ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE

REVIEWER'S OPINION OF FINAL THESIS

I. IDENTIFICATION DATA

Thesis name:	Numerical Analysis of Glass Pane: A blind point connection
Author's name:	Jan Lorenz
Type of thesis :	master
Faculty/Institute:	Faculty of Civil Engineering (FCE)
Department:	Of Steel and Timber Structures
Thesis reviewer:	Ing. Klára Machalická, Ph.D.
Reviewer's department:	Klokner Institute, CTU in Prague

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment **extraordinarily challenging**

Evaluation of thesis difficulty of assignment.

This thesis is in accordance with the assignment and it deals with experimental and numerical analysis of blind point connection in glass pane. FE modelling of connection comprises delamination and usage of cohesive zone material modelling which is extraordinary challenge for diploma thesis.

Satisfaction of assignment **fulfilled**

Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.

Formally, thesis is very well structured and it is in accordance with all parts of assignment.

Method of conception **outstanding**

Assess that student has chosen correct approach or solution methods.

Student chose correct approach. He has summarized the related work topics, described the basics of structural glass and joining methods of glass panes. In experimental analysis he determined the mechanical behavior of blind connection and subsequently he used experimental data for FE modeling of blind connection in software Ansys. A short parametric study described influence of the diameter of the contact area on joint stiffness and delamination force, was worked out. Finally, the outcomes were clearly summarized.

Technical level A - excellent.

Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.

The technical level of the work is very good.

Formal and language level, scope of thesis B - very good.

Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.

The work organization, language, terminology and typographical arrangement are on a high level.
But some paragraphs of the thesis could be more precisely described, e.g. testing procedure or creation of "ideal blind point diagram". Also creation of FE model by CZM, especially reasons for usage of particular element types, could be explained.
In some places of work passive voice would be better to use in professional technical text, e.g. on page 44: "We had to be very careful…".

Selection of sources, citation correctness C - good.

Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.

Student wrote a clear and full overview of the state-of-art papers in topic. Only selection of sources with focusing mainly on diploma or PhD thesis is not sufficient and correct in reviewer´s point of view. Student should rather use original sources

instead. Example, Figure 2.7 was originally published in Glass Structures by Jan Wurm or Fig. 2.21 was originally published in Elastic Bonding by B. Burchardt et al.

Additional commentary and evaluation

Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.

Please insert your commentary (voluntary evaluation).

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Summarize thesis aspects that swayed your final evaluation. Please present apt questions which student should answer during defense.

The handed thesis is very consistent, the state-of-art provides full overview of the topic. It is obvious that student fully understands issue of blind point connection in glass pane. The thesis comprises evaluation of experimental testing of blind point connection on three specimens and subsequent validation of FE model with experimental results. Creation of FE model by cohesive zone modelling in Ansys software and performed parametric study exceeds the common requirements to the master thesis. Therefore I strongly recommend to mark this thesis with classification grade **A - excellent.**

Questions:

1. Do you know how fully tempered glass should be tested to nickel-sulphide inclusions before usage?

With regard to experimental analysis:

2. What does it mean "short-term loading"? Can you provide rate of loading used for the tests?
3. Please, explain properly, why usage of load-frame was necessary.

With regard to numerical analysis:

4. Where element types CONTA174 and TARGE170 were exactly use in model?
5. Why did you choose SOLID185 for steel and glass materials and SOLID186 for SentryGlass and HDPE?
6. Comparison of original FE model validated with experiments and results of parametric study is missing in the thesis, also e.g. dimensions of connection in table 5.16. Please, can you compare it, preferably in Graph 10. Please, add legend to the Graph 10.

Date: 27.1.2017 Signature: