

**REVIEWER'S FORM
for thesis evaluation**



1. Identification of the student

Student:	Saray S. Sepulveda Cruz
Thesis:	Experimental investigation of climate effects on historical building materials: the Gothic towers of Prague.
1 st Institution:	Universidade do Minho
2 nd Institution:	Czech Technical University in Prague
Academic year:	2022/2023

2. Identification of the reviewer

Name:	Tomáš Weiss
Institution:	Charles University, Faculty of Science, Institute of Hydrogeology, Engineering Geology and Applied Geophysics
Position:	Assistant Professor

3. Fulfillment of thesis goals

excellent <input type="checkbox"/>	above aver. <input type="checkbox"/>	average <input type="checkbox"/>	below aver. <input type="checkbox"/>	weak <input type="checkbox"/>
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Comments:

The thesis goals are somewhat challenging to comprehend due to unclear sentences. Nevertheless, I have attempted to summarize them, considering their context.

The thesis has four objectives which can be summarized as follows: (1) to simulate such environmental conditions applied to the studied material that allow interpretation of material behaviour of cultural heritage, (2) to define parameters and procedures for the analysis of the effect of wind-driven rain on cultural heritage, (3) to evaluate the effectiveness of simulations of climatic scenarios with focus on moisture motion, (4) to find a relationship between moisture content and the quantities of rain and wind, and to generate index susceptibility curves that will allow vulnerability analysis of the studied structure.

I must emphasize that accomplishing all the stated goals within the scope of a master's thesis would be exceedingly challenging. Therefore, I would have highly recommended the author to consider focusing on one or two objectives to ensure a more in-depth and manageable research endeavor. This approach would likely lead to a more coherent and comprehensive study within the constraints of the thesis.

Nevertheless, the author successfully simulated environmental conditions to interpret the material behaviour of cultural heritage. It remains unclear from the thesis whether the second objective, defining parameters and procedures for analysing the effect of wind-driven rain on cultural heritage, was achieved. The third objective, evaluating the effectiveness of simulations of climatic scenarios with a focus on moisture motion, has, to my opinion, not been addressed in the thesis. The fourth goal, establishing a relationship between moisture content and the quantities of rain and wind and generating susceptibility curves for vulnerability analysis of the studied structure, has been accomplished.

The conclusions drawn from the gathered dataset appear to be appropriate.

However, the thesis is quite complex, and it lacks a clear structure, making it challenging for readers to grasp its content. A more organized chapter arrangement in a classical order would greatly improve its overall clarity and cohesiveness.

4. Academic/scientific/technical quality

excellent

above aver.

average

below aver.

weak

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The thesis impressively gathers and interprets a substantial amount of data; however, its presentation undermines the potential of this dataset. The main concern lies in the unclear division between the methodology, results, and discussion sections. To enhance clarity, it is essential to distinctly separate the methodology from the results and discussion, allowing readers to understand the experiment's execution and the obtained outcomes.

For example, the chapter on vulnerability assessment and analysis is slightly confusing as the author initially emphasizes the distinction between vulnerability assessment and risk analysis. However, later in the chapter, the author mentions "In order to perform a risk analysis..." without clarifying whether a complete risk analysis was conducted or if only vulnerability analysis was carried out. This lack of clarity necessitates further explanation to understand the (planned) scope of the analysis conducted in the thesis.

The section on the state of the art provides a concise and informative overview of several masonry damaging processes and highlights the significance of building preservation. However, it could benefit from expanding more on the central focus of the thesis, which is the impact of rain on historical building materials.

The thesis would greatly benefit from a more detailed description of the installation of the electrode sensors, given its significant impact on the recorded resistance. While the moisture monitoring system is well-described, the missing information about the depth of sensor installation remains a notable gap.

The author correctly asserts that scale models can be employed to study climatic effects on historical materials. However, the thesis lacks a description of how the scaling was performed, leaving a gap in understanding the methodology behind the use of scale models.

The simulation of rain is accomplished by infiltrating water through karsten tubes. However, this method may replicate a scenario of material submersion in water rather than accurately simulating rain droplets falling onto the material.

5. Formal arrangement of the thesis and level of language

excellent <input type="checkbox"/>	above aver. <input type="checkbox"/>	average <input type="checkbox"/>	below aver. <input type="checkbox"/>	weak <input checked="" type="checkbox"/>
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Comments:

The language used in the thesis occasionally presents challenges for understanding, and there is room for improvement in stylistics. However, the author usually demonstrates a correct use of scientific terms throughout the document.

There is a significant number of misspellings, for example "Objetive" instead of "Objective".

Regarding terminology, it is suggested to use "important injuries in buildings" instead of "relevant damage to buildings" to enhance clarity. Additionally, the presence of unfinished sentences, such as "Considering that the environmental control functionalities are subject to the operational limitations of the electronic or structural components of the circuit" (pg 11), requires further elaboration to provide complete thoughts.

Consistency in using the appropriate tense (were/are) throughout the thesis would further help with coherence. The methodology section should explicitly describe how the experiments were conducted, rather than how they should be performed, to avoid confusion and ensure clarity.

The mention of "Rainfall loads L1, L2, and L3" on page 26 without providing an immediate explanation of what these loads correspond to may cause confusion for the reader. It is essential to provide clear explanations or references for such terms to aid comprehension.

The terms "R1" and "R2" appear to have varying meanings in different sections of the thesis. They stand for resistors, for different wind speeds and perhaps even for locations of moisture measurements. This inconsistency causes confusion in the text, making it unclear what each respective "Rx" stands for.

There is also repetition of information, such as the mention of resin on pages 20 and 21, which could be streamlined. On the other hand, crucial details, like the depth of the holes for the copper electrodes, are missing. Clear information on the electrode depth (e.g., 0-30 mm or 5-35 mm) should be provided to enhance the thesis's overall clarity.

In conclusion, the thesis displays great potential but requires improvements in language clarity, consistency, and proper arrangement of methodology and results. Addressing these concerns would enhance the thesis's effectiveness and understanding for readers.

6. Further comments

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How would the author explain the differences in readings from different specimens but from the same experiments?

How did the author calibrate the resistivity measurement to obtain moisture content?

How were the figures 25 and 26 constructed?

7. Grade: _____ **E** _____

Use the following scale

A (excellent)	B (very good)	C (good)	D (satisfactory)	E (sufficient)	F (fail)
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Prague

July 20, 2023

The Reviewer,

Tomáš Weiss