

## Why this course?

Offering high strength, light weight and excellent durability characteristics, in combination with ease of application, FRP (Fibre Reinforced Polymer) reinforcement has become a technique of increased popularity in the construction sector. Since the early 1990's commercial applications of strengthening with bonded FRP reinforcement and of FRP reinforced and prestressed concrete structures have been growing numerously. With a share of 17%, composites in construction have become one of the main sectors in the global composites market. Furthermore, FRP as non-traditional reinforcement has reached a broad status of recognition in the previous years and is entering mainstream design codes, such as fib Model Code 2010.

*This course gives an excellent exposure on the design and application of FRP reinforcement in new construction and rehabilitation and is taught by international experts in this field. The aim of the course is to train participants with specific knowledge and skills, allowing them to consider, design and apply FRP reinforcement in a systematic way.*

# FRP TRAINING COURSE

# Reinforcing and strengthening of structures with FRP reinforcement

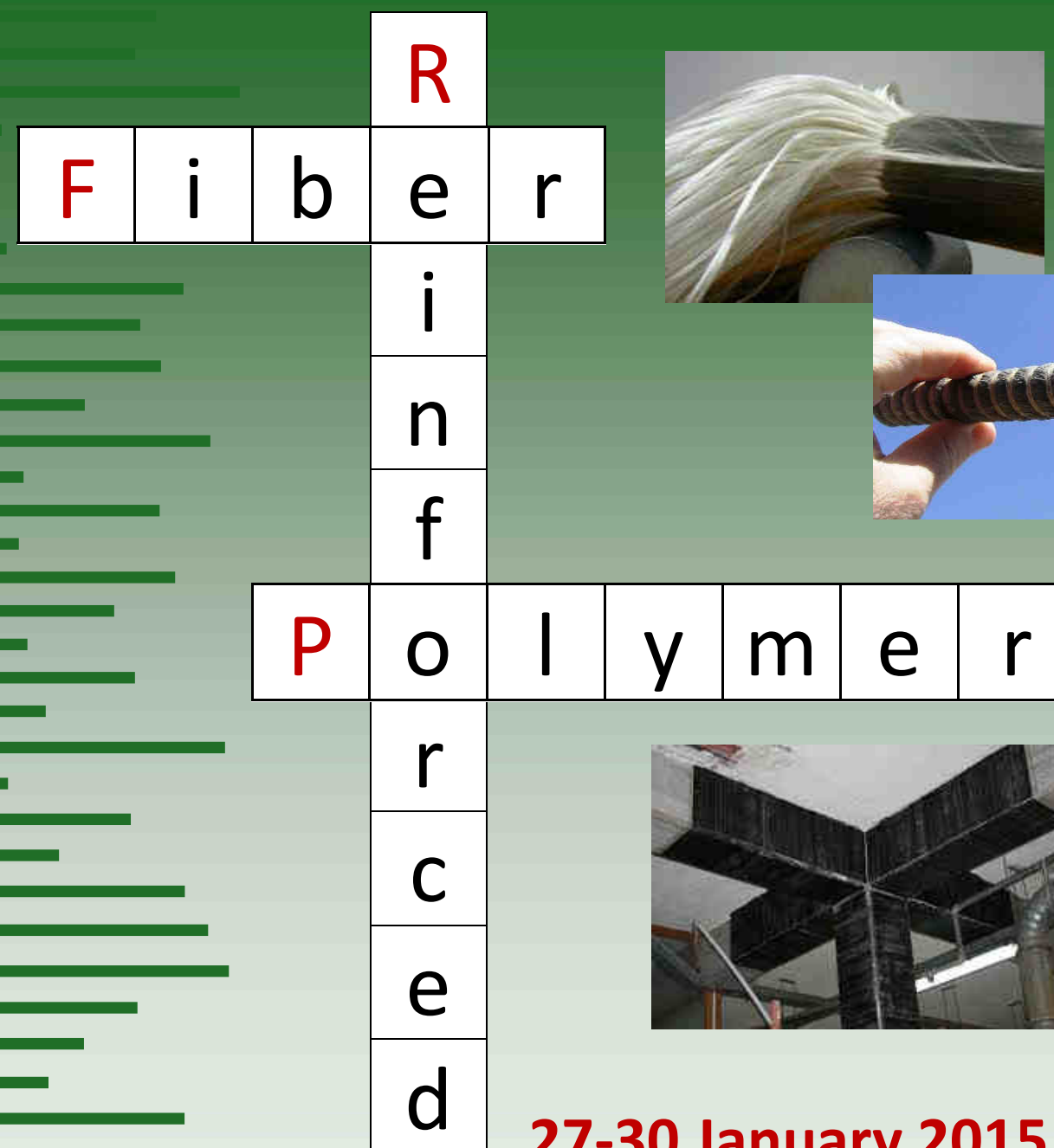
### Scientific coordination

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### Organized by



### With the support of



## What to expect?

In this 4 days training course you will obtain theoretical and hands-on knowledge on the use of FRP reinforcement in construction. FRPs are non-metallic reinforcements with excellent engineering properties, to reinforce and prestress concrete elements or to strengthen existing structures. Their use as a sustainable and cost efficient solution has increased considerably over the years.

