

# THESIS SUPERVISOR FORM



## 1. Identification of the student:

Student:	Dwipayana Ali Muhammad Hanafiah
Thesis:	Numerical Analysis of Bell Tower of St. Jakub Church in Kutná Hora
1 <sup>st</sup> Institution:	UPC Barcelona
2 <sup>nd</sup> Institution:	Czech Technical University in Prague, Czech Republic
Academic year:	2016/2017

## 2. Identification of the supervisor:

Name:	Doc. Ing. Petr Fajman. Csc.
Institution:	CTU Faculty of Civil Engineering in Prague
Position:	Associative Professor

## 3. General comments

The student deals in the thesis with dynamics response of St. Jacob tower of Church on Kutna Hora in the Czech Republic.

The thesis is divided in five chapters.

The first two chapters aim at the general description of tower and bell characteristics. The structure compare with similar churches solved in others country.

The chapter three deal with numerical model and analysis of tower and bell of St. Jacob church. It starts with history and briefly description of the tower and bell. Three-dimensional model representing a part of church was realized in the software Dlubal, where he was loaded and computed in dynamics mode. The numerical model was validated by the experimental tests. The first three engine values were compared with values from experimental measurement.

After that the model was loaded by combination of dead and bell load. By the determination of bell load was used the original program for bell cross-section properties and forces included in the national annex of the DIN 4178.

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The chapter four is focused on results.

The forces obtained from numerical dynamic analysis were small and cannot put the tower in danger. The bell which can make resonance disaster has to be heavier. The forces from wind load are significantly bigger.

The last chapter is conclusions followed by appendix.

Mr. Dwipayana has proven very good ability to collect, analyze and classify a large amount of diverse information. He looked for a solution to the thesis with a very little intervention from his supervisor. The calculations involved analysis by FEM. The student had to acquire advanced knowledge of dynamics modeling and FEM with commercial softwares Dlubal for advanced structural analysis. In general I can report that Mr. Dwipayana in his thesis work successfully coped with all tasks assigned to him.

I regard Mr. Dwipayana as a diligent and hard working young professional who is competent to solve advanced problems related to analysis of monuments and historical constructions. Therefore, I recommend his admission to the state exam and to process the defending act of his thesis.

I recommend grading his thesis by 95 points out of 100, i.e. A on the ECTS scale (excellent).

4. Grade: \_\_\_\_\_ **A** \_\_\_\_\_

Use the following scale

A (excellent)	B (very good)	C (good)	D (satisfactory)	E (sufficient)	F (fail)
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CTU faculty of Civil Engineering in Prague

July of 18th 2017

The Supervisor,

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Petr Fajman