

ACTIVITIES AT IMID

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INSTITUTE OF MACHINE
AND INDUSTRIAL DESIGN



Activities at IMID

CONTENT

- Introduction – From my beginnings to the current position at IMID
- Research activities
- Other activities

From my beginnings to the current position at IMID

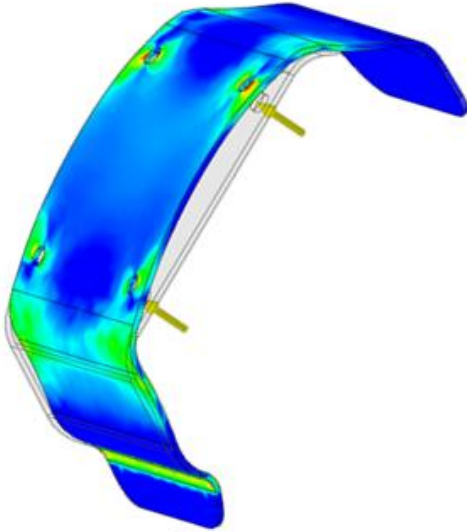
2008

Bachelor's degree

2011

The beginning - Bachelor thesis

- Title: Design of plastic part of PDA holder
- Supervisor: doc. Ing. Daniel Koutný, Ph.D.



ACTIVITIES AT IMID



From my beginnings to the current position at IMID

2008

Bachelor's degree

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Master's degree

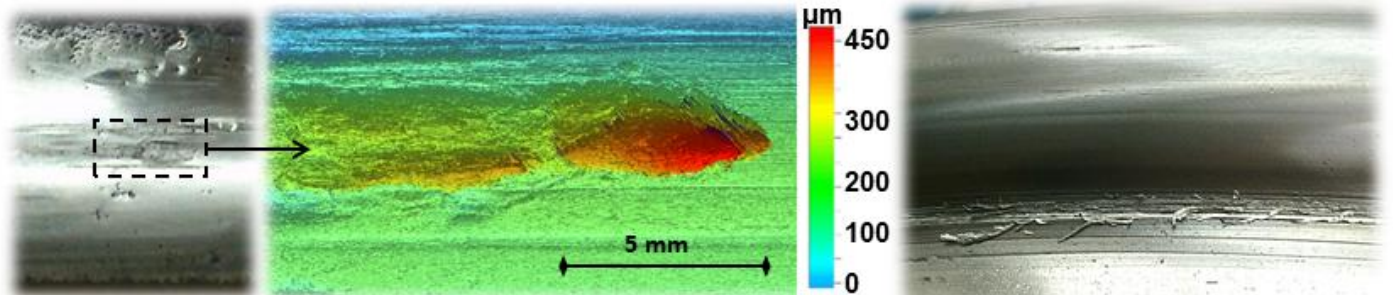
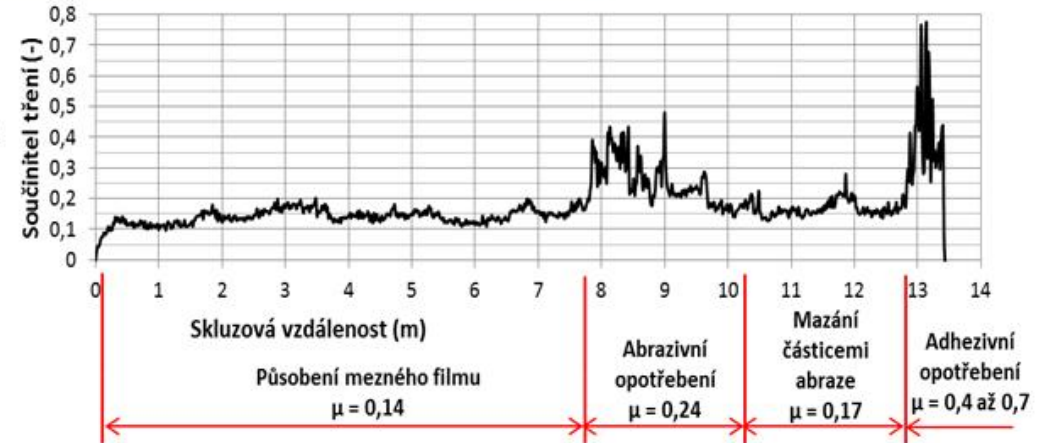
2013

Diploma thesis

- Title: Experimental Study of Wheel Flange Lubrication
- Supervisor: Ing. Milan Omasta, Ph.D.



