

## I. IDENTIFICATION DATA

<b>Thesis title:</b>	<b>Nonlinear numerical evaluation of baroque epoch foundation structures on the examples of the Broumov Group Churches footings</b>
<b>Author's name:</b>	<b>Tatiana Larionova</b>
<b>Type of thesis :</b>	master
<b>Faculty/Institute:</b>	Faculty of Civil Engineering (FCE)
<b>Department:</b>	Department of Mechanics
<b>Thesis reviewer:</b>	Ing. Jan Kos, CSc.
<b>Reviewer's department:</b>	Department of Geotechnics

## II. EVALUATION OF INDIVIDUAL CRITERIA

<b>Assignment</b>	<b>ordinarily challenging</b>
<i>How demanding was the assigned project?</i>	
I consider the assignment of the master thesis to be moderately demanding. Main tasks have been calculations of vertical displacements of strip foundations of four churches using analytical and FE methods. Comparison of calculation results, conclusions and recommendations has been required. Also brief description of the region and solved churches history and geological conditions has been required.	

<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>	
The thesis fulfils all assigned tasks. The computer programs have been used for the solution, no manual calculation has been made. The results have been compared, but without deeper and more detailed analysis of their differences. The planar solution of vertical displacements of church towers with square ground plans has been not a good method.	

<b>Methodology</b>	<b>partially applicable</b>
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
The methods used for the solution are commonly correct. But in two cases of vertical displacement calculations of church towers with square ground plans, the planar solution perpendicularly to the strip foundation has been not correct. Analytical solutions for rectangular loading areas exist. In FEA, it should be better to use the axial symmetric model. The GEO5 Slab computer program (elastic plate on the Winkler-Pasternak subsoil) could be also used.	

<b>Technical level</b>	<b>D - satisfactory.</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>	
The standard calculation methods and (planar) models have been used. But in some situations (vertical displacements of towers) it has been not a good solution.	

<b>Formal and language level, scope of thesis</b>	<b>A - excellent.</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>	
The formal level of thesis is very good. The diploma thesis is well graphically processed; pictures, tables and graphs are sufficiently illustrative. The text of the thesis is concise, clear and understandable. There are not many errors in the text.	

<b>Selection of sources, citation correctness</b>	<b>A - excellent.</b>
<i>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?</i>	
The technical literature used has been chosen appropriately and is cited to a sufficient extent. I did not find any cases of violation of citation ethics.	

**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.*

Please insert your comments here.

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

*The assignment of the master thesis has been moderately demanding. Main tasks have been calculations of vertical displacements of strip foundations of four churches using analytical and FE methods. All assigned tasks have been fulfilled. But the planar solution of vertical displacements of church towers with square ground plans has been not a good method. The calculation results have been compared, but without deeper and more detailed analysis of their differences. On the other hand, the formal and language levels have been excellent, and complications due to the pandemic situation in the Czech Republic have to be considered. Overall the student has demonstrated sufficient knowledge and skills to obtain the master degree, so I recommend a positive acceptance of the master thesis.*

Questions:

1. Is it possible to model the "structural strength of soil" in FEA?
2. Spiral staircases close to church towers are critical (thin wall) positions under differential settlement of the church and its tower. How can be explained the possibility of their presence?

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

Date: **22.7.2021**

Signature: