Statistical survey of existing reinforced and pre-stressed bridge types for the AT-CZ region within the "ATCZ190 SAFEBRIDGE" Project

Eftychia APOSTOLIDI

Dipl. Ing. MSc

University of Natural Resources and Life Sciences (BOKU)

Vienna, Austria
eftychia.apostolidi@boku.ac.at

Specialist in seismic assessment, retrofitting and reliability assessment of existing structures. Actively involved in IABSE TG1.1 and 5.5.

Martina ŠOMODÍKOVÁ

Dr. Ing.

Brno University of Technology

Brno, Czech Republic
somodikova.m@fce.vutbr.cz

Specialist in the field of load bearing capacity and lifetime assessment of existing structures, modeling of degradation processes in concrete.

Alfred STRAUSS

Assoc. Prof.

University of Natural Resources and Life Sciences (BOKU)

Vienna, Austria
alfred.strauss@boku.ac.at

Expert in safety, reliability and performance assessment of engineering structures. Chair of fib Committee 3 and of IABSE TG1.4.

David LEHKÝ

Assoc. Prof.

Brno University of Technology

Brno, Czech Republic
lehky.d@fce.vutbr.cz

Expert in the field of stochastic and reliability analysis of structures, material model parameters identification and artificial neural network.

Drahomír NOVÁK

Prof.

Brno University of Technology

Brno, Czech Republic
novak.d@fce.vutbr.cz

Head of the Institute of Structural Mechanics; Expert in the field of stochastic computational mechanics, reliability of structures, risk engineering.

Contact: *eftychia.apostolidi@boku.ac.at*

1   Abstract

Advanced modeling of structures using combination of non-linear finite element methods (NLFEM) and reliability analysis is a strong tool for realistic assessment of structures. NLFEM simulation has been recently a well-established approach to the analysis of concrete structures since the response of the structure can be simulated quite realistically. In combination with fully probabilistic approaches, one can consider the randomness of input parameters such as material, technological and environmental characteristics that can have a direct impact on economic aspects during structural lifetime. However, guidelines fully describing NLFEM modeling of structures and safety formats are not available until now. In the framework of the European Project INTERREG AUSTRIA-CZECH REPUBLIC "ATCZ190 SAFEBRIDGE", a number of existing bridges are carefully selected to be studied and modeled with NLFEM on deterministic and stochastic levels based on the upcoming Austrian standard ON B4008-2. The assessment of structures will be described and documented in detail and the results will assist the development of a guideline. This guideline targets to help the engineering community perform accurate NLFEM analysis and to assist the structure's owners to check the accuracy of the assessment process. The current paper focuses on the presentation and discussion of statistical information about road and railway bridges provided by the main bridge operators in both countries. Moreover, the most commonly addressed structural characteristics of bridges within the program region are summarized and the further future steps of the project are briefly described.

Keywords: bridge structures; statistical data; non-linear analysis; reliability; safety

1