UNIVERSITÀ DI TRENTO
Dipartimento di Ingegneria Industriale

DII Seminar

September 17 2024, h. 2.30 PM
Room A215, Polo Ferrari 1 - Via Sommarive 5, Trento

Robust fatigue design and its relation to basic research

Speaker: Joona Vaara, Wärtsilä

Real machine components must serve for 20 or 30 years under various conditions. The transferability of modern fatigue results obtained in the laboratory to industrial practices requires a thorough understanding of the underlying physics and stochastic processes yielding the observations. Of the modern fatigue theories, the cyclic R-curve has proven to be especially interesting, quantifying the crack closure development and non-propagating crack sizes. In this talk, the use of cyclic R-curve in the analysis of extensive experiments with artificial defects and non-propagating cracks is discussed.

Influence of defects on the high and very high cycle fatigue strength

Speaker: Bernd M. Schönbauer, BOKU University

With increasing strength, metallic materials become highly sensitive to defects under cyclic loading conditions. Even very small defects such as nonmetallic inclusion and microstructural inhomogeneities can lead to the initiation of fatigue cracks that may cause fracture after high and very high numbers of load cycles. A basic understanding of the influence of defect size and geometry is essential for a safe design of components and structures against fatigue failure. Based on comprehensive experimental results, an overview of the failure mechanisms of defect-induced fatigue failure is given, and prediction approaches based on fracture mechanics as well as notch-fatigue principles are discussed.

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