

SIMPLIFIED NONLINEAR DYNAMIC MODELS FOR RC STRUCTURES UNDER BLAST AND IMPACT LOADING

DOCENTE: Flavio Stochino
DURATA DEL CORSO: 1 ora
CREDITI: 2
Lingua: Inglese

ABSTRACT:

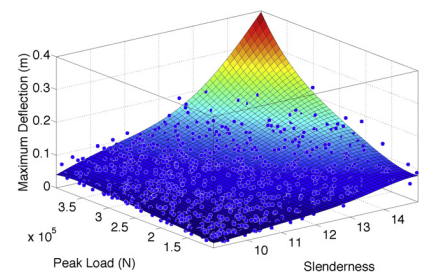
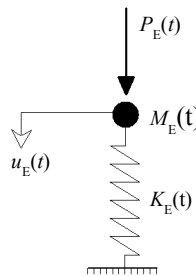
The effects of impulsive loading on structures can be very dangerous: damages and failures are expected with serious threats to structural safety and human life. Materials stresses and strains are often pushed to the limit and the modelling of these phenomena can be very complex. This seminar presents a synthesis of simplified models in order to highlight the main characteristics of this problem and of its solutions. Starting from the scratches, the steps necessary to build a reliable non-linear dynamic model considering the possible collapse scenarios with particular attention to the flexural failure will be presented.

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 models and advanced ones will be provided in order to highlight advantages and disadvantages of several approaches.

CONTENTS:

- Single Degree of freedom model
- Lumped-mass multi-degree of freedom
- Structures with distributed mass and load
- Numerical methods
- Sensitivity Analysis



BIO:

Flavio Stochino is Assistant Professor of Theory and Design of Structures at University of Cagliari. His research deals with computational mechanics and extreme loads (blast, impact, fire etc.) on structures and construction materials.

After his PhD, obtained in 2013 at University of Cagliari (Italy), he has worked as Post Doc Researcher at University of Sassari (Italy). Then he has improved his computational mechanics skills at Technical University of Dresden (Germany) under the Dresden Junior Fellow program.

He has produced several papers for international journals and he has participated and presented academic papers in several international conferences.

Selected Publications:

Singh K., Stochino F., Gardoni P. "Probabilistic models for blast parameters and fragility estimates of steel columns subject to blast loads", *Engineering Structures*, 222, n. 110944 (2020).

Stochino F. "RC beams under blast load: reliability and sensitivity analysis", *Engineering Failure Analysis*, (2016) 66, 544-565.

Stochino F., Carta G. "SDOF models for reinforced concrete beams under impulsive loads accounting for strain rate effects." *Nuclear Engineering and Design*, 276, 74-86, (2014).

Carta G., Stochino F. "Theoretical models to predict the flexural failure of reinforced concrete beams under blast loads" *Engineering Structures*, 49, 306-315, (2013).