

PhD opportunity

Truncated lubrication of large-size spinning contacts

Context



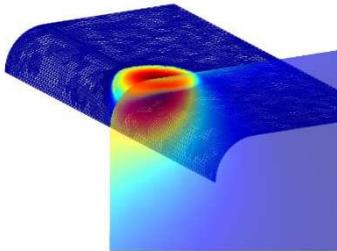
SKF group together with LaMCoS at INSA de Lyon propose a PhD dealing with the lubrication of large-size spinning contacts, as those found in the flange – roller-end contacts in roller bearings. They are characterized by their large dimensions and radii of curvature, by the contribution of several velocity components, by the intense power dissipated within the conjunction and by severe operating conditions. All these features make difficult the operation of such contacts and underline the need for improving our understanding for a better prediction of their response.



Subject and program

In previous PhD works, to study such contacts, a dedicated test rig (including friction and lubricant film thickness measurements) altogether a thermo-elasto-hydrodynamic (TEHD) numerical model were developed. Influence of spin/skew contribution [1], contact geometries [2] and lubricant starvation [3] were successively investigated in order to get closer to the real contact working conditions.

In the present work, the truncation of the contact will be studied. According to the geometry, the working conditions, etc... truncation may occur when the lubricated contact moves towards the edge of the flange. The work will cover both experimental and numerical aspects in approximately equal proportions. In particular, the actual test rig/specimens and the existing multi physics FEM model of large-size lubricated spinning contacts will be further adapted according to the consideration of the truncation. This double experimental & numerical approach allows for a quantitative exploration of lubrication mechanisms (film thickness, friction, thermal dissipation) in the presence of spin while being close to the actual working conditions.



Profile and conditions

The successful candidate holds a Master or Engineer degree in either mechanical engineering, physics or material science. He/she must show both adequate skills and motivations for numerical models and experimentation. English as well as French should be currently read, written and spoken.

The folder includes: CV, motivation letter, recommendation letter, marks and ranking (Master's degree), name and contact information of 2 or 3 referees.

This thesis is part of the SKF-INSA Lyon Chair "Lubricated Interfaces for the Future" and will be held at the Laboratoire de Mécanique des Contacts et des Structures (LaMCoS, INSA Lyon - CNRS UMR5259). The student will be jointly supervised by researchers from LaMCoS and SKF. He/she will interact with engineers from SKF.

Beginning of the contract: September 2021

Contacts

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- [1] T. Doki-Thonon, PhD thesis, INSA Lyon, 2012
[2] J.-D. Wheeler, PhD thesis, INSA Lyon, 2016
[3] A. Porrás-Vazquez, PhD thesis, INSA Lyon, 2020