



ThermoElastoHydroDynamic Study of Journal and Thrust Bearings

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Short description of the lecture (up to 10 sentences):

The lecture will mainly focus on the thermal effects and the influence of the bearing component mechanical and thermal deformations on the hydrodynamic bearing performance. The theoretical, numerical and experimental analyses will be presented for both journal and thrust bearings and for both fixed geometry and tilting-pad bearings. Successively, the steady state and transient regime will be studied. On important point will concerned the start-up period and the risk of bearing seizure. Then, the adverse operating conditions will be treated: shaft misalignment in the bearing and bushing wear. In the two last parts, the effects of surface texturing and coating materials will be exposed and discussed.

Syllabus of the lecture subjects (enlisted):

Proposed lecture is divided into 5 parts (about 3 hours for each):

1) Thermal effects in journal bearings: permanent and transient regime.

Theoretical, numerical and experimental analyses.

Fixed geometry and tilting-pad journal bearings.

Start-up and speeding-up.

Risk of bearing seizure.

2) Analysis of misaligned journal bearings.

Theoretical, numerical and experimental analyses.

Fixed geometry and tilting-pad journal bearings.

Film rupture and film reformation.

3) Influence of wear on plain journal bearing performance.

Theoretical and numerical approaches.

Experimental analyses:

- wear during start-ups and shutdowns,
- wear under turning-speed conditions.

4) Textured surfaces influence on journal bearing performance.

Numerical analysis on textured pad slider bearings.

Experimental study on fixed geometry textured pad thrust bearings.



Theoretical analysis of textured bushing plain journal bearings.

5) Thermal and deformations effects in tilting-pad thrust bearing operating under permanent regime

Theoretical and numerical analyses.

Comparison between numerical predictions and experimental data.

Influence of the viscosity.

Influence of the type of pad coating material (Babbitt, PTFE, PEEK).

Parametric analysis of centrally pivoted pad thrust bearings

Experimental analyses.

| Terminy wykładów | | | |
|-------------------------|-------------------|----------------|-------------|
| Data | Dzień tyg. | Godzina | Sala |
| 2015-11-23 | Pn | 12.15-15.00 | WM 200 |
| 2015-11-24 | Wt | 12.15-15.00 | WM 200 |
| 2015-11-25 | Śr | 12.15-15.00 | WM 200 |
| 2015-11-26 | Cz | 12.15-15.00 | WM 200 |
| 2015-11-27 | Pt | 12.15-15.00 | WM 200 |