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Università Iuav
di Venezia

SCUOLA
DI DOTTORATO



FIRE AND BLAST IN RC STRUCTURES

doctoral course

July 13 > 15th, 2022
S. Polo 2468, Venezia
Badoer, room E



doctoral course

July 13 > 15th, 2022

palazzo Badoer,
S. Polo 2468, room E

Both basic and advanced topics concerning fire and blast effects on reinforced concrete (RC) structures are treated in this course, which is organized in two modules.

The first module deals with fire in RC structures, through an overview of significant real fires and of reduced or full-scale fire tests, with an in-depth discussion on materials behaviour at high temperature.

The main differences between the standard and advanced approaches in modelling the fire scenario are discussed as well. Then, the steps required by the thermo-mechanical analysis of RC structures are covered for different levels of approximation with an application to a case study.

The second module is focused on the behaviour of reinforced concrete members under blast loading. The steps necessary to build up a reliable nonlinear dynamic model are analysed, considering the possible collapse scenarios and particularly flexural failures. The numerical methods necessary to solve the problem are presented with a detailed analysis of the algorithms, inclusive of their implementation. A comparison between simplified and advanced models is provided as well, to highlight the advantages and disadvantages of the various approaches.

The course will enable the students to use simplified methods in the thermo-mechanical analysis of RC structures under blast and fire loading, taking care of the field of applicability of each method.

A final test is required for students who need the formative credits.

DAY 1 - WEDNESDAY, JULY 13TH 2022

- 9.00 *Introduction and greetings*
SALVATORE RUSSO
Università Iuav di Venezia
- 9.15 *Keynote Lecture: Fire Literacy in Structural Engineering*
CRISTIAN MALUK
Astute Fire – University of Queensland
- 11.15 *Fire Effects on RC Structures
Fire Tests and Experiments -
Materials properties*
ANTONIO BILOTTA
University of Naples – Federico II

lunch break

- 14.00 *Modelling of the fire scenario:
simplified and advanced
approaches
Post-fire investigation*
ANTONIO BILOTTA
University of Naples – Federico II
FLAVIO STOCHINO
University of Cagliari
- 16.00 *Thermo-mechanical modelling
of RC structures under fire*
PATRICK BAMONTE
Politecnico di Milano

DAY 2 - THURSDAY, JULY 14TH 2022

- 9.00 *Case study*
FRANCESCA SCIARRETTA
Università Iuav di Venezia
Cergy Paris University
- 11.00 *Introduction to rapidly varying
loads. Constitutive behaviour
of concrete under static and
dynamic loads*
CRISTOFORO DEMARTINO
Zhejiang University

lunch break

- 14.00 *Single Degree of freedom
systems and P-I diagrams
for blast design*
MATTEO COLOMBO
Politecnico di Milano
- 16.00 *Extreme loading for structures*
AAYMAN EL FOULY
Applied Science International

DAY 3 - FRIDAY, JULY 15TH 2022

- 9.00 *Lumped-mass multi-degree
of freedom structures with
distributed mass and load*
FLAVIO STOCHINO
University of Cagliari
- 11.00 *Numerical methods for RC
Structures under blast load*
CHIARA BEDON
University of Trieste Practical

information

The lectures will be given at the Iuav University of Venice – Doctoral School.

The course will also be streamed using Microsoft Teams.

The students attending online should open a Microsoft account to receive the invitation link.

secretariat

Francesca Sciarretta
Iuav University of Venice
Cergy Paris University
Cristoforo Demartino
Zhejiang University
Flavio Stochino
University of Cagliari

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