Outline of research and educational activities

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Outline of research and educational activities
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Contents

- Dissertation thesis
- Scientific and research activities
- Educational activities

Dissertation thesis

- **Supervisor:** prof. Ing. Ivan Křupka, Ph.D.

- Initial title of thesis:

  Lubricated contacts in a vibration environment.

- Current title of thesis:

  Bi-directional shear stress loading of elastohydrodynamic lubrication films under transient conditions.

- Future title of thesis?

Dissertation thesis

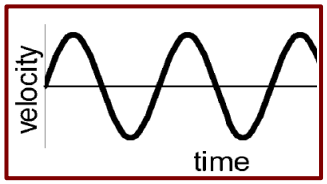
- **History of research of unsteady EHL contacts**
  - Origins in the 60s of the 20th century (electrical and optical methods)
    - Low accuracy of experiments with vibratory movement
    - Experiments aimed at dynamic (impact) loading
  - Boom in 1990 (high-speed cameras)

Dissertation thesis

Studies focused on unsteady movements

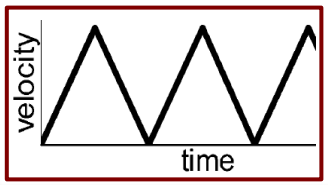
Longitudinal direction

- **Harm. motion**



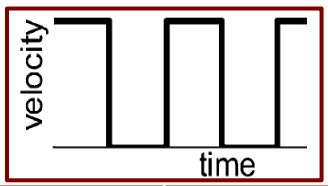
- 1995-2005
- **Kaneta, Nishikawa**
  - Entrapped oil at dead center
  - Starvation by air bubbles
  - Breakdown of lubrication film
- 2010
- **Maruyama**
  - Limiting ratio of the stroke length and the contact diameter

- **Ac(de)celeration**

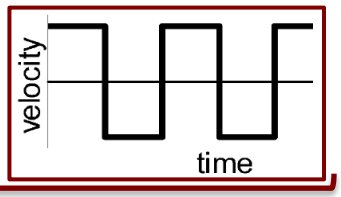


- 1998-2002
- **Sugimura, Spikes**
  - Thicker film for deceleration
  - Frequency increases deviations from fundamental EHL theory
- 2000-2004
- **Glovnea, Spikes**
  - The phases of formation and breakdown of lub. films
  - Significant impact of acceleration and visco-pressure coef. of lubricat

- **Start-Stop**

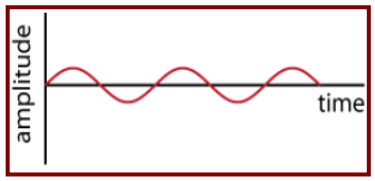


- **Reciprocation**



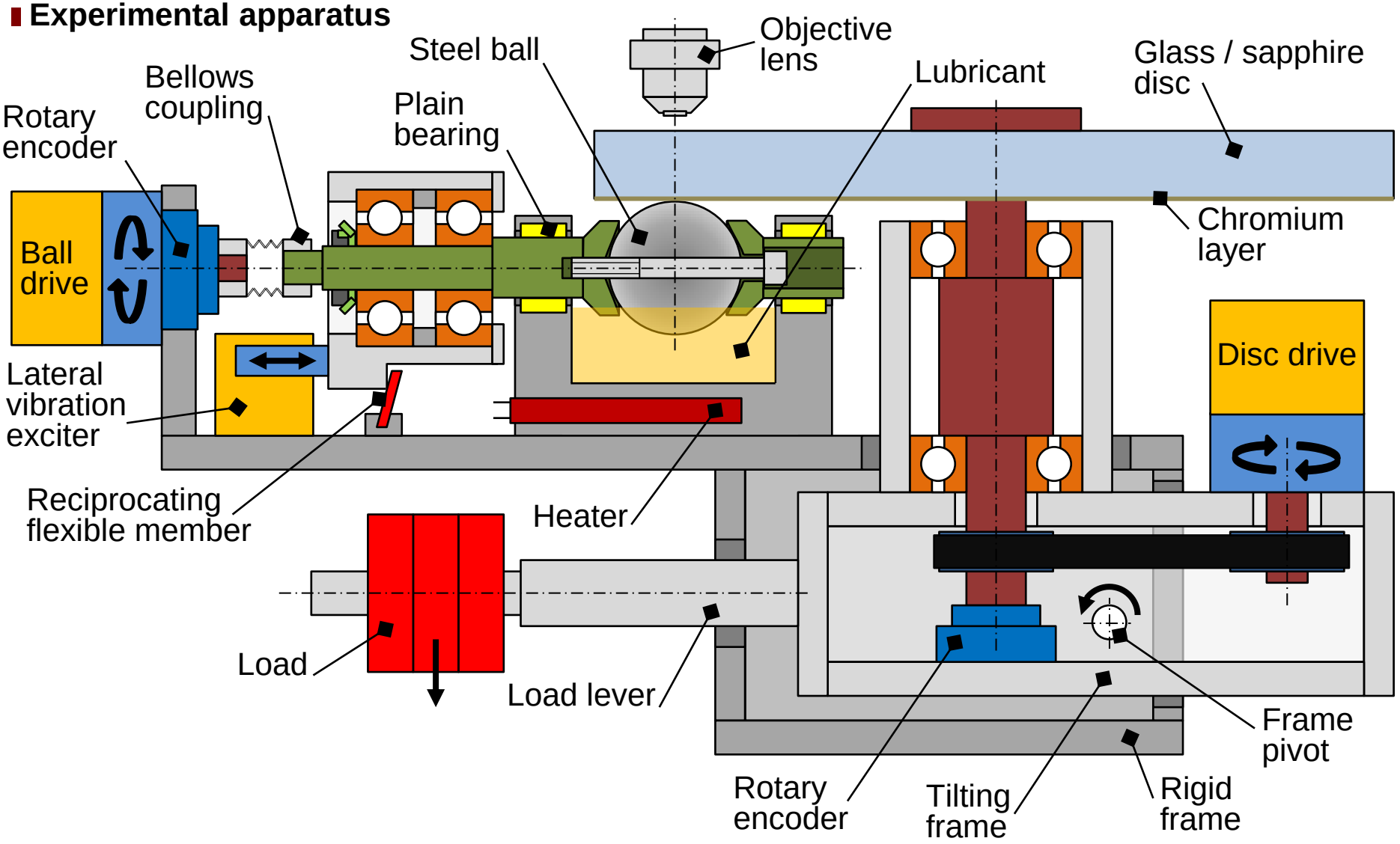
Transverse direction

- **Harm. motion**



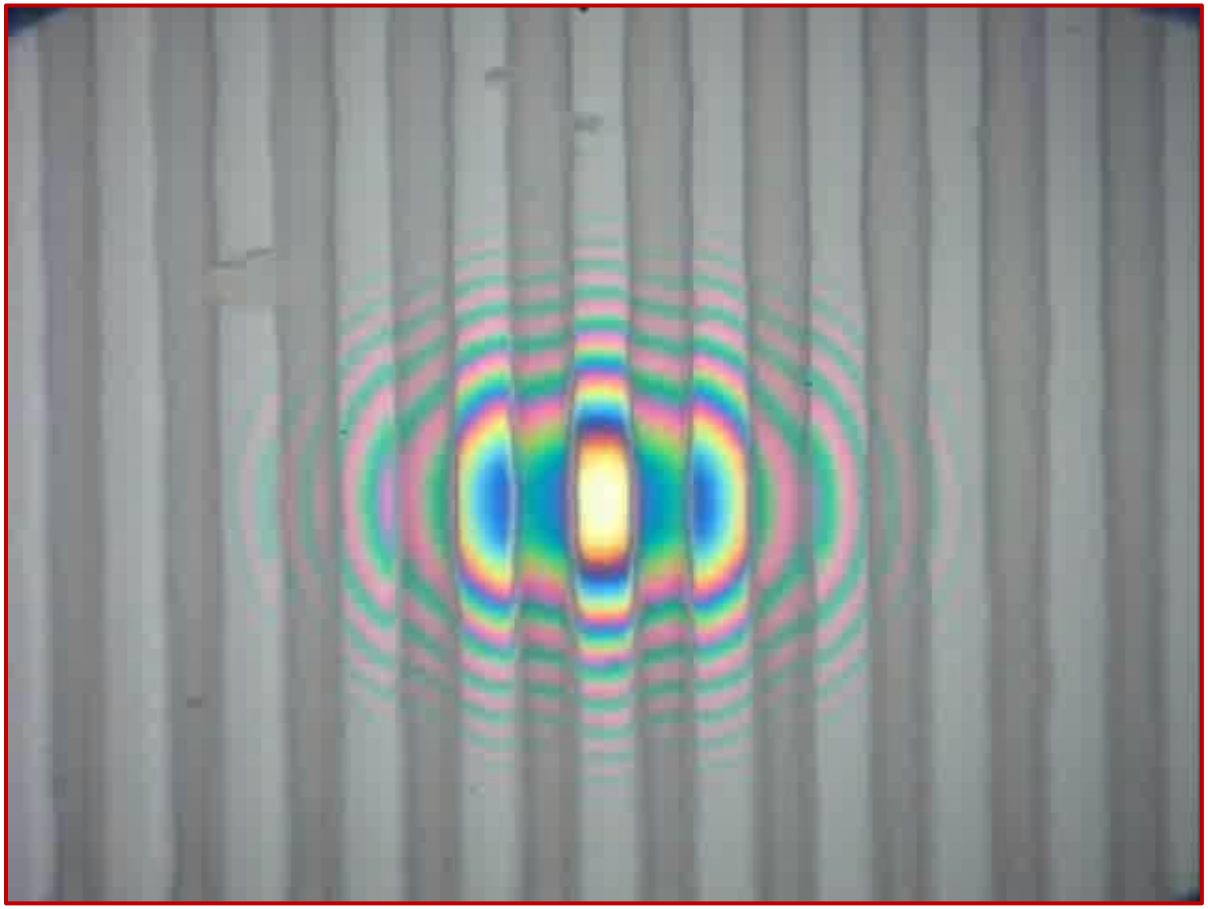
- 2009-2013
- **Kalogiannis, Nagata, Glovnea**
  - The mechanism of contact supply by grease
  - Ration of the longitudinal and transverse velocity (side slip)
  - Fluctuations of the film thickness

Experimental apparatus



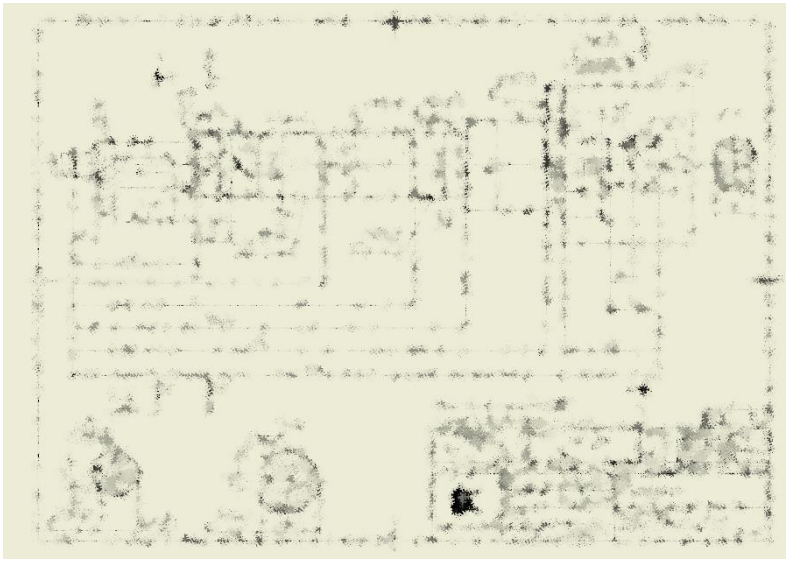
Scientific and research activities

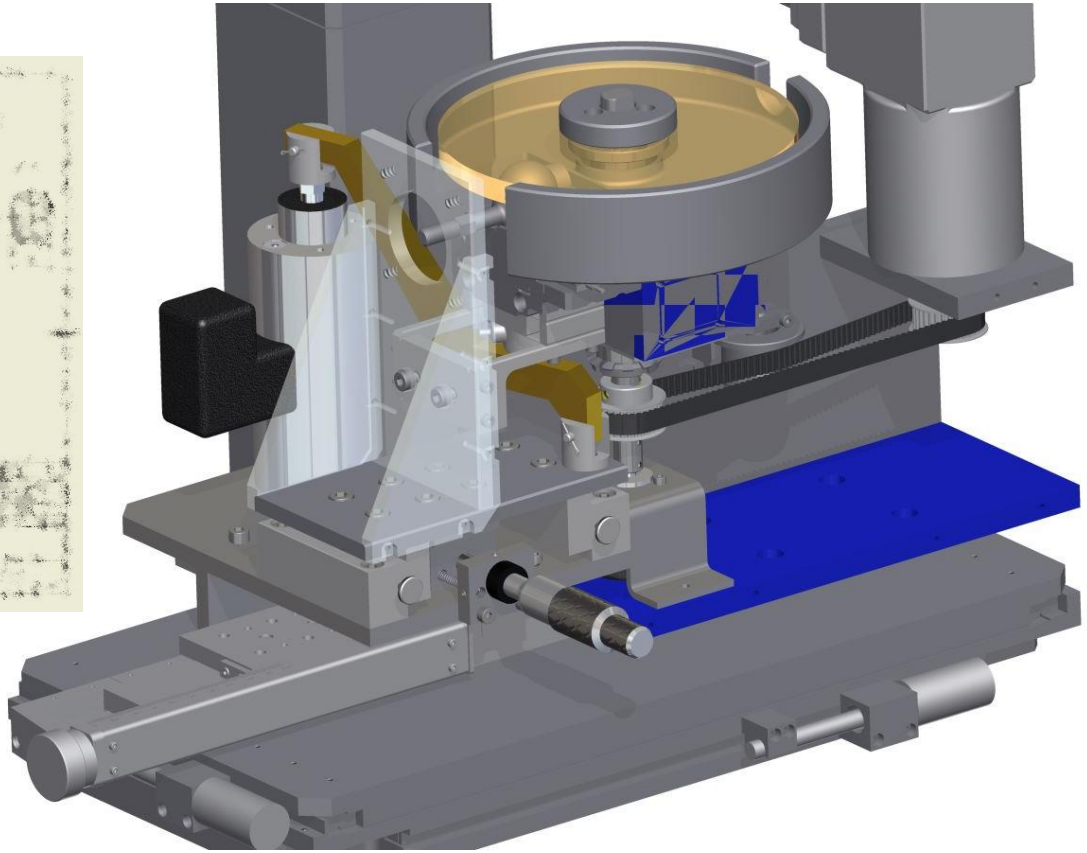
- **GAČR** (2012-2014) - *A novel concept of non-conforming contact lubrication based on thermal micro-elastohydrodynamics*
  - Applicant: Prof. Motohiro Kaneta, M.Eng., Ph.D.



Scientific and research activities

- **GAČR** (2014-2016) - *Roughness Induced Effects in Transient Elastohydrodynamic Contacts*
- Applicant: prof. Ing. Martin Hartl, Ph.D.





Educational activities

Teaching and learning activities:

- Teaching:
  - Winter semester
    - 5KS (Machine Design – Machine Elements)
    - ZTR (Tribology)
    - ZKP (Team Project)
  - Summer semester
    - 6KT (Machine Design – Mechanical Drives)
    - 6KM (Machine Design – Mechanisms)
  - Supervisor of bachelor´s theses
- Learning:
  - 9MOP (Methodologies of Scientific Work)
  - 9VPR (Research Project and its Manag.)
  - 9AJ (English for Doctoral Degree Study)
  - 9EHD (Elastohydrodynamics)
  - 9EXT (Experimental Methods in Tribology)



Thank you for your attention

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