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## PATRONAGE



EVENT REALISED WITH THE UNCONDITIONAL CONTRIBUTION OF:



## MEDIA PARTNER



SEPTEMBER 12-13, 2024

**ORTO BOTANICO**

Via Orto Botanico 15, (PD)

**Padova (Italy)**

# 1<sup>ST</sup> INTERNATIONAL WORKSHOP ON INSPECTION, TESTING, MONITORING, ASSESSMENT AND MAINTENANCE OF MASONRY ARCH BRIDGES

&

**GIORNATA-STUDIO FABRE: VALUTAZIONE, GESTIONE, MANUTENZIONE E MONITORAGGIO DEI PONTI IN MURATURA**

## CONFERENCE ORGANISED BY:



UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA





## INTRODUCTION

Masonry arch bridges still constitute a significant portion of European rail and road infrastructures. Although they are massive structures in service since many years, masonry bridges are now supporting higher traffic loads than those originally envisaged. Their mechanical response is significantly influenced by the inherent variation of their constituent materials, the deterioration caused by weathering processes and the development of other defects, which increase over the years. In addition, also due to climate change, these historic bridges are increasingly subjected to extreme actions and pushed to new limits. It is therefore necessary to plan some activities such as monitoring (through periodic inspections, diagnostic investigations, structural health monitoring, etc.), maintenance and strengthening interventions to keep their efficiency and safe conditions.

This workshop is designed to bring together practitioners, researchers and managers involved in the assessment, design, and management of masonry arch bridges. It is organized in collaboration with FABRE, a Research Consortium for the Evaluation and Monitoring of Bridges, Viaducts and Other Structures. FABRE promotes and coordinates the participation of Consortium Universities and Research Institutions in scientific activities in the fields of Civil Engineering and Architecture, with special reference to the evaluation of bridges, viaducts, and other structures.

The workshop is intended to provide an invaluable opportunity for participants to exchange knowledge and ideas on masonry arch bridge infrastructure. It also aims to support research in this area by promoting two prizes, which will be awarded at the Workshop dinner to:

- A Researcher who has contributed significantly to masonry bridge research over the past 10 years;
- A young Researcher who has completed a PhD dissertation on masonry arch bridges in the past 5 years.

## LOCATION

The Orto Botanico di Padova is a botanical garden in Padua, in the northeastern part of Italy. Founded in 1545 by the Venetian Republic, it is the world's oldest academic botanical garden that is still in its original location. The garden, affiliated with the University of Padua, currently covers roughly 22,000 square meters and is known for its special collections and historical design.

Since September 2014, following the acquisition of a new area in the south of the ancient Botanical Garden, a tourist destination of great attraction, the new greenhouses of the Biodiversity Garden are open to the public: a symbolic microcosm that allows the visitor to experience the different climatic conditions and vegetation present on the Earth.



## PROFESSIONAL CREDITS:

L'evento patrocinato dal CNI da diritto all'ottenimento di un totale massimo di 9 cfp. L'evento è stato organizzato ai sensi dell'art 4.5.4. del TU Linee di indirizzo per l'aggiornamento della competenza professionale del CNI, con accumulo di cfp validi per un massimo di 9 cfp annui.

## GETTING HERE

### BY PLANE

Venice Marco Polo airport (VCE) is about 40 km far from Padua (*Padova* in Italian) - the city centre can be easily reached by taxi or public transport

### BY TRAIN

The railway station is close to the city centre. You can get to the Botanical Garden by bus or tram (leaving every 10 minutes from the railway station - stop n. 12-Santo)

### BY CAR

There are parking facilities surrounding Prato della Valle. Other parking options nearby are:

- Piazza Rabin Car Park (entrance from via 58° Reggimento Fanteria Brigata Abruzzi): 1.00 €/hr
- On-street parking (delimited by blue lines): rates range from 1.10 €/hr to 1.70 €/hr

Free car parks are available outside the city centre. From there, you can reach the Botanical Garden by public transport:

- via Bembo Parking - from *Tangenziale Est* (beltway) take exit n. 11 (Via Bembo). Bus line 3
- via Piovese Parking - from *Tangenziale Est* (beltway) take exit n.12 (Via Piovese). Bus lines 16 or 5

## REGISTRATION METHOD AND FEES

	In-person	Online*
WOMAB & FABRE fee (with social dinner)	200 €	-
WOMAB & FABRE fee	120 €	120 €
WOMAB fee (with social dinner)	190 €	-
WOMAB fee	100 €	100 €
FABRE fee (with social dinner)	130 €	-
FABRE fee	30 €	30 €

\*The online mode will be activated only after the number of in-person seats at the Botanical Garden have been filled.

**Registration fees are inclusive of VAT.**

To register press [here](#).

For any information contact e-mail address: [womab@dicea.unipd.it](mailto:womab@dicea.unipd.it).

### Terms and Conditions

To best organize the event, participants must register by **August 26, 2024**. Payment confirmation notifications will be sent to your e-mail address once payment has been successfully processed. For online payments, please print the bank confirmation. No other confirmations will be sent.

### Refund Policy

There is no refund of the conference registration fee.



## WORKSHOP PROGRAM

### SEPTEMBER 12<sup>th</sup>

08:30 Registration

09:15 Event welcome & Workshop introduction.

#### WORKSHOP SESSION 1: "TESTING AND MONITORING"

Plenary lectures (Chairs: Calì and Zampieri):

9:45 Non-Destructive testing and monitoring of masonry arch bridges.  
Carmelo Gentile (Politecnico di Milano)

10:15 Risk assessment and monitoring of masonry bridges exposed to scour.  
Enrico Tubaldi (University of Strathclyde)

10:45 Break

11:15 Laboratory testing of a full-scale masonry arch bridge.  
Vasilis Sahrosis (University of Leeds)

11:45 Session lectures and discussion (Chairs: Gentile and Zizi):

NDTs for the characterization of material degradation and structural damages of masonry arch bridges and collapse evaluation.  
Filippo Ubertini, Nicola Cavalagli (University of Perugia)

Experimental characterization of the structural behaviour of masonry arch bridges  
Cristina Costa (University of Porto)

Monitoring of railway arch bridges  
Alberto Mauro, Giulia Polimanti (RFI)

Structural response of masonry arch bridges with scoured piers.  
Fabrizio Scozzese (Università di Camerino)

12:50 Lunch

13:50 The NORISK International Master in Risk Assessment and Management of Civil Infrastructures  
Mariano A. Zanini (University of Padova)

#### WORKSHOP SESSION 2: "ASSESSMENT AND ANALYSIS"

Plenary lectures (Chairs: Sahrosis and Cannizzaro):

14:00 Practical analysis and assessment of masonry arch bridges.  
Matthew Gilbert, Serena Amodio (University of Sheffield)

14:30 A 3D discrete-macro-element-method for the structural assessment of masonry bridges.  
Ivo Calì (University of Catania)

15:00 Multi-level assessment of masonry arch bridges.  
Lorenzo Macorini (Imperial College London)

15:30 FE limit analysis modelling of masonry arch bridges interacting with the backfill: suitability and open challenges.  
Gabriele Milani, Yiwei Hua (Politecnico di Milano)

16:00 Virtual experiments on masonry arches and barrels with the help of the discrete element method.  
Katalin Bagi (Budapest University of Technology and Economics)

16:15 Break

16:30 Session lectures and discussion (Chairs: Macorini and Cavalagli):

Crack pattern in masonry bridges including soil elasticity.  
Vincenzo Mallardo (University of Ferrara)

Advanced 3D modelling of masonry arch bridges subjected to earthquake loadings.  
Bartolomeo Pantò (Durham University)

Effect of the damage state on structural safety of masonry bridges.  
Corrado Chisari (University of Campania "Luigi Vanvitelli")

Nonlinear numerical simulation tools for in-service assessment of masonry arch bridges.  
Ruben Silva (University of Porto)

Discretization issues in kinematic limit analysis of masonry arch bridges.  
Nicola Grillanda (University of Ferrara)

17:50 Closing session

19:30 Social Dinner  
Departure shuttle at 19.15 in Prato della Valle (Padua). For more information: <https://www.womab.com/social-dinner>

### SEPTEMBER 13<sup>th</sup>

09:00 Session lectures and discussion (Chairs: Oliveira and Zizi):

Fatigue assessment of existing masonry arch bridges.  
Michele D'Amato (Università degli Studi della Basilicata)

Integration of advanced modeling and cost-effective strategies in the structural analysis of masonry bridges as operational support for the design of the knowledge process and management of uncertain parameters.  
Luigi Salvatore Rainone<sup>1</sup>, Luis Carlos Martins da Silva<sup>2</sup>, Vito Tateo<sup>1</sup>, Siro Casolo<sup>2</sup>, Giuseppina Uva<sup>1</sup> (<sup>1</sup> Politecnico di Bari; <sup>2</sup> Politecnico di Milano)

Seismic retrofit of an historical Italian railway masonry arch bridge  
Guido Furlan (Net Engineering)

#### WORKSHOP SESSION 3: "STRENGTHENING AND MAINTENANCE"

Plenary lectures (Chairs: Ubertini and Scozzese)

9:45 Discussion on the different strengthening techniques for masonry bridges.  
Paolo Zampieri (University of Padova)

10:15 Masonry arch bridges: from visual inspection to structural assessment.  
Gianfranco De Matteis (University of Campania "Luigi Vanvitelli")

10:45 Break

11:15 Masonry arch bridges: from non-destructive techniques and numerical models to repair.  
Daniel Oliveira (University of Minho)

11:45 Session lectures and discussion (Chairs: De Matteis and Costa)

Strengthening strategies for spandrels of masonry arch bridges.  
Natalino Gattesco, Ingrid Boem (University of Trieste)

Numerical modelling of retrofitting strategies of masonry arch bridges by means of the Discrete Macro-Element Method.  
Francesco Cannizzaro (University of Catania)

Plenary lecture (Chair: Calì)

12:15 Partitioned modelling for effective multi-fidelity analysis of masonry arch bridges  
Bassam A. Izzuddin (Imperial College London)

12:45 Workshop Closing Ceremony

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