

## I. IDENTIFICATION DATA

<b>Thesis title:</b>	<b>Design of a four-stroke single-cylinder motocross engine</b>
<b>Author's name:</b>	<b>Adam Bureš</b>
<b>Type of thesis :</b>	master
<b>Faculty/Institute:</b>	Faculty of Mechanical Engineering (FME)
<b>Department:</b>	Department of Automotive, Combustion Engine and Railway Engineering
<b>Thesis reviewer:</b>	Ing. Tomáš Zemek
<b>Reviewer's department:</b>	Principal Engineer, Ricardo Motorcycles, Ricardo Prague s.r.o.

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	<b>challenging</b>
<i>How demanding was the assigned project?</i>	
<i>The topic of this thesis was challenging because of its wide scope. To design a competitive motocross engine, it is necessary to understand the category of the motorcycles, the main competitors (Benchmark) and marketing purpose. For the choice of the proper engine concept the designer must get knowledge of each engine systems and its interactions. The designer must be able to gather a lot information and make its own judgement for chosen engine layout.</i>	

<b>Fulfilment of assignment</b>	<b>fulfilled with minor objections</b>
<i>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.</i>	
Assignment was fulfilled almost completely. All parts of the thesis are roughly explained without going too deep into the details (which would exceed the amount of work). In the part 2.4 (Comparison of motocross engines) would be good to criticize and decide which engine systems are better by one of the competitors.	

<b>Methodology</b>	<b>correct</b>
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
This thesis has logical steps needed to sort the information required for decision of the engine layout. In the real project would be much more options for the design of engine systems evaluated (not possible to fully comprehend in one thesis).	

<b>Technical level</b>	<b>B - very good.</b>
<i>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?</i>	
From the thesis is evident, that author understood the engine layout and its systems very well. Author has spent a lot of time to get information about the benchmark engines and real parts available by Ricardo. The thermodynamic model as well as design of engine components are exceeding the expectations. The strength analysis of the components would need more cooperation and discussion with the colleagues from Simulation department of Ricardo Prague – Student has correctly pointed this out in his conclusion.	

<b>Formal and language level, scope of thesis</b>	<b>B - very good.</b>
<i>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?</i>	
This thesis is organized logically. Some of the text could be modified to reduce original "marketing" style of description. In text, part 2.2.3 (2 vs 4 stroke) could be some simplifications avoided. English level is good with clear understanding. In text could be word "great" replaced with another suitable synonyms. In text, part 3.3.4.5 "Camshaft cover" the correct name should be "Camshaft ladder frame".	

**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?*

Selection of sources was adequate. Some of the sources have more popular than scientific character. I would add also some build manuals, where could be a lot of usual information found.

**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.*

This thesis was very comprehensive for the student due to following points:  
to design of a lot of engine components, get understanding of the motocross market, analyze competitor engines, analysis of the components and some basic calculations of the engine systems.  
The thesis is more oriented on describing and analyzing of the existing solutions rather than proposing new ideas.

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

*Summarize your opinion on the thesis and explain your final grading. Pose questions that should be answered during the presentation and defense of the student's work.*

In this thesis, student has shown his knowledge for the general engine design and analysis. Also, a lot of effort was spent on the gathering of the information and their evaluation.

This thesis has more informative character because the proposed solution is following the benchmark. This approach is correct for most cases, where new engines are designed with limited budget, time and low risk.

Questions:

If you would be designing 250 and 450 motocross engines for common chassis, which valvetrain layouts would you choose and why?

Which lubrication system are using motocross engines (dry or wet sump) and why?

Which design features could be used in the modern engines to achieve high power?

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

Date: **2.2.2021**

Signature: Tomáš Zemek