## Who should attend?

This training course is intended for all industry and research professionals involved in FRP reinforcement for reinforcing concrete structures or for strengthening of existing structures.

- Engineers and designers in the public or private sector, involved in the design of concrete structures and/or the design of repair and strengthening (including seismic rehabilitation) of existing structures.
- Engineers at construction companies, material suppliers or research institutes with special interest into sustainable construction.
- Technical advisors of construction companies and control organisms.
- Professionals interested in the field of developing and applying advanced composites, and more specifically FRP reinforcement, in the construction sector.
- PhD students, scientists and teachers seeking specialist knowledge on the use and design of FRP reinforcement.

## Teachers

Prof. Valter **Carvelli**, Politecnico di Milano, Italy  
Dr. Christoph **Czaderski**, Empa, Switzerland  
Prof. Joaquim **Barros**, University of Minho, Portugal  
Dr. Maurizio **Guadagnini**, University of Sheffield, United Kingdom  
Prof. Renata **Kotynia**, University of Lodz, Poland  
Prof. Stijn **Matthys**, Ghent University, Belgium  
Prof. Lluís **Torres**, University of Girona, Spain  
Prof. Thanasis **Triantafillou**, University of Patras, Greece

## Practical information

### Venue

The training school is taking place at the Magnel Laboratory for Concrete Research of Ghent University, Belgium.

### Certificate of continued education

Participants attending the complete course and successfully completing the assignment, will receive an UGent certificate.

### Course material

Hand-outs of the presentations during the course will be provided both in paper and digital format, along with other useful information. A dedicated web-based training course learning environment is available for the course participants.

### E-learning

This training course will be video captured for e-learning purpose. Course participants will have full access to the e-learning modules.

**MORE DETAILED INFORMATION & REGISTRATION: [www.frpcourse.eu](http://www.frpcourse.eu)**

## Programme

### Module 1 – FRP constitutive materials

At the starting day of the course an introduction will be given on the subject. Hereby, FRP reinforcement will be discussed in terms of materials, systems and industrial applications. Concepts introduced in module 1 are considered to be known in the other course parts. During this module focus will also be given to the use of FRP for prestressed concrete structures, both in new construction or in the framework of repair and strengthening. Furthermore, a design exercise in the framework of a laboratory competition will be assigned.

*Teachers:* Stijn Matthys, Renata Kotynia and Christoph Czaderski

*Date:* 27 January 2015

### Module 2 – FRP for reinforced concrete

This module focusses on the use and design of FRP reinforcement for reinforced concrete structures. Amongst other, the serviceability and ultimate limit state of concrete elements with FRP flexural and shear reinforcement is dealt with and durability of FRP in concrete is discussed. As part of the teaching, cases or design examples will be given.

*Teachers:* Lluís Torres, Maurizio Guadagnini and Valter Carvelli

*Date:* 28 January 2015

### Module 3 – Repair and strengthening with FRP

Most applications of FRP reinforcement deal with the repair and strengthening of existing structures, eg. by means of externally bonded reinforcement. This is covered in this module in terms of flexural and shear strengthening and its design aspects, as well as confinement and seismic rehabilitation. Similar to module 2, cases or design examples will be given as part of the teaching.

*Teachers:* Stijn Matthys, Joaquim Barros and Thanasis Triantafillou

*Date:* 29 January 2015

### Module 4 – Hands-on experience

During this module participants will have the opportunity to obtain hands-on experience with FRP materials. Laboratory work will be organized handling FRP and adhesive materials and performing a tensile test on FRP. In addition a site visit will be organized (to be confirmed). Moreover, in the framework of the design exercise teaching staff will remain available for questions after the course and until submission deadline of the design exercise.

*Teachers:* Stijn Matthys, Brenda Debbaut

*Date:* 30 January 2015

## Registration

Registration is mandatory through the course website. The registration fee includes hand-outs, lunches, coffee breaks, e-learning platform access and evening activities.

The number of participants is limited to 40.

Registration fee	Before 25 December	After 25 December
Participants	500 EUR	600 EUR
PhD students	350 EUR	450 EUR

Endure / COST TU1207 members obtain a discount of 75 EUR on the above prizes.

Financial support will be available for a limited number of participants through COST TU1207. Endure researchers attending the course are supported by their project budget. Financial support may also be offered by the doctoral school of your university. For further info on this and on cancellation conditions please see the course website.

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