ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

SUPERVISOR'S OPINION OF FINAL THESIS

I. IDENTIFICATION DATA

Thesis name:	**Hybrid Vehicle Driveline Concept**
Author's name:	**Pavel Fabry**
Type of thesis :	master
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Department of Automotive, Combustion Engine and Railway Engineering
Thesis supervisor:	Gabriela Achtenová
Supervisor's department:	Department of Automotive, Combustion Engine and Railway Engineering

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **challenging**

Evaluation of thesis difficulty of assignment.

Although the concept was given by Ricardo, the thesis topic remains to be complex assignment. The student should prove his ability to create a simulation model, as well as to design and compute the gearbox.

Satisfaction of assignment **fulfilled with minor objections**

Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.

The assignment was fulfilled. Although many parts of the work are very briefly described, are hard to check, some results are completely missing.

Activity and independence when creating final thesis **Choose an item.**

Assess that student had positive approach, time limits were met, conception was regularly consulted and was well prepared for consultations. Assess student's ability to work independently.

The thesis was done by Ricardo Prague, and mainly supervised by Filip Hostaš. His opinion is included.

Technical level **E - sufficient.**

Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.

Chapter 3.1 is the best described chapter of the master thesis. Anyhow I have some doubts about calculation of the highest ratio. I am not sure, if the maximal speed can be really achieved by maximal mass. The last sentence on page 21 is not very clear and seems, that rolling resistance should not be taken into account – but the calculation is OK. In the calculation of top speed is included the acceleration resistance. Although it is small value, it is strange approach.
Chapter 3.2: Can happen that ICE+EM1+EM2 will drive the vehicle? Can happen that one/both of the EM will work as generator? If this will be possible, can it influence the load of the gearbox?
Chapter 3.2.4, page 34: typing mistake in first row, not the normal module, but transverse module. Bottom of page: df is dedendum diameter, which does not correspond to the equations.
The proposal of the number of teeth is mostly decided to commensurable number of teeth.
The parameters of the gearwheels can't be found anywhere.
Chapter 4.2: Missing results of bearing (already mentioned). What I treat as worse, that nowhere is mentioned how the calculation proceeded. Especially the input shafts are not standard ones. Every shaft is on two own bearings + both shafts are linked via next 2 radial needle bearings. The task is statically undetermined. No explanation. No methodology. No theory.
Chapter 4.2.2: Not legible results. Just the maximal value is mentioned, but is this value really relevant? Why are not listed the values under the gearwheels, bearings, etc?
Chapter 5.3: Again very briefly and totally unsufficient description of the model.
Drawing: Left gearwheel is stopped with help of shoulder, but which is not treated as sufficient and a circlips is added. What is the reason?
How will be manufactured the shift teeth of the free rotating gearwheel of the second speed on output shaft?
What type of bearings are under free rotating wheels of the 1^{st}, 2^{nd}, 3^{rd} and 4^{th} speed?

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Formal and language level, scope of thesis	**D - satisfactory.**
Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.	
The master thesis is written in relatively good English. Pavel Fabry did not make any effort to clarify his work, and to describe how he proceeded. His work can't be followed by anyone else, and even I would say, that half a year later, even the author himself. Some results are not presented. Table 3 on page 45 is not legible, and it is one of the most important outputs, where the bearings life is stated. On page 49 till 51 he is wasting paper by describing the NEDC cycle, instead of using graphs. When he finally uses graphs, he did not make the effort to change the background color, on the black background the thin yellow line is almost not visible. The same effect we can observe on graph, which is one of the main results – Figure 30, page 65.	

Selection of sources, citation correctness	**B - very good.**
Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.	
Important amount of references, thanks to the overview of the vehicles in the same group. Some wrong citations in the text, or completely missing ones.	

Additional commentary and evaluation
Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.
No comment

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Summarize thesis aspects that swayed your final evaluation.

I evaluate handed thesis with classification grade **D - satisfactory.**

Date: **1.2.2017** Signature: