



# EUROSTRUCT

EUROPEAN ASSOCIATION ON  
QUALITY CONTROL OF BRIDGES AND STRUCTURES

**TRAINING SCHOOL**  
Slovenian National Building and  
Civil Engineering Institute (ZAG)

Slovenia, Ljubljana

17 – 20 October, 2023



# BRIDGE ASSESSMENT TRAINING SCHOOL ZAG

## EUROSTRUCT

EUROPEAN ASSOCIATION ON  
QUALITY CONTROL OF BRIDGES AND STRUCTURES



DATE OF EVENT  
17 – 20 October 2023

Slovenian National Building and Civil Engineering Institute  
Ljubljana, Slovenia

### ACTION CONTACTS

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Local organizers	Dr. Andrej Anžlin Dr. Maja Kreslin Dr. Mirko Kosič Doron Hekič Dr. Aleš Žnidarič	<a href="mailto:andrej.anzlin@zag.si">andrej.anzlin@zag.si</a>
Action websites	<a href="http://eurostruct.org">http://eurostruct.org</a>	
LinkedIn event	<a href="#">Event link</a>	

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# 1. INTRODUCTION

## 1.1. ABOUT

The objective of the EUROSTRUCT Training School, hosted by the Slovenian National Building and Civil Engineering Institute (ZAG), Department of Structures, Section for Bridges and Other Civil Engineering Structures, is the exchange of knowledge and experience in quality control, to encourage awareness and responsibility of structural engineers towards the needs of society, and to encourage actions necessary for the progress of quality control in bridges and structures.

In this training school, trainees will elevate the expertise in bridge inspection, structural health monitoring, structural safety analysis and bridge life cycle management at the prestigious EUROSTRUCT Training School.

Join us in Ljubljana, Slovenia, from October 17 - 20, 2023, as we bring together young researchers, professionals, and decision-makers to explore groundbreaking advancements in bridge engineering:

- Comprehensive Digital Bridge Inspection
- Next-Generation Health Monitoring for Structures
- Structural Safety Analysis
- Smart network level decision making

Immerse yourself in the Slovenian-based experience, gaining invaluable insights into:

- Digital inspection technologies, like Unmanned Aerial Vehicles (UAVs) and digital models
- Innovative Structural Health Monitoring (SHM) techniques, including soft-load testing with Bridge Weigh-In-Motion (B-WIM) systems and structural model updating based on measured response
- Bridge assessment strategies for existing bridges, considering traffic, hydrodynamic loads and scour, and seismic loads

Trainees will also engage with and use essential tools such as:

- Structural analysis using FEM models (software Midas Civil)
- On-site experience in bridge inspection and SHM living-lab facilities
- Analysis of SHM data to support bridge assessment analysis using DewesoftX and Python software

Connect with fellow trainees in hands-on problem-solving sessions and use the knowledge gained in your daily practice and research projects.

EuroStruct's training school offers targeted instruction for young researchers, professionals, and decision makers to collaborate on problem-solving sessions. Participants gain practical knowledge applicable to their daily work and research, empowering them to become influential figures in bridge management.

Venue: Slovenian National Building and Civil Engineering Institute, Ljubljana, Slovenia

Time: 17 – 20 October 2023

Capacity: 15-25 trainees

Fee: 400 € per person

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### Local Organizers

**Andrej Anžlin, Maja Kreslin, Mirko Kosič,  
Doron Hekič and Aleš Žnidarič**  
Slovenian National Building and Civil Engineering  
Institute  
Department of Structures  
Section for Bridges and Other Civil Engineering  
Structures  
Ljubljana, Slovenia

### Co-Organizer

**Irina Stipanovic**  
*University of Twente,  
Faculty of Engineering Technology, Enschede,  
Netherlands*

Learn from renowned lecturers:

- Dr. Irina Stipanovic, University of Twente (Decision-making framework for BMS)
- Dr. Aleš Žnidarič, Director of ZAG, with ZAG “bridge” team Dr. Andrej Anžlin, Dr. Mirko Kosič, Dr. Maja Kreslin and Doron Hekič (bridge assessment using SHM data)
- Asst. Prof. Dr. Robert Klinc, University of Ljubljana (Digitalization in built environment)
- Asst. Prof. Luke Prendergast, University of Nottingham (Scour of bridges)
- Prof. Dr. Tatjana Isaković, University of Ljubljana (Seismic design of bridges)
- Dr.h.c. Marjan Pipebaher, Ponting inženirski biro d.o.o. (design of bridges)

In the upcoming training program, participants will be strategically divided into various work groups, each consisting of a diverse mix of individuals. The aim is to promote collaborative learning and foster a spirit of teamwork. These groups will be entrusted with real-world case studies to work on, which are chosen from a wide range of potential scenarios, providing a comprehensive view of the issues encountered in a practical environment.

