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Opponent's review of the Doctoral Thesis

Candidate   Ing. Jakub Diviš

Title of the doctoral thesis   Sorption properties of clay materials

Study Programme 3608V001 Pozemní stavby

Tutor   prof. Ing. Petr Hájek, CSc., FEng, , tutor specialist, Ing. Jan Růžička, Ph.D.

Opponent   Doc. Ing. Pavel Padevět, Ph.D.

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Topicality of the doctoral thesis theme

Commentary: I find the topic of the work highly focused on the issue of clay structures. The time of responsible behavior also brings with it topics related to construction optimization. Clay building belongs to the construction industry. Nevertheless, knowledges about the use of clay are small, and it is appropriate to deepen this area of knowledge, because clay as a building material hides great opportunities from an environmental point of view.

| ☒ excellent | ☐ above average | ☐ average | ☐ below average | ☐ poor |

Fulfilment of the doctoral thesis objectives

Commentary: The tasks as defined in the dissertation are fulfilled without reservations. The student's work fulfills all the parameters of the dissertation, both in the field of research and at the scientific level.

| ☐ excellent | ☒ above average | ☐ average | ☐ below average | ☐ poor |

Research methods and procedures

Commentary: Jakub Diviš first focused on a very detailed explanation of the issue of sorption. He explained the properties of clays in the depth needed for the elaboration of the dissertation. On the basis of theoretical data, he developed a methodology for obtaining the necessary results. He statistically evaluated the obtained data and drew comprehensive conclusions from them.

| ☐ excellent | ☒ above average | ☐ average | ☐ below average | ☐ poor |

Results of the doctoral thesis – dissertant's concrete achievements

Commentary: The author presents the results on a total of 7 pages of his work. In addition to these conclusions, the data are continuously evaluated within individual chapters. The conclusions are described and discussed in great detail. It can be stated that the conclusions are not simply generalized, but on the contrary very detailed. The results correspond to the assignment set by the doctoral student.

| ☒ excellent | ☐ above average | ☐ average | ☐ below average | ☐ poor |

Importance for practice and for development within a branch of science

Commentary: This area can be divided into two categories in terms of the submitted work. The first area can be dedicated to the construction research community. Working in this area is a useful example of a careful approach and subsequent steps leading to the desired goal.

The second area, practical, will certainly be satisfied with the results obtained. Conclusions in the area of sorption properties of unfired clays are exemplary and legible in comparison with common building materials. When designing buildings, designers can be inspired by the results, especially in the field of indoor environmental theory, and the use of non-traditional building materials..

| ☒ excellent | ☐ above average | ☐ average | ☐ below average | ☐ poor |

Formal layout of the doctoral thesis and the level of language used

Commentary: The dissertation is written in English. The author lists many citations, which he used throughout the work. The structure of the work from theoretical background through measurement, processing of results and determination of conclusions brings the reader a sense of understanding of the topic and understanding of the dissertation. I did not find language offenses at work. Perhaps only the editing provided by common text editors could sometimes cause style discrepancies. But that's just a small reminder.

| ☐ excellent | ☒ above average | ☐ average | ☐ below average | ☐ poor |

Remarks

I would like to ask the dissertation several questions that could better clarify the content of the dissertation:

Did you use chemical solutions for the appropriate saturation level to measure sorption? Could you, for example, comment on this in the graph in Fig. 48?

How do you think the adsorption isotherm would behave if you used the S70 C30 mixture, ie with a larger amount of filler? The amount of water could be as needed. Would clay C only work as a binder in this mixture, or do you think it would still have the function of a significant adsorber? Where would you place the estimated curve, see Fig. 48?

For the graph in Figure 58, I would expect a logarithmic scale on the horizontal axis. What would such a chart look like? Would it be more readable for smaller pore sizes?

In the graph in Figure 78, the 1/3 measurement is significantly different, which will affect the average value (blue line). What would happen if you excluded 1/3 measurement from the evaluation? I note that I know why you did not do it.

In Chapter 6, you work with the Student Statistical Distribution. Would a Normal Statistical Distribution be applicable? Would it be possible to process the data in this way? Would it be possible to obtain parmeters for normal distribution?

Would you clarify the term dynamic potential, which you often use at work, see eg page 121? (6.2.3.)

Could the use of regression curves of the type of polynomial functions of higher degree > 5 be more beneficial for a more accurate solution of the regression function?

Final assessment of the doctoral thesis

Jakub Diviš's dissertation is in all respects a very carefully and thoughtfully prepared work. It is logically arranged and it is clear that considerable effort has been put into it. Questions that I ask the author do not reduce the value of the work and are asked for a more accurate explanation of the issue.

The submitted thesis fulfills the attributes of a dissertation, and therefore I recommend to award the degree of Ph.D. to the graduate after its successful defense.

Following a successful defence of the doctoral thesis I recommend the granting of the Ph.D. degree

yes ☒ *no* ☐

Date: 2.2. 2022

Opponent's signature: ....