DIPLOMA THESIS EVALUATION

Student´s name and surname: Gowtham Ananthasayanan

Name of the diploma thesis: HEAT TRANSFER IN HORIZONTALLY ORIENTED AIR ENCLOSURE

Supervisor of the thesis: Doc. Ing. Jaroslav Šulc, CSc

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: special sheet enclosed

3. Questions about diploma thesis: 1. Why can vertical walls delimiting the air enclosure be considered to be a reemitating surface?

2. Is it possible to simulate air cavities with a different surface of the base than indicated in your work?

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

5. Supervisor ´s grading of the diploma thesis: very good minus

Date: 17.06.2020, in Liberec

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Supervisor´s signature

2. Comments and remarks on diploma thesis:

Gowtham Ananthasayanan

Heat Transfer in Horizontally Oriented Air Enclosure

According to the content, Mr. Ananthasayan's thesis is divided into five main chapters. The first chapter briefly outlines the gradual steps towards achieving the declared objective of this work. In chap. 2. is given a general description of the basic mechanisms for heat sharing. In chap.. 3. the mechanism of heat transfer in gaseous enclosures in a case of natural convection is described in detail, with an emphasis on horizontally oriented rectangular air enclosures. At the end of the chapter, the HFM 436/3/1E Lambda measuring device is described, which was used to simulate air enclosures and enabled all the data needed for subsequent numerical solutions to be obtained. The results of the measurements made and the procedure for the solution to find the shape of the criteria equation, expressing the Nusselt's number dependence on the Rayleigh's number, are given in chapter 4. This is terminated by the calculation of the radiant component of the heat flux through the air cavity, provided that the vertical walls of the cavity can be considered as a reemiting surface. In chapter 5. the derived shape of the criteria equation for the determination of Nusselt's number is given. Comparison of the analytically determined and on the basis of an experiment determined of the radiant component of the total heat flux through the air enclosure was performed.

In my opinion, when evaluating this thesis, it is necessary to take into account the specific conditions when writing it during the final semester of study.
In order to achieve the above-mentioned objective of the thesis, the diplomant had to familiarize himself with some of the mechanisms of heat transfer and the ways in which they are addressed, which are far beyond the lectures of the relevant subject. Mr. Ananthasayanan managed it quite successfully. All the more surprising is how little attention he paid to drafting the text of his thesis, despite the warnings of these errors in the first version of the manuscript. A number of grammatical errors and vague formulations and gross errors in the derivation of certain calculation relationships can be found in the presented work.
Only some of them I mention:
p. 14 – missing dt on the left side of the stiffness (2), p.23 – Max Planck, p. 23 – in dimension C1 is missing W, the uncluttered size C1 and C2, p. 24 – would be a suitable picture showing the relationship of the quantities of emissive power, irradiation, radiosity i with regard to eq. (11) to (13) to (13), p. 25 – figure demonstrating the determination of the view factor and general formula, would be convenient, p. 26 – Grashof number: ν^2 eq. (19) and eq. (31) p. 27 – k [W/mK] it was recommended to use K insted of C,
p. 38 – Table 3 - Thermal Conductivity- In the previous text, it should be stressed that the quantity provided bythe measuring device is not the coefficient of thermal conductivity of the material in the case of the air enclosure, as is the case with solid materials for which the measuring device is primarily intended. This quantity referred to in Table 3 and Table 5 should be interpreted as " Coefficient of heat transfer by the air enclsure of a given thickness" with a dimension [W/mK].

p. 41 – despite the incorrectly indicated placement in the relationship for calculating Grashof's number, its size is determined correctly and the size of Rayghleigh's number is determined correctly, in eq. (32) Nusselt number is missing in the numerator,
eq. (33) – the right side must be divided by L (air layer height) and multiplied by A (area), this error is also transferred to eq. (35) , eq. (36) is correct and its interpretation by the following sentence as well,
p. 43 – in relations (43) and (44) the subscript is missing for Q.

Despite these reservations, the results of the solution set out in Mr Ananthasayan's thesis are correct and it can be concluded that a predetermined goal and assignment of work has been achieved.
According to the diploma thesis assessment form published by the Faculty of Mechanical Engineering TUL, the assessment of the thesis is given by a set of seven aspects without mentioning any "weight factors" preferring some of the above aspects. The resulting evaluation of the work should thus be drawn up taking into account the evaluation of each of those aspects.
In such a case, I believe that Mr Ananthasayanan should be allowed to defend his thesis, on the basis of an assessment of the achievement of the objective and the assignment of work, the methodology of the solution of work, the professional level of work and the contribution of work and the potential applicability of the results.

In Liberec 2020-06-16

Doc. Ing. Jaroslav Šulc,CSc
Head of Thesis