ADVANCED ANALYSIS OF EXISTING REINFORCED AND PRE-STRESSED CONCRETE BRIDGES: NONLINEARITY, RELIABILITY SAFETY FORMATS, LIFE-TIME ASPECTS

Project awarded by European Regional Development Fund within the European Union program Interreg Austria–Czech Republic

EUROPEAN UNION

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Project No.: **ATCZ190**
Acronym: **SAFEBRIDGE**
URL: **https://www.at-cz.eu/safebridge**
Project duration: **01.09.2018–31.08.2021**

INTRODUCTION. Road system in Vienna, Lower Austria and Moravia regions faces great challenges: aging structures, increasing traffic load, effect of climate changes, quality requirements as well as limited road infrastructure budget. In order to maintain a reliable road network, new and innovative approaches must be pursued, especially in case of bridge structures. At present, bridge maintenance is mainly based on periodic visual inspections of structures when damage of a structure is not discovered until it is quite obvious. Damage and other structural problems often appear inside the structure where it develops as a result of actual, often unknown, effects. In the future, bridges should be able to provide information on their condition and development early in their lifetime independently of the visual inspections carried out.

PROJECT GOALS. The project „SAFEBRIDGE“ aims at the design of advanced procedure of numerical assessment of bridge structures based on reliability theory (on the basis of EN 1990) and make this available for more engineering offices as well as road/railway infrastructure operators in regions of Vienna, Lower Austria and Moravia. The detailed stochastic nonlinear modeling of structural response with respect to its deterioration can provide relevant information and complex assessment of bridge structures; hence it has a significant impact on effective utilization of a bridge management budget.

MAIN OUTPUTS. The outputs of the project are designed mainly for the needs of road/railway infrastructure operators and engineering community in the regions of Vienna, Lower Austria and Moravia. Their general utilization in other regions/countries will also be supported. The main project outputs focus on:

- Ensuring the possibility of utilization of advanced reliability assessment of bridges based on combination of numerical and statistical methods;
- Creation of a Guideline for practical utilization of methods mentioned above;
- Design of sustainable training program focused on the assessment of structural reliability.

Such outputs are not available for engineering community and infrastructure operators in any European country, hence these are highly innovative.

SCHEDULED EVENTS.

- Training courses – in April 2019, 2020, 2021;
- Seminars – in November 2019, 2020 and August 2021;
- Special sessions at Brückentagung Conference 2020, 2021.

PROJECT PARTNERS AND STRATEGIC PARTNERS. Partners from both sides of the Austria–Czech border are involved:

- *University of Natural Resources and Life Sciences in Vienna, Austria* as a lead partner (project key persons: Assoc. Prof. Dipl.-Ing. Dr. Alfred Strauss; Dipl.-Ing. Eftychia Apostolidi MSc.);
- *Brno University of Technology, Czech Republic* as a project partner (project key persons: Prof. Ing. Drahomír Novák, DrSc.; Assoc. Prof. Ing. David Lehký, Ph.D.; Ing. Martina Šomodíková, Ph.D.).

Relevant strategic partners from both countries – small and medium-sized companies and local/regional/national public institutions – are also involved to support the project.

Austrian strategic partners:

- *BMVIT (Austrian Ministry for Transport, Innovation and Technology;* Dipl.-Ing. Dr. Eva-Maria Eichinger-Vill*) – client-* and service-oriented organization optimizing the infrastructure and its technical and operational safety;
- *ASFINAG* (*Motorway and Expressway Finance Corporation;* Dipl.-Ing. Christian Honeger*)* – a customer-financed, commercial operator and builder of motorways and expressways;
- *ÖBB Infrastructure AG* (Dipl.-Ing. Alfred Hüngsberg) – the owner, constructor and operator of Austrian railway network;
- *MA 29 (City Council of Vienna – Municipal Department 29 Bridge Construction and Foundation Engineering;* Dipl.-Ing. Hermann Papouschek);
- *Vill ZT GmbH* (FH-Prof. Dipl.-Ing. Dr.techn. Markus Vill) – company ensuring complex tasks in the areas of bridge and civil engineering;
- *Schimetta Consult ZT GmbH* (Dipl.-Ing. Dr. Roman Geier) – engineering office with a full range of engineering services in Austria and abroad.

Czech strategic partners:

- *ŘSD Brno establishment (The Road and Motorways Directorate of the Czech Republic)* – the owner and operator of the highways and main roads owned by the state;
- *SŽDC (Railway Infrastructure Administration)* – the owner and operator of the nation-wide and regional railway infrastructure owned by the state;
- *SÚS JMK (Motorways Administration and Maintenance of the South Moravian Region)*;
- *Dopravoprojekt Brno a.s.* – company ensuring design, engineering and consulting services in the transport sector;
- *EXprojekt s.r.o.* – company offering services in building design activities, statics and dynamics of building structures;
- *Klokner Institute of the CTU in Prague, Department of Structural Reliability* – organization devoted to the creation of national and international standards and their introduction into the system of Czech standards;
- *Brněnské komunikace a. s.* – stock company ensuring transport services for corporate town Brno.

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16th INTERNATIONAL PROBABILISTIC WORKSHOP 2018
University of Natural Resources and Life Sciences
12-14 September 2018, Vienna, Austria
http://probabilistic.boku.ac.at