Opponent’s review of the Doctoral Thesis

Candidate: Özgür YURDAKUL
Title of the doctoral thesis: PROBABILISTIC NONLINEAR COMPUTER SIMULATIONS FOR REALISTIC PREDICTION OF STRUCTURAL RESPONSE
Branch of study: 3706V005 - Transport Means and Infrastructure
Tutor: Ing. Ladislav ŘOUTIL, Ph.D.
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Topicality of the doctoral thesis theme
Commentary: The recently available software tools enable realistic, i.e. stochastic nonlinear investigation of RC structural members. This could be a rational base for probabilistic assessment of structural safety. Nevertheless, a validation of such numerical simulation by experiments for various static schemes, situations and failure modes is necessary to confirm their feasibility. This problematics considering various effects and sensitivity to input (material) parameters has been studied within the thesis. Any contribution to the stated problematics is very valuable, and therefore the topic of the presented thesis can be declared as very important.

☐ excellent ☐ above average ☐ average ☐ below average ☐ poor

Fulfilment of the doctoral thesis objectives
Commentary: The thesis objectives are widely described in Chapter 1.4. They have been fulfilled within the presented work.

☐ excellent ☒ above average ☐ average ☐ below average ☐ poor

Research methods and procedures
Commentary: The conducted methodology is summarized in the second part of Chapter 1.4. The particular itemized steps are logical and suitable. Numerical studies using commercial NLFE and stochastical software are appropriately combined with experimental research.

☒ excellent ☐ above average ☐ average ☐ below average ☐ poor

Results of the doctoral thesis – dissertant’s concrete achievements
Commentary: Extensive results are described in detail and documented in particular Chapters, and partially shifted to Appendices. All presented results have been achieved by dissertant personal work. The main achievements, results and conclusions are summarized in Chapter 7.1.
Importance for practice and for development within a branch of science
Commentary: The achieved results are important and can serve as a base for practical utilization of fully probabilistic assessment of structural safety.

Formal layout of the doctoral thesis and the level of language used
Commentary: The thesis is written in well English language. It is rather extensive, well organized, and include all substantial and obligatory parts. It contains numerous graphical representations of the achieved results (in particular in the Appendices), and also extensive list of references. In the PDF version of the Thesis the references to German sources contain multiple misspels. Block text alignment is not very well suitable for References.

Remarks
For the discussion following topics would be of interest:
1. Safety formats for RC structures. Their specifics, advantages and disadvantages for practical use.
Distinguish between design of new structures and assessment of existing ones.
2. Fully probabilistic structural assessment - what are the main obstructions in practical use? In which cases it could be especially suitable?
3. Autocorrelation length in the random field approach - practical aspects. Are there any other obstructions in practical use of random fields?

The stated topics are rather broad. Please concentrate on crucial / selected issues.

Final assessment of the doctoral thesis
The presented thesis contain results from an extensive and demanding scientific research. It documents high scientific level of dissertant and prove his ability to successfully solve complex research tasks and projects.

Following a successful defence of the doctoral thesis I recommend the granting of the Ph.D. degree

Date: 4.12.2019

Opponent’s signature:..................................................................................