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Lubrication and design of dynamically loaded journal bearings for compressors

Inženýrská analýza a simulace

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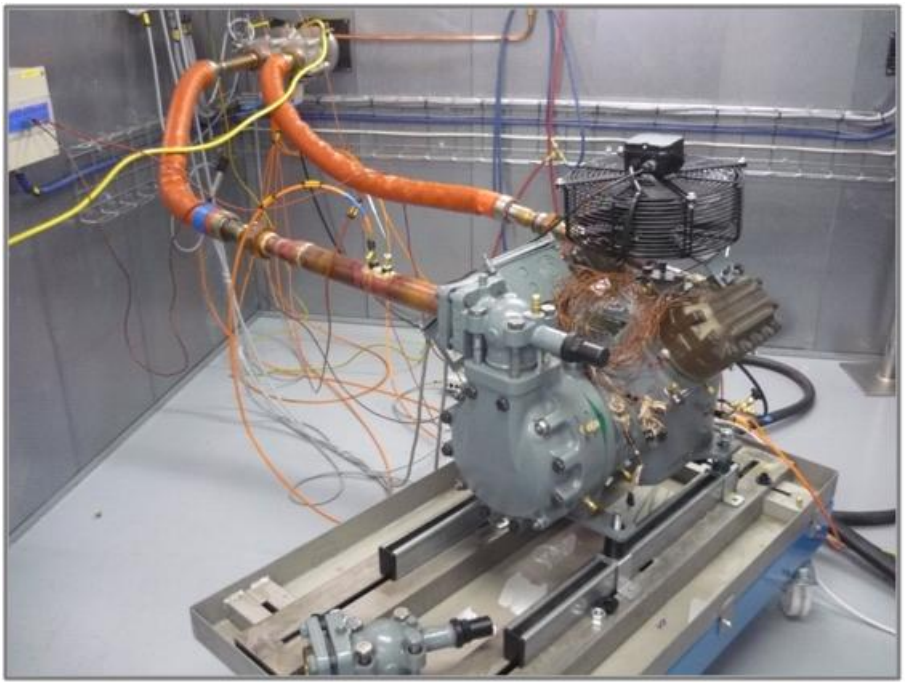

Formulace řešeného problému

My task is to use a special programme called JDynamic that is suitable for designing of journal bearings. This master thesis should contain information about theoretical results as well measured data on a real compressor. The measurements will be conducted also with company´s compressor D4DT. First of all it is necessary to understand how the programme works – based on input and output variables: Input: speed,load (cylinder pressure),bearing dimensions, oil type, oil supply type,oil pressure Output: oil flow, bearing load, oil film pressure, minimum film thickness, power losses oil temperature The parametric study is dealing with the mentioned quantities. The results of the analysis should be plotted into tabular charts. Later on test of real compressor should be carried out and compared with theoretical results. The test of the real compressor has to be conducted with variation of shaft speed and oil pressure as it is assigned by the company. The comparison of theoretical and measured results of the compressor should be the next step. If it is necessary some iteration should be made to match the theoretical model and the measurement more closely. The final task will be to write a proposal of bearings improvements for the compressor concerning: Dimensions, Oil flow, Oil pressure, Bearing material.

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Cíl práce

The target of this master thesis is modelling of compressor Journal Bearing Lubrication by JDynamic Software.

The paper should contain:

Overview of theory of hydrodynamic journal bearing design

JDynamic software

Test of the real compressor

Comparison of calculated and measured results

Proposal of bearings improvements for current compressor

Závěr

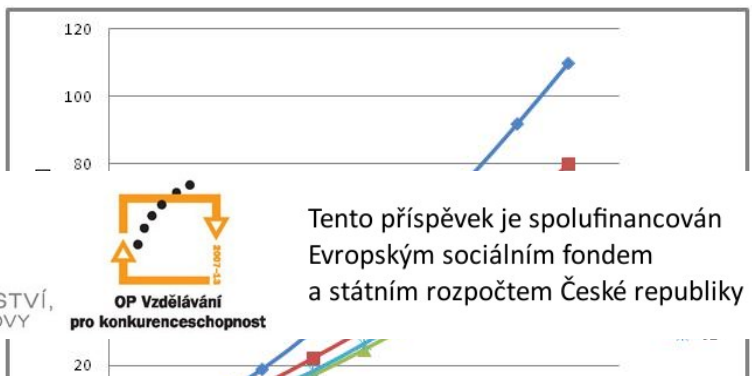
The main goal of this master thesis modelling of current compressor journal bearing lubrication by JDynamic software has been mostly achieved.

The introduction is devoted to journal bearing design theory. The next part is JDynamic software analysis of recent compressor data. The following part of the paper journal bearing J1 is characterized with its input variables. The comparisons of the other four journal bearing are mentioned at the end of the parametric study. For the presentation of the results, charts have been created in Microsoft excel.

The practical measurements were been conducted in the subsidiary office in Mikulov. Two variables were been measured: speed and oil pressure. It was desired to compare theoretical calculations with practical experiment measurement. Either way it was found out that it is not so simple, because recent science is not able to measure certain quantities like: minimum film thickness, peak oil film pressure at the bearing and other values that are subjects of this research. However this paper can be used as a study base for the future development.

At the end of the document there are few suggestions for improvements of current compressor concerning bearing material and dimensions.

Fotografická dokumentace



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