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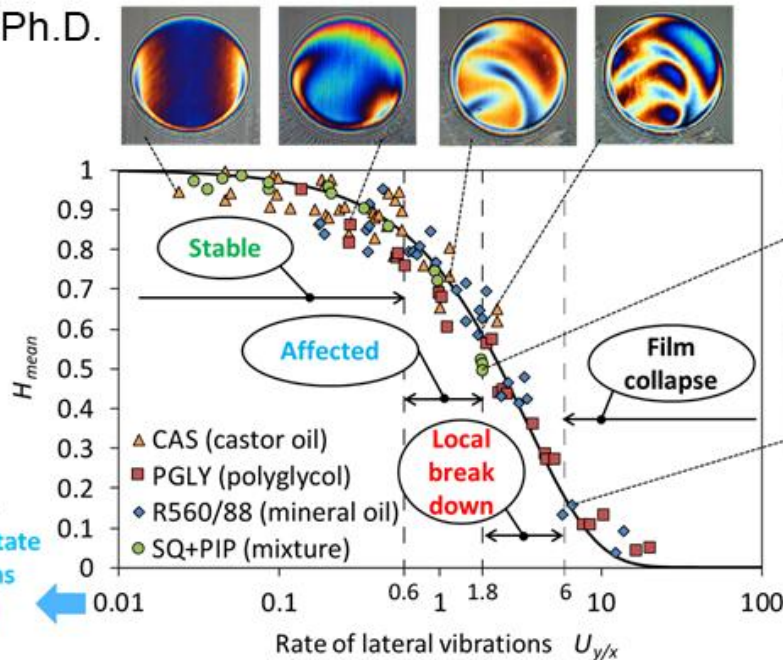
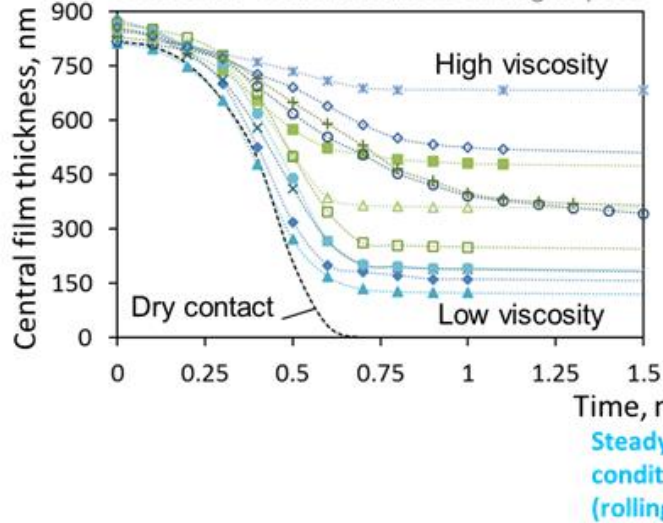
Doctoral degree

2018

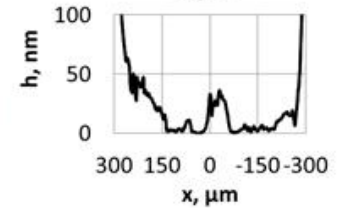
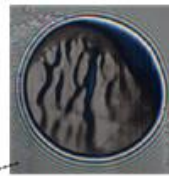
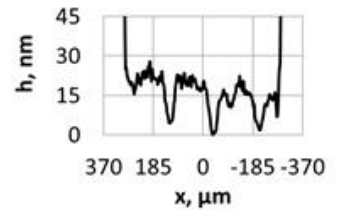
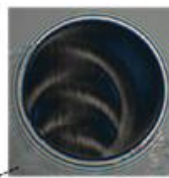
PhD thesis

- Title: Elastohydrodynamic Film Study under Impact Loading and Lateral Vibrations
- Supervisor: prof. Ing. Ivan Křupka, Ph.D.

