THESIS REVIEWER'S REPORT

I. IDENTIFICATION DATA

Thesis title:	**Planetary Gearbox for Electric Vehicle**
Author's name:	**Samed Ali Akköse**
Type of thesis :	master
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Department of Automotive, Combustion Engine and Railway Engineering
Thesis reviewer:	prof. Dr. Ing. Miloš Němček
Reviewer's department:	VŠB – Technical University of Ostrava, Dept. of Machine Parts and Mechanisms

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **challenging**

How demanding was the assigned project?

The assignment is quite demanding, but the student still expanded his work somewhat.

Fulfilment of assignment **fulfilled**

How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.

The student completely fulfilled the assignment. He also performed a number of calculations beyond the scope of the assignment in the computational part.

Methodology **correct**

Comment on the correctness of the approach and/or the solution methods.

The assignment specified the solution procedure quite precisely. The student respected this. The methods he used in the calculations are appropriate, except for some details.

Technical level **B - very good.**

Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?

From the results of the research and from the overview of patents, it is clear that the student was interested in the topic and fully devoted himself to it. The computing part is extensive and with good use of special software. It is a pity for certain weaknesses in defining gear geometry. On the contrary, cooperation with Ricardo company is valuable. Overall, however, the work is at an excellent level in terms of work.

Formal and language level, scope of thesis **B - very good.**

Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?

From a formal point of view, the diploma thesis is of good quality. However incorrect references to image numbers appear (e.g. pages 54, 55, 81, 82). The figures on pages 43 and 50 do not have numbers. Figures 40 and 41 do not agree with the list of figures. Figure 22 shows different designations than in the equations. On page 65, the reference to Equation 21 is incorrect. PHEV is missing from the list of abbreviations (Fig. 1). Chapters 2.1.5.1 and 2 are not in the table of contents. The pitch diameter is not denoted P but d. Rd (rd) is not "the kinematic radius of the tire" nor "the dynamic radius of the vehicle".

Selection of sources, citation correctness **B - very good.**

Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?

The student drew on a sufficient number of resources. These resources are current and high quality ones. Citations are relevant.

Additional commentary and evaluation (optional)

Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.

The computing part is nice and interestingly processed. However, a few things can be said for future improvement. Equation 11 lacks efficiency. On page 52, it is missing to include the losses of highly loaded satellite bearings in variant 3. The geometric design of the planetary gearbox gears is not the best one. Profile shift coefficients are poorly designed and the integer total contact ratio is not met. Negative shift coefficient of the satellite leads to its weakening and reduction of the bending load capacity. Specific slidings on all wheels of the planetary gearbox are greater than -3.3. This value is very high and must be addressed. It is also an omission - Table 13 shows the total torque on the satellites. However, about a third of the torque enters the satellite-ring gear load capacity calculation (three satellites).

III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

I have three questions for this diploma thesis –

1) Why don't you mention at least one car from a car manufacturer in the Czech republic in the list of vehicles?
2) Why is a fixed reduction gear usually (but not always) needed for electric cars?
3) The table (tab. 4) of the parameters of the YASA electric motor used by you does not agree with its characteristics (fig.24), please explain.

Despite a few minor shortcomings, the thesis is very good. It is also unusually large. The drawing documentation is the corresponding assignment. I can say that the student met the requirements of the assignment.

The grade that I award for the thesis is **B - very good.**

Date: **19.8.2020** Signature: