POLITECNICO

MILANO 1863

**DIPARTIMENTO DI
INGEGNERIA CIVILE E AMBIENTALE**

14 May 2019
11:00 Aula Castigliano, Building 5, Ground floor

Seminar by Dr Miroslav Marjanović

Recent advances in static and dynamic analysis of damaged laminated composite plates

Laminated composite materials have increasingly been used in various engineering disciplines, playing an important role in the design and construction of aircrafts, cars and civil engineering structures. These materials have excellent fatigue properties and corrosion resistance, as well as high stiffness-to-weight and strength-to-weight ratios. However, significant shear stresses between layers of laminated composite plates may cause delamination. After significant damage has occured, constitutive equations of the composite material must be altered before any further static and/or dynamic analysis of the corresponding structure. This requires adequate computational models able to account reliably for the delamination under different circumstances and to predict the transient response of the delaminated composite structure.

The seminar first presents briefly a FEM-based algorithm that predicts a delamination growth and controls overlapping of the layers in the prescribed delaminated zone of a composite plate. This is followed by details of a computational model based on the dynamic stiffness method for the free vibration analysis of both intact and cracked laminated composite plates. The seminar ends with some practical implementations of the theoretical aspects demonstrated on a series of numerical simulations, followed by a Q&A session.

Dr Miroslav Marjanović is Assistant Professor at the Faculty of Civil Engineering, University of Belgrade and is a member of the Serbian Society of Mechanics and the Association of Structural Engineers of Serbia. His wide research interests include theory of laminated composite plates and shells, structural vibration, fracture mechanics, non-linear structural analysis and application of smart materials in civil engineering. His area of expertise is computational analysis of laminated composite plates using finite element and dynamic stiffness methods.