Seminars by **Prof. Endel Iarve** from University of Texas at Arlington

Tuesday, 17 December 2024, room T200 at Budapest University of Technology and Economics (BME)

10:00-11:00 Personal introduction, **Discrete Damage Modelling (DDM) of composites, part I.**

11:00-11:30 Coffee break

11:30-12:30 **Discrete Damage Modelling of composites, part II.**

12:30-14:00 Lunch break

14:00-15:00 Introduction to Endel's institutions' research portfolio (15 min), Seminar on **3D reinforcement architecture reconstruction** (30 min), **Highlights of durability and moisture ageing of composites** (15 min)

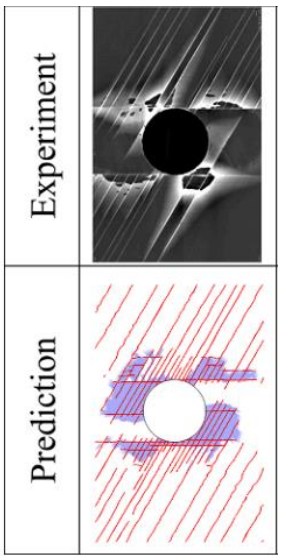
15:00-16:30 Coffee break and networking

Participation at the seminars is free but **registration by 9 December is required**: https://forms.office.com/e/pDssURAfVj

Endel Iarve is a Professor of Mechanical and Aerospace Engineering and the Director of the Institute for Predictive Performance Methodologies at the University of Texas at Arlington. His research focuses on discrete damage modelling methodologies for laminated composites under a broad range of loading conditions, including compression and fatigue. He also focuses on integrated computational materials science and engineering which brings together manufacturing and performance aspects of advanced composite materials. Iarve received his Ph.D. in mechanical engineering at St. Petersburg University in Russia. He received his M.S. and B.S. at Latvian State University, Latvia.

Abstract

Detailed modeling of the deformation and fracture of composites materials is widely considered a vital step toward a new design and qualification paradigm, where significant volumes of conventional testing are replaced by computational simulation. It is equally critical for increasing the service hours of composite structures in commercial aviation characterized by lower loads and high service hours. Fracture in a composite structure is the result of the evolution and interaction of discrete damage events such as fiber/matrix debonding, matrix cracking, delamination between plies and fiber failure. Regularized extended finite element method (Rx-FEM) for the simulation of matrix crack initiation and propagation at initially unknown locations, as well as cohesive interface models for their evolution allowing the interaction with delaminations are presented. Rx-FEM methodology has been applied to a wide range of composite structural performance problems ranging from coupon to sub-element level problems under static and fatigue loading. Selected examples will be presented.



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