Reduction of film thickness during impact



$$H_{mean} = e^{-0.29U_{y/x}}$$



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Reciprocating motions (pure sliding) 5/12

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From my beginnings to the current position at IMID

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Master's degree

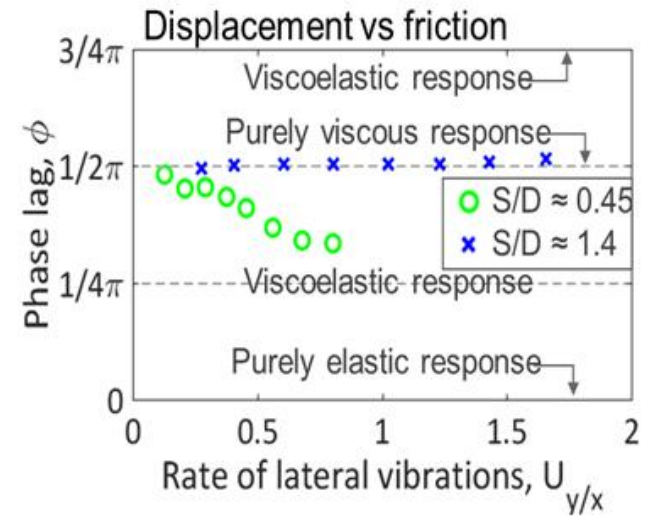
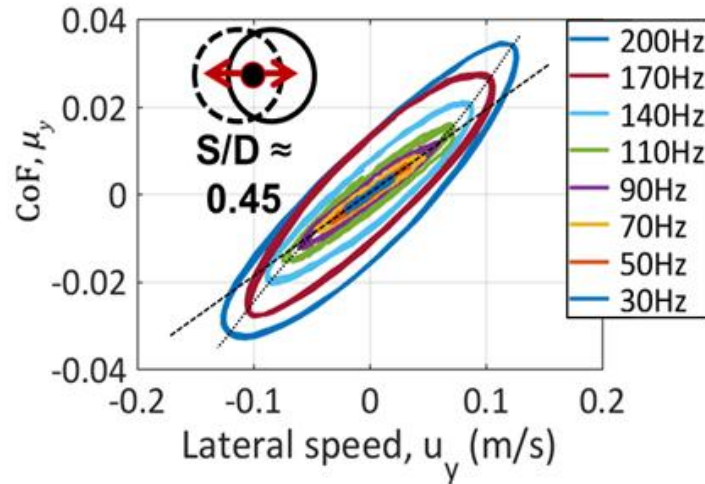
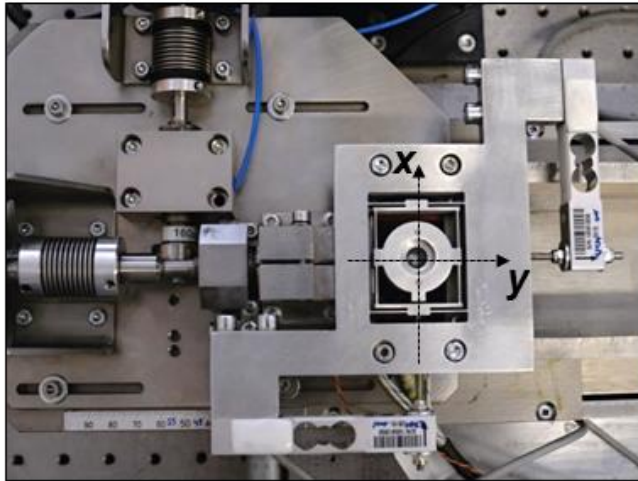
2013

Doctoral degree

2018

PhD thesis

- Title: Elastohydrodynamic Film Study under Impact Loading and Lateral Vibrations
- Supervisor: prof. Ing. Ivan Křupka, Ph.D.



From my beginnings to the current position at IMID

Current position: Researcher

- Responsibility: Laboratory (device development, methodology&measurement, training of students on facilities), data processing and reports



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7/12



Research activities

Contract with bearing manufacturer

- Contract duration: 1.2017 - 12.2019
- General topic: Results transferability
- **2017: Ball-on-disc experiments** – film thickness and traction tests
- **2018/19: Thrust bearing experiments**

*Figures were excluded from online
version of presentation*



Research activities

Grease distribution via fluorescence method (2020)

