



Within the activities of AICAP's
workgroup "*Relazioni con
l'Università*", we are glad to
announce the repetition – in person
and online – of the doctoral course

Fire and Blast
in
RC Structures

July 14-16th, 2021

Room Manfredi Romano



DESCRIPTION OF THE COURSE

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.



Module 1: Fire

Module 2: Blast and Impulsive Loads

Wednesday, July 14th 2021

9:00-9:15 Emidio Nigro
(*University of Naples – Federico II*)

Introduction to the course: exceptional loads in Structural Engineering

9:15-11:00 Antonio Bilotta
(*University of Naples – Federico II*)

Fire Effects on RC Structures
Fire Tests and Experiments - Materials properties

11:00-13:00 Antonio Bilotta
(*University of Naples – Federico II*)
Flavio Stochino
(*University of Cagliari*)

Modelling of the fire scenario: simplified and advanced approaches
Post-fire investigation

Lunch break

14:00-16:00 Patrick Bamonte
(*Politecnico di Milano*)

Thermo-mechanical modelling of RC structures under fire

16:00-18:00 Francesca Sciarretta
(*IUAV – Venice– University of Cergy-Pontoise*)

Case study

Thursday, July 15th 2021:

9:00-11:00 Cristoforo Demartino
(*Zhejiang University*)

Introduction to rapidly varying loads
Constitutive behaviour of concrete under static and dynamic loads

11:00-13:00 Matteo Colombo
(*Politecnico di Milano*)

Single Degree of freedom systems and P-I diagrams for blast design

Lunch break

14:00-16:00 Students Workshop on their own research activities (more information will be given in the registration form)

16:00-18:00 Donatella de Silva
(*University of Naples – Federico II*)

Introduction to the software SAFIR for modeling the behavior of structures subjected to fire

Friday, July 16th 2021:

9:00-11:00 Flavio Stochino
(*University of Cagliari*)

Lumped-mass multi-degree of freedom structures with distributed mass and load

11:00-13:00 Chiara Bedon
(*University of Trieste*)

Numerical methods

Practical Information

The lectures will be given at the Department of Structural Engineering of the University of Naples – Federico II.

The course will also be streamed using Microsoft Teams. The students attending online should open a Microsoft account to receive the invitation link.

Secretariat:

Antonio Bilotta
University of Naples Federico II

Cristoforo Demartino
Zhejiang University

Flavio Stochino
University of Cagliari

For further information, please email:

concrete.fire.blast@gmail.com

Please register at:

<https://forms.gle/NJqboAAmh8B2Nz1w6>