



In the framework activities of the AICAP workgroup “*Relazioni con l’Università*”, we are glad to announce the online doctoral course:

Fire and Blast *on* **RC Structures**

July 13-16th 2020



DESCRIPTION OF THE COURSE

The online course covers both basic and advanced topics in fire and blast load on reinforced concrete (RC) structures. The course is organized in two modules.

The first module deals with the will introduce the effect of fire on RC structures, through an overview of significant real scale fires and little to full-scale fire tests, with an in-depth discussion on the materials behaviour at high temperature. The main differences between standard and advanced approaches for fire scenario modelling will be discussed. The steps to be followed for the thermo-mechanical modelling of RC structures will be covered as well, for different levels of approximation. Finally, an application of thermo-mechanical analyses to a case study will be shown.

The second module will introduce the behaviour of reinforced concrete members under blast load. Starting from scratch, the steps necessary to build a reliable non-linear dynamic model will be analysed, considering the possible collapse scenarios with particular attention to flexural failure. The numerical methods necessary to solve the problem equations will be presented with a detailed analysis of the algorithms and of their implementation. A comparison between simplified and advanced models will be provided in order to highlight advantages and disadvantages of the different approaches.

At the end of the course the students will be capable of applying simplified methods for the analysis of the structural behaviour of RC structures under blast load and for the thermo-mechanical modelling of RC structures under fire within their fields of applicability.



Module 1: Fire

Module 2: Blast and Impulsive Load

Monday, July 13th 2020

14:30-14:45 Emidio Nigro
(*University of Naples – Federico II*)

Introduction to the course: exceptional loads in Structural Engineering

14:45-16:30 Antonio Bilotta
(*University of Naples – Federico II*)

Fire Effects on RC Structures

Fire Tests and Experiments - Materials properties

16:30-18:30 Antonio Bilotta
(*University of Naples – Federico II*)
Flavio Stochino
(*University of Cagliari*)

Fire scenario modelling: simplified and advanced approaches
Post fire investigation

Tuesday, July 14th 2020

14:30-16:30 Patrick Bamonte
(*Politecnico di Milano*)

Thermo-mechanical modelling of RC structures under fire

16:30-18:30 Francesca Sciarretta
(*IUAV – Venice– University of Cergy-Pontoise*)

Case study

Wednesday, July 15th 2020:

14:30-16:30 Cristoforo Demartino
(*Zhejiang University*)

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

16:30-18:30 Matteo Colombo
(*Politecnico di Milano*)

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

Thursday, July 16th 2020:

14:30-16:30 Flavio Stochino
(*University of Cagliari*)

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

16:30-18:30 Chiara Bedon
(*University of Trieste*)

Numerical methods

Practical Information

The course will be streamed using Microsoft Teams, the students will receive an invitation link. A Microsoft account is necessary to access to the course.

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