The program will culminate on the last day with an interactive presentation session. Every group will get an opportunity to present their findings, interpretations, and solutions to their peers, trainers. This will not only foster a knowledge-sharing environment but also help participants refine their public speaking and presentation skills.

In this way, this training program is not just about theoretical learning, but it emphasizes practical skills and real-world application, equipping trainees with the knowledge, skills, and confidence to tackle real-world challenges effectively.

## 2. PROGRAMME

Please be aware that all times referenced herein are based on Central European Summer Time.

### 2.1. DAY #0 | BREAKING THE ICE

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Tuesday, October 10<sup>th</sup>, 2023 | Building virtual connection

10:00 – 11:00 *Let's Get Acquainted Online: virtual meeting of all trainees, Deploy information on technical requirements (software installment)*

### 2.2. DAY #1

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Tuesday, October 17<sup>th</sup>, 2023 | Expert Insight on Bridge Management

08:30 – 09:00 *Registration*

09:00 – 09:15 Introduction and welcoming, Detailed program, Learning outcomes  
by [Andrej Anžlin](#) from ZAG

09:15 – 10:00 Decision making for efficient bridge life cycle management.  
by [Irina Stipanović](#) from University of Twente

10:00 – 10:45 Slovene practice on bridge inspection: classical vs digital  
by [Maja Kreslin](#) from ZAG

10:45 – 11:15 *Coffee break*

11:15 – 12:00 ZAG's experience in SHM and B-WIM  
by [Aleš Žnidarič](#) from ZAG

12:00 – 13:00 *Guest lecture: Design and construction of land-scape bridges*  
by *Dr.h.c. Marjan Pipenbahr and Tomaž Weingerl from Ponting inženirski biro d.o.o.*

13:00 – 14:30 *Lunch break*

14:30 – 17:30 *Site visit: Bridge inspection and SHM living lab*

### 2.3. DAY #2

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Wednesday, October 18<sup>th</sup>, 2023 | Digital construction, Weigh-in-motion Tech, Resilient Infrastructure

09:00 – 10:00 Numerical modelling of existing bridges exposed to seismic and flooding events  
by [Mirko Kosič](#) from ZAG

10:00 – 11:00 *Beyond B-WIM: Practical applications of data gathered by bridge WIM systems*  
by [Matija Mavrič](#) from Cestel d.o.o.

11:00 – 11:30 *Coffee break*

11:30 – 12:30 Digitalisation of the built environment  
by [Robert Klinc](#) from University of Ljubljana

12:45 – 14:00 *Lunch break*

14:00 – 17:00 *Establishment of work groups and assignment of tasks*  
*Distribution of case study materials*  
*Work on FE modelling, manual model updating, analysis of SHM data*  
by *trainers from ZAG*

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## 2.4. DAY #3

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### Thursday, October 19<sup>th</sup>, 2023 | Design and Monitoring

09:00 – 10:00	The second generation of Eurocode 8 standard with an emphasis on the second part for the seismic design of bridges. by <a href="#">Tatjana Isaković</a> from University of Ljubljana
10:00 – 11:30	Scour assessment of bridges using online and offline monitoring by <a href="#">Luke Prendergast</a> from University of Nottingham
11:30 – 12:00	<b>Coffee break</b>
12:00 – 13:30	Analysis of SHM data with Dewesoft & Python software by <a href="#">Doron Hekić</a>
13:30 – 14:30	<b>Lunch break</b>
14:30 – 16:30	<i>Manual model updating using SHM data (strain vs acceleration based)</i> by trainers from ZAG
16:30 – 18:00	Preparation of workgroup reports and presentations by Trainees
19.00 –	Dinner

## 2.5. DAY #4

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### Friday, October 20<sup>th</sup>, 2023 | Synthesis, Presentation and Celebration Hike

08:30 – 11:00	Preparation of workgroup report & discussion by Trainees and Trainers
11:00 – 11:30	<i>Coffee Break</i>
11:30 – 12:30	Workgroup presentations, summary, and conclusions by Trainees + Trainers
12:30 – 16:00	<b>Nearby scenic hike with lunch</b> to celebrate your successful completion of EUROSTRUCT training school and honor your hard work and achievements.

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Trainees are required to submit a written report summarizing their key takeaways from the training session within seven days of its completion. The report should be no more than 10 pages long and cover all topics from the training. The deadline for submission is 7<sup>th</sup> of July 2023.





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