



LMS Seminar

7 December 2023 at 2:00 pm - Room Jean Mandel

Crack nucleation assessment by the coupled criterion

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ABSTRACT

This presentation will focus on crack initiation in brittle solids. It will first be focused on the description of the so-called “coupled criterion” approach established within the framework of Finite Fracture Mechanics, from theoretical aspects to examples of its capability to predict the nucleation of a crack in various situations. Then, the example of crack front segmentation under mode III loading will be more thoroughly investigated. It will cover the main role of T-stress and mode-dependent fracture properties, which enable understanding why daughter facets may form ahead of the crack front under such loadings.

BIOGRAPHY

Aurélien DOITRAND is associate professor at INSA Lyon, MATEIS Laboratory. He holds a master’s degree from Ecole des Mines de Saint Etienne (2013). In September 2016, he defended his PhD thesis at ONERA Chatillon entitled "Damage at the mesoscopic scale and its influence on the strength of woven composite materials" under the supervision of Nicolas Carrère. Following this thesis and small period as a research engineer at ONERA, during which he focused on the characterization of damage to composite materials, he was then hired for a year as a research engineer at Safran Aircraft Engines. His research activities focused on the mechanical behavior and damage of 3D woven composite materials used for the fan blades of LEAP engines. In 2018, he completed a post-doctorate at SIMAP laboratory, supervised by Rafael Estevez. This post-doctorate enabled him to broaden his research themes beyond the field of woven composite materials. In particular, he tackled fracture simulation using cohesive zone models including time-dependent formulations. In September 2019 he was recruited as associate professor at MATEIS Laboratory (INSA LYON) in the Ceramics and Composites team. He teaches most of his courses in the mechanics of materials in the Materials department at INSA Lyon. His research work focuses mainly on the mechanical characterization and numerical simulation of brittle fracture of materials and bonded/interface assemblies.