

Conclusion

- In the reviewer´s opinion the conclusion is not a conclusion at all