

Mercoledì 1 Giugno alle 10.30 presso Aula M, Dipartimento ICEA

Proposta di seminario

Finite elements with embedded discontinuities in the scope of the discrete crack approach



Presenta il **Dr. Daniel Dias-da-Costa**, University of Sydney

Abstract: This seminar will present an overview on finite element techniques that can be used in the simulation of fracture within the scope of the discrete crack approach. Particular focus will be given to a procedure that can embed the shape functions of interface elements within regular finite elements – a technique known by the Discrete Strong Discontinuity Approach (DSDA). In order to extend the applicability of this framework to the simulation of real structures, an innovative solution-finding algorithm is proposed as means to efficiently handle the many sources of material non-linearities usually involved in the simulation of a structure and that can be responsible for the non-convergence found with classic iterative algorithms. A real case study is used to validate the framework with particular focus given to the evolution of the crack pattern.

Dr. Dias-da-Costa is senior lecturer at the School of Civil Engineering from the University of Sydney. He coordinates courses about reinforced concrete structures at both undergraduate and postgraduate levels. His current research interests include both numerical and experimental topics of structural engineering and material mechanics, where he proposed several innovative techniques over the last 10 years. He developed finite element enrichment techniques for the simulation concrete fracture, both at the meso and real structural scales, including solution-finding algorithms for highly non-linear problems. His experimental research is focused on image processing techniques for structural assessment and monitoring, including the identification of strain localisation and crack propagation. Dr Dias-da-Costa is chief investigator in several research projects financed by the Australian Research Council and other international agencies. He has been awarded the Discovery Early Career Research Award 2015 from the Australian Research Council. He published over one hundred technical papers and reports focusing on numerical, analytical and experimental characterisation of concrete structures. He frequently acts as an expert consultant regarding the strength and safety of concrete buildings and bridges.