Virtual ATCx Composites December 2 – 3, 2020

A Complete Composite Workflow for all Industries

Sign-up today for Altair's line-up of its own, and industry experts for this free-to-attend online event.

Join us to learn how to leverage the latest composites design, analysis & simulation technologies to reduce development cycles. Learn how to save money by confidently being able to reduce the amount of physical testing, and how multiscale technology helps resolve prediction of composites' failure.

December 2, 2020
Presentations in Central European Time (CET)

Composites at Altair 9:00am – 9:30am

The composites design and simulation suite by Altair is actively developed with a holistic view to cover all stages of the process from material modeling, all the way to the certification of composite structures. On the material modeling side, the focus is on continuous further development of Altair's multiscale modeling technology for continuous fiber composites and injection molded plastics. The ply-based composite modeling in Altair HyperWorks has recently undergone a major update to achieve an improved, more efficient modeling workflow that links with the manufacturing to create realistic models of composite components as built.

Markku Palanterä, Altair

Multiscale Methods: from Theory to Practice 9:30am – 10:00am

In this presentation, Dr Jacob Fish introduces some of the key concepts and approaches in multiscale modeling, highlights recent advances aimed at developing practical multiscale tools, and survey the current landscape in multiscale modeling ranging from linking atomistic-to-continuum and continuum-to-continuum scales, physics and data-driven multiscale approaches, and applications in automotive, aerospace and biomedical industries.

Dr. Jacob Fish, Columbia University

Efficient, Engineering Based Modeling of Layered Composite Structures

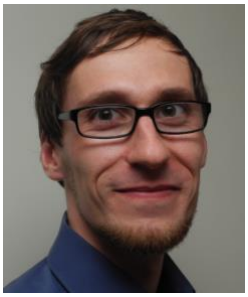
10:00am – 10:30am

While it's a given that the simulation models we build are intended to capture and predict physical behavior, the data used to create them is not always representative of the manufacturing process used to build the physical part. For layered composite parts in particular, this mismatch can cause significant overhead in managing the simulation data as the model is created and evolves. To solve this problem, Altair's ply-based modeling methodology strives to maintain a 1:1 relationship between the simulation data and the manufacturing process, independent of solver. The latest developments of this methodology will be presented as a workflow in the new Composite Browser, available in HyperWorks.

Rob Jopson, Altair

Improved Workflow with Integrated Composite Stress Toolbox and Certification

10:30am – 11:00am



Classical composite analysis and certification methods continue to be used in a significant share of the composite design process. In particular, applying classical methods early in design, and integrating them with finite methods as soon as possible can allow faster decisions which will be rewarded when it comes time for certification. Altair's latest developments to respond to those needs will be presented, covering the Integrated Composite Stress Toolbox and a Certification framework available in HyperWorks.

André Mönicke, Altair

Increasing the Efficiency of Damage Modeling for Filament Wound Pressure Vessels through Multiscale Simulation 11:00am – 11:30am

A key design issue for new hydrogen-based vehicle drive systems is assuring safety of the start-of-the-art polymer lined, carbon fiber overwrapped vessels working at pressures over 700 bar. Cikoni will describe how a multiscale approach gives a better estimation of burst pressures and insight into damage mechanisms for different laminate layups, at both the macroscopic and micromechanical levels, to validate simulation m

Dávid Migács, CIKONI GmbH

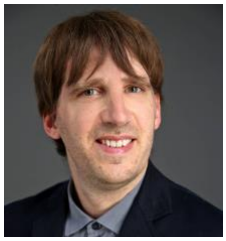
Curing, Cracking and Distortions in Epoxy Composites. Simulating Manufacturing Processes using Finite Element Approach 11:30am – 12:00pm

Manufacturing induced deformations and residual stresses are an unavoidable consequence of processing composites at elevated temperatures. A number of mechanisms have been identified causing residual stresses and distortions, including mismatch in the thermal expansion, cure shrinkage of the resin, consolidation and tool-part interaction. These mechanisms usually act collectively through the curing process and may lead to severe changes in the laminate characteristic. When cured and exposed to natural environment moisture swelling, as well as subsequent stress relaxation mechanisms lead to further geometrical changes. A novel cure simulation solver is demonstrated here with the application to typical aircraft components.

Dr. Tomasz Garstka, LMAT Ltd.

Design Freedom for Sandwich Structures: How Multiscale Simulation Takes Us Beyond Foam and Honeycomb with Additively Manufactured Lattice Structures

12:00pm – 12:30pm

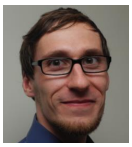


Traditional cores are limiting the capabilities to apply sandwich structures in areas where a certain level of geometrical complexity is reached. To ensure the successful application more flexibility is needed. In this session a boundary conformal design of laser sintered sandwich cores and simulation of graded lattice cells using a forward homogenization approach will be presented.

Frank Ehrhart, Altair, for KTM Technologies / Johannes Kepler University Linz

Ask the Experts 12:30pm – 1:00pm

Workshops 1:30pm – 3:00pm



End-to-end Workflow for Modeling Layered Composites in HyperWorks

André Mönicke, Altair

Molding and Structural Simulation of Injection Molded Parts

Frank Ehrhart, Altair

December 3, 2020
Presentations in Pacific Standard Time (PST)

Composites at Altair 9:00am – 9:30am

The composites design and simulation suite by Altair is actively developed with a holistic view to cover all stages of the process from material modeling, all the way to the certification of composite structures. On the material modeling side, the focus is on continuous further development of Altair's multiscale modeling technology for continuous fiber composites and injection molded plastics. The ply-based composite modeling in Altair HyperWorks has recently undergone a major update to achieve an improved, more efficient modeling workflow that links with the manufacturing to create realistic models of composite components as built.

Jeff Wollschlager, Altair

Multiscale Methods: from Theory to Practice 9:30am – 10:00am

In this presentation, Dr Jacob Fish introduces some of the key concepts and approaches in multiscale modeling, highlights recent advances aimed at developing practical multiscale tools, and survey the current landscape in multiscale modeling ranging from linking atomistic-to-continuum and continuum-to-continuum scales, physics and data-driven multiscale approaches, and applications in automotive, aerospace and biomedical industries.

Dr. Jacob Fish, Columbia University

Efficient, Engineering Based Modeling of Layered Composite Structures
10:00am – 10:30am

While it's a given that the simulation models we build are intended to capture and predict physical behavior, the data used to create them is not always representative of the manufacturing process used to build the physical part. For layered composite parts in particular, this mismatch can cause significant overhead in managing the simulation data as the model is created and evolves. To solve this problem, Altair's ply