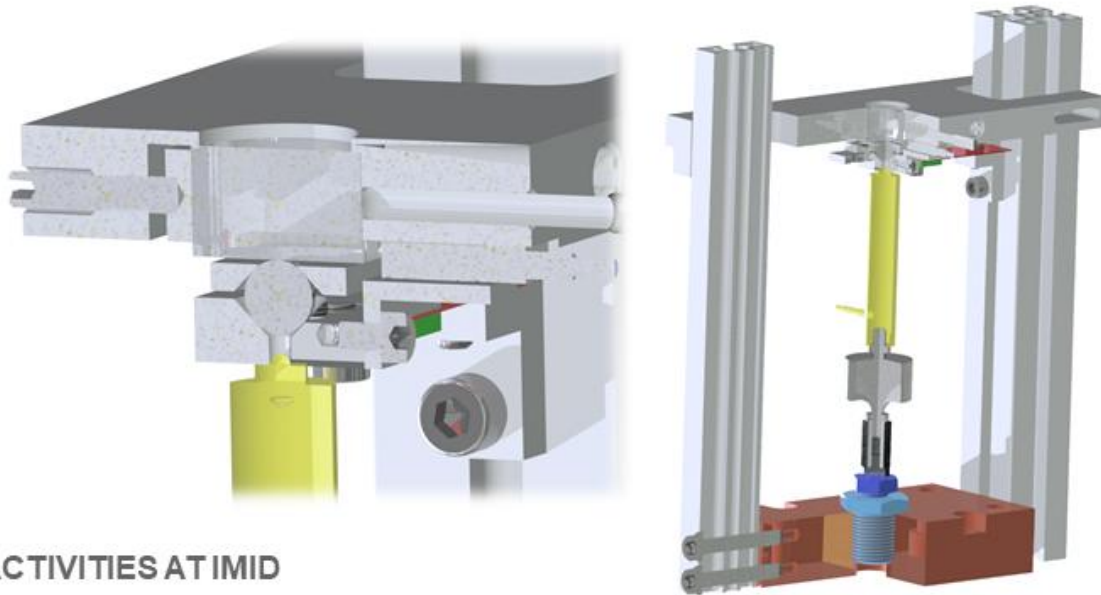
- Cooperation: David Košťál, Petr Šperka
- Comparison for ball-on-disc and ball thrust bearing
- Methodology & measurement

*Figures were excluded from online
version of presentation*

Research activities

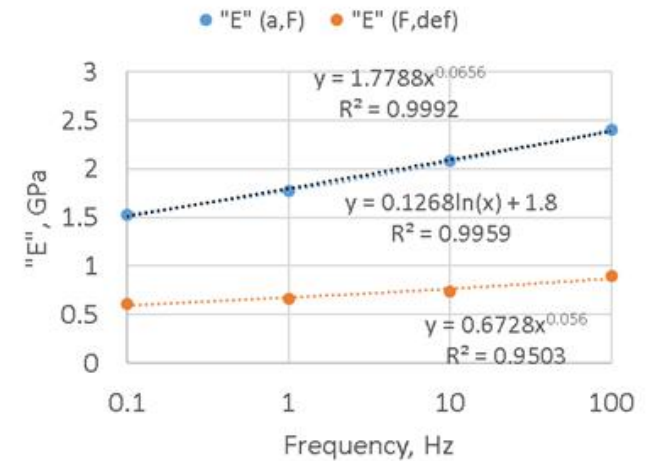
Lubrication of plastic parts by greases (2020)

- Cooperation: Petr Šperka, Jiří Křupka
- Effect of PMMA deformation on inlet effective viscosity (ball-on-disc)
- Effect of loading frequency on PMMA/grease properties (impact tester)
 - Update of impact tester (load and proximity sensors, heating, low mass)



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Apparent "Young modulus" of PMMA on frequency



10/12



Other activities

Teaching - No teaching

- **Supervisor of 1 Master's thesis(2018/2019):**
 - Jiří Kroupa - Grease lubrication in rolling element bearings
- **Participation in conferences (after PhD):**
 - **2018 – Tribology Frontiers Conference (Chicago, USA)**
 - Fluid film friction in two directions of EHL contact under lateral micro-oscillations
 - **2019 – SERBIATRIB (Kragujevac, Serbia)**
 - FRÝZA, J.; KROUPA, J.; ŠPERKA, P.; KŘUPKA, I.; HARTL, M. Investigation of film thickness of grease-lubricated thrust bearing: From ball-on-disc to bearing. In Proceedings on Engineering Sciences. Proceedings on Engineering Sciences - 16th International Conference on Tribology. 1. Kragujevac, Serbia: University of Kragujevac, Faculty of Engineering, 2019. p. 550-554. DOI: 10.24874/PES01.01.072.

Other activities

2018



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2019



2020 COVID pandemic

12/12

THANK YOU FOR YOUR ATTENTION

Josef Frýza

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