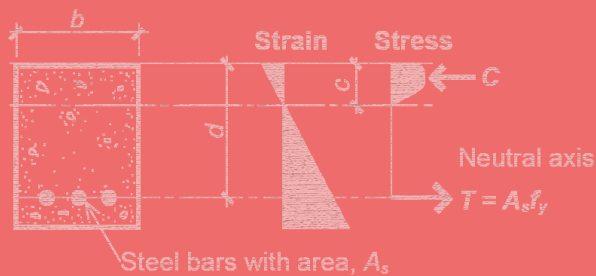




We are delighted to unveil the reiteration of our cutting-edge doctoral course, available for in-person and virtual participation.

Fire and Blast in RC Structures



July 24-26th, 2023

Building A – Aula Berio
Via Marengo 2 – 09123 Cagliari

DESCRIPTION OF THE COURSE

This course delves into the fundamental and advanced concepts of fire and blast impacts on reinforced concrete (RC) structures, structured into two comprehensive modules.

The initial module explores fire dynamics in RC structures by examining notable real-world fires and reduced or full-scale fire experiments, coupled with a detailed investigation of material behavior under elevated temperatures.

Furthermore, the course contrasts standard and advanced methodologies in simulating fire scenarios. Subsequently, the necessary stages for conducting thermo-mechanical analysis of RC structures are elucidated for varying levels of approximation, demonstrated through a practical case study application.

The second module delves into the intricacies of reinforced concrete members' behavior under blast loading conditions. The methodology for constructing a robust nonlinear dynamic model is scrutinized, taking into account potential collapse scenarios, with an emphasis on flexural failures. Advanced numerical techniques for problem-solving are elucidated through a comprehensive analysis of the underlying algorithms and their implementation. A comparative study between rudimentary and sophisticated models is also furnished, accentuating the merits and demerits of each approach.

This course empowers students to adeptly employ simplified methodologies in the thermo-mechanical evaluation of RC structures subjected to blast and fire loading, while remaining cognizant of the applicability boundaries of each technique.

For students seeking formative credits, a conclusive assessment is obligatory.



Day 1

9:00-9:15 Opening speech from UNICA PhD school
(University of Cagliari)

Introduction to the course:
Exceptional loads in Structural Engineering

9:15-10:00 Antonio Bilotta
(University of Naples – Federico II)

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

10:00-11:00 Antonio Bilotta & Flavio Stochino
(University of Naples – Federico II - University of Cagliari)

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

11:00-12:00 Patrick Bamonte
(Politecnico di Milano)

Thermo-mechanical modelling of RC structures under fire

12:00-13:00 Francesca Sciarretta
(IUAV – University of Venice– University of Cergy-Pontoise)

15:00-19:00 Workshop Fire
(Donatella De Silva & Patrick Bamonte)
(University of Naples – Federico II & Politecnico di Milano)

Ignite your creativity and skills at the Workshop Fire!

Day 2

9:00-10:00 Cristoforo Demartino
(University of Roma Tre)

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

10:00-11:00 Matteo Colombo
(Politecnico di Milano)

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

11:00-12:00 Flavio Stochino
(University of Cagliari)

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

12:00-13:00 Chiara Bedon
(University of Trieste)

Numerical methods for RC Structures under blast load

15:00-19:00 Workshop Blast
(Flavio Stochino, Cristoforo Demartino, & Dade Lai)

Ignite your creativity and skills at the Workshop Blast!

Day 3

9.00 - 11:00 Visit to Structural Laboratory

11:00 - 13:00 Keynote Lecture – Ezio Cadoni

Construction materials under extreme conditions

Information

The lectures will be given at
Faculty of Engineering and Architecture
University of Cagliari - Building A – Aula Berio
via Marengo 2 – 09123 Cagliari

Morning sessions will be live-streamed via Microsoft
Teams, offering a dynamic and engaging experience.
Afternoon hands-on workshops and exclusive
laboratory tours are reserved for on-site participants in
Cagliari, further enhancing the learning experience.

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

Secretariat
Cristoforo Demartino & Flavio Stochino

For further information, please email:
concrete.fire.blast@gmail.com

Registration link:
<https://forms.gle/g54wfHxx9NYbKRcP8>

