CZECH TECHNICAL UNIVERSITY IN PRAGUE
Faculty of Mechanical Engineering
12120 - Department of Automotive, Combustion Engine and Railway Engineering
Technická 4, 166 07 Prague 6, Czech Republic

SUPERVISOR'S REPORT ON THE MASTER'S THESIS

Master's thesis title ..... **Power Transmission Torsional Analysis for a Tilting Test Stand**

Author ..... **Mehmet Ekmekci**

Supervisor ..... **Ing. Jiří Vávra, PhD.**

Evaluation criteria and their classification

Fulfilment of the thesis requirements and goals ..... E (sufficient)

Self-action and own initiative during the thesis elaboration ..... E (sufficient)

Application of knowledge gained
by self-study and from professional literature ..... E (sufficient)

Usage of groundwork and data from practice ..... E (sufficient)

Professional level and contribution of the thesis ..... F (failed)

Formal aspects of the thesis ..... E (sufficient)

Further comments to the thesis:

Comments to the thesis goals

Since the motivation was not clearly described in the thesis, the supervisor will clarify that point at first. The main goal was to support an ongoing project to design and build safe, flexible hydrostatic power transmission between a combustion engine and a dynamometer for a tilting test stand in engine laboratory. A challenge with resonance of the rotating masses of the transmission in the operational speed range was identified by previous works. The design modifications aimed to shift resonance frequencies out of the engine speed range, made by another student, should have been confirmed by this thesis.

Another planned outcome of the work was a preparation of a multi-body model of a specific power transmission for forced torsional vibration analysis. The model was aimed to serve as a virtual tests bench to characterize the features of the complex system in transient regimes as engine start or stop. The student choose a GT Suite software environment to build a model of this system.

Comments to the student's approach

The student was multiple times advised to start with an analytic multi body simulation and free torsional frequency analysis, then to learn the GT Suite basics with provided tutorials of simple systems. He decided to elaborate the work in as short as possible way. The submitted work looks as a typical product of a trial and error approach.

It needs to be point out, that it took him almost half a year to build a model of torsional system with five masses and four springs.

Unfortunately, during his five months internship in the engine test laboratory he did not use the chance to see a single engine test on a dynamometer. He did not have any interest to explore the hydrostatic unit which had been delivered to the laboratory.

On the other hand, he experimentally evaluated moments of inertia of several rotating parts and spring stiffnesses. He built CAD models of the elements of the system and put together and ran the model in the GT Suite software.

Comments to the thesis

The most of the results presented were acquired within the last minute. The thesis is difficult to understand even for a reader who is informed about the subject. There is no introduction in almost any of the chapters of the thesis. There is a lack of discussion and analysis of the results presented in each chapter. The results are questionable and conclusions are not well supported. The dynamic torque amplitudes or spring deformations and their comparison with allowed values when transiting the resonant frequencies during start and stop of the system remained unanswered.

The final remarks

Although the supervisor's expectations were not fully met with the submitted thesis, he decided to let the student to present and defend the thesis in front of the examination board.

I **recommend** the master's thesis for the defence.

Summary classification of the master's thesis..... E (sufficient)

Jiří Vávra

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supervisor's name supervisor's signature

In Prague..... February 2, 2017