MTA-BME MOMENTUM - NEW GENERATION OF STEEL BRIDGES RESEARCH GROUP

WOULD LIKE TO JOIN A CONSORTIUM FOR HORIZON-CL4-2022-RESILIENCE-01-19:
Advanced materials modelling and characterisation

We can contribute to the following tasks as described in the Topic:

- Develop a relevant range of characterisation methods, models and simulation tools to enhance the design – with clear demonstration of modelling and characterisation integration – and development stages of advanced materials and products, focusing on user cases related to low carbon and clean industry applications;

- Focus on the combination of theory with large-scale computational screening;

Our approach:

The research group aims to improve the steel structural design by **integrating the consideration of manufacturing technique with advanced numerical modelling-based design simulations**. Our aim is to improve our virtual manufacturing framework for simulating thermal cutting, cold-forming and welding which can be efficiently used for various materials and structural configurations. Virtual specimens can be tested in order to analyse structural behaviour and determine resistance under different conditions. Probabilistic stability, fatigue, and manufacturing simulations focusing on novel advanced materials such as high-strength and advanced high-strength steels.

THE NEW GENERATION OF STEEL BRIDGES RESEARCH GROUP

The core of the research group contains one associate and three assistant professors, making research for 5-8 years in a close relationship. To the research group, PhD students and talented MSc students connect. The research group has notable experience in the field of advanced numerical modeling-based design of steel structures and contribution to European standardization for steel structures. [Website of the Research Group]
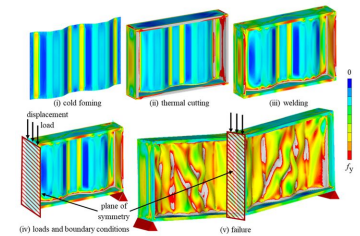
COMPETENCES AND REFERENCES RELEVANT TO THE TOPIC

- Relevant publications in the field of numerical modelling-based design
- Collaboration with European standardization bodies (CEN/TC 250/SC 3/ WG5, WG13 and WG22 committees)
- Qualified project management staff at university level.
- Structural laboratory for performing large-scale measurements and material tests
- Stability, fatigue, corrosion, etc. tests and simulations
- Deterministic and stochastic finite element analysis
- Virtual prototyping
- Projects with the main participants of the Hungarian bridge engineering industry

BUDAPEST UNIVERSITY OF TECHNOLOGY AND ECONOMICS (BME)

With its regular high-ranking positions (between 200 and 800) BME is among the top universities (2-6%) globally. At the university's 8 faculties and 76 departments, there are 1,200 lecturers teaching 5,000 subjects and 10,000 courses each semester. In the H2020 Framework Programme BME has ranked #2 among the Hungarian institutions (67 funded projects). The University is an active member of the European Engineering Learning Innovation and Science Alliance (EELISA) European University, the CESAER association of universities of science and technology and the European University Association. [University website]

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RESEARCH TEAM
FOR HORIZON-CL4-2022-RESILIENCE-01-19:
Advanced materials modelling and characterisation

BALÁZS GÉZA KÖVESDI, PhD., Associate Professor, Head of Research Team
Obtained his PhD in 2010. His research fields are the stability and fatigue analysis of welded steel structures, especially for bridges. Research activities focus on the advanced numerical-model based design of steel structures, analysis of innovative structural solutions and new steel materials. He is member of three European standardization bodies (CEN/TC 250/SC 3/ WG5, WG13 and WG22 committees) taking active contribution in the European standardization process.

Google Scholar
Hungarian repository of Publications

BENCE JÁGER, PhD, Assistant Professor
Obtained his PhD in 2020 in the topic of buckling analysis of corrugated web girders. His research focus targets the buckling behaviour of slender steel structures, especially having non-conventional layout. Experienced in the execution of laboratory tests and development of advanced numerical modells as well. His special research focus is on the validation of numerical models to test results and advanced evaluation and identification of the virtual reality and its application in the steel structural design.

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DÉNES KOLLÁR, PhD, Assistant Professor
Obtained his PhD in 2020 in the topic of welding simulation of steel structures. He has seven years of experience in advanced finite element-based numerical modelling especially focusing on the development of a simulation framework including modelling of thermometallurgical and mechanical behaviour of different steel materials at elevated temperatures during welding and fire conditions.

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BALÁZS NORBERT SOMODI, PhD, Assistant Professor
Obtained his PhD in 2018 in the topic of buckling strength of high strength steel structures. He has eight years of experience in advanced finite element-based numerical modelling especially focusing on stability behaviour of steel structures. Expert in topics of high-strength steel and residual stress of welded steel structures. Within the research group his research focus is on the mechanical and structural behaviour of new steel materials and its consideration in the design processes.

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