

I. IDENTIFICATION DATA

Title of the thesis:	Design of load-bearing structure of an office building with large slab opening
Candidate:	Madina Zharas
Type of thesis:	Bachelor thesis
Faculty:	Faculty of Civil Engineering
Department:	Department of Concrete and Masonry Structures
Opponent:	Ing. Josef Novák, Ph.D.
Opponent's department:	Department of Concrete and Masonry Structures

II. EVALUATION

Topicality of the thesis theme	Simple
The objective of the thesis was to design the load-bearing structure of the selected building which is rather simple from a structural point of view. The main tasks include carrying out a layout of structural elements, a preliminary design, a reinforcement design of both a slab with a large opening and a column, structural and reinforcement drawings of selected elements and a technical report.	

Fulfilment of the thesis	Average
The objective of the thesis has been achieved rather successfully. The thesis consists of the structural analysis part and engineering drawings which demonstrate all the required outcomes. The technical report is missing.	

Methods and procedures:	Average
The methods and procedures used for the structural design of selected structure are adequate. However, the structural analysis is rather unclear and difficult to check. In general, the procedures are mostly described and no hypothesis or detailed evaluation of obtained findings are carried out. For instance, the comparison between the FEM analysis results and Direct Design Method results would improve the thesis. The procedure used for the reinforcement design of the reinforced concrete column does not correspond to the assumption about the reinforcement layout in a cross-section.	

Formal layout of the thesis and the level of language used	Below average
From a technical point of view the thesis is poorly written and unclear. Some figures are not readable (p.29, p.57, p.60), the text style is not unified, drawings and figures in the thesis are not numbered.	

Citation of references	Below average
The thesis contains a reference list at the end but no citations are included within the thesis. Moreover no source is identified when figures are clearly taken over from other publications (p.17, p.21).	

Other remarks
Page 6: The information about a number of floors does not correspond to the figure 1. Were there any adjustments made to the building prior the structural design?
Page 7: What is the reason to use concrete with the class designation XC2 for reinforced concrete walls (communication areas)?
Page 10,15: How was the uniform load resulted from partitions determined? Did the student take into account a whole partition composition or only one gypsum board.
Page 13: Although the preliminary design shows that the load-bearing capacity of 200 mm thick pillar is sufficient for the intended use, the pillar 250 mm thick was finally designed. What was the reason?
Page 13: Could the student clarify which modelling environment (two-dimensional/three-dimensional)

was used for the FEM analysis?

Page 34: Would it be possible to reduce the slab depth given the deflection distribution over the slab. Is there any other type of slab which could be used in order to reduce the self-weight.

Page 39: Which of the mentioned simplified methods (page 39) is more appropriate for the preliminary design of a reinforced concrete column subjected to the combination of high bending moment and a compressive force?

Page 42: The computational procedure for the reinforcement design of the column does not correspond to the assumption about a reinforcement layout in a cross-section (figure at page 42) likely due to the simplification in calculation.

Page 46: Could the student clarify the diagram at page 46.

Page 51: Where the sound insulation elements are located in the staircase? Do the proposed static schemes reflect the staircase structure with those elements?

Structural plan - formwork: Material specification, section C-C' and size of elevator shaft are missing. Level dimensions do not match - staircase, slab.

Flat slab top reinforcement: Material specification, information about concrete cover and detailed information (position, bar diameter) about edge reinforcement are missing. Shear punching reinforcement in the region of columns are not included. Because of a too long hook some bars (17,22,26,33) are not possible to fit into the slab. Some reinforcement seems to be missing given the bending moment distribution (Page 24)

Flat slab bottom reinforcement: Material specification and information about concrete cover are missing.

Column reinforcement: What was the reason to use 10 mm transverse reinforcement? Material specification and information about concrete cover are missing.

Wall reinforcement: Material specification and information about concrete cover are missing. Vertical reinforcement does not have any laps for bonding with vertical reinforcement in an upper floor.

Staircase reinforcement: No sections included. What "T", "C" and "U" mean? Lap length seems to be short. Material specification and information about concrete cover are missing.

II. FINAL ASSESSMENT, REVIEWER'S QUESTIONS, GRADING

The reviewer's questions and comments are summarized above.

Grade: D

Date: 29.1.2019

Opponent's signature:.....