

DIPLOMA THESIS EVALUATION

Student's name and surname: Fernando Rafael Rubio Burga

Name of the diploma thesis: Optimization of the boat engine design

Supervisor of the thesis: prof. Ing. Tomáš Vít, Ph.D.

1. Diploma thesis evaluation

Evaluation	excellent	excellent minus	very good	very good minus	good	failed
Meeting the goal and fulfilling task of the thesis		X				
Quality of conducted survey		X				
Methodology of solutions		X				
Expert level of the thesis			X			
Merit of the thesis and its potential applicability of results			X			
Formal and graphic level of the thesis			X			
Student's personal approach		X				

Mark x in the corresponding box.

Supervisor's final evaluation is based on his/her overall subjective evaluation.

Grading is stated literally in the article no. 5, neither by a number, nor by a letter.

2. Comments and remarks on diploma thesis:

Meeting the goal and fulfilling task of the thesis:

The problem description and the state of the art has been carried out. Main parameters of the boat engine were described and explained. The review of CFD and experimental methods is relatively strict, but contains most of the information needed to solve the problem. Missing information can be found in the used literature cited at the end of thesis. The main part of the thesis is focused on the analytical and CFD studies of the influence of the jet pump design on operating parameters. The experimental part is well described. The design of the experiment and some components for experimental setup were completed. However, the realization of experimental part were limited by the actual situation. The comparison of the theoretical and CFD results was presented. Discussion of the results have been performed. **The main goals of the thesis were fulfilled.**

Quality of conducted survey:

The review is based on sources published mainly in recent years. Some parts should be explained more detailed, e.g. the theory of CFD methods. Considering the cited sources, **the review represents a good insight into the topic.**



Methodology of solutions:

The improvement of pump parameters was based on the original design analysis and analysis of theoretical performance curves. Then, the CFD methods were used for flow analysis inside the pump. CFD methods are suitable for solving the problem. Steady state simulation of single phase fluid flow could be sufficient for analysis of the inner channel shape of the jet pump. Some additional methods for optimization could be applied, otherwise **the used methodology is sufficient for the solution.**

Expert level of the thesis:

Author solved several cases of the jet pump with different design parameters. The specialized software (Matlab/Octave, ANSYS Fluent) was used for the problem solution. To use the specialized software, a certain level of knowledge is required. This **corresponds to the requirements for the level of master's study.**

Merit of the thesis and its potential applicability of results:

The jet type pump could be used as an alternative to the propeller drive. The investigation of the phenomena inside the inner channel of the pump and influence of the design parameters on operating characteristics can lead to greater efficiency and wider application possibilities. The verified CFD model could be used for future work on real engines, e.g. for small boats, scooters etc.

Formal and graphic level of the thesis:

The thesis is fluently readable with occasional typos and grammatical mistakes. The pictures taken from the cited literature have a good quality. Some graphs created by the author contain hard-to-read captions. Some of the image captions in Chapter 6 contain the word „experimental“, this probably means CFD results. The overall elaboration of the **thesis formally meets the requirements for the diploma thesis.**

Student's personal approach:

Author was very active. He was able to work independently with a small help of a supervisor. Sometimes the student had his own opinion on the solution, then the recommendations of a supervisor was not fully accepted. The elaboration of the thesis took place evenly throughout the year. Student regularly participated in consultations. **Activity and independence were most important in the student's approach.**

3. Questions about diploma thesis:

Describe the approach used in CFD model to include rotation of blades.

How did you define the parameters of Water-Jet pump models for CFD study?

Compare the results for original design (old model) and other tested models. Explain the improvement.

4. Supervisor's statement on results of the inspection carried out by the anti-plagiarism program in the STAG system:

The STAG system used for plagiarism check evaluated the match of 0%.

5. Supervisor's grading of the diploma thesis:

I recommend this work for the defense and grade it as **excellent minus.**

Date: 19. 06. 2020, in Liberec



Supervisor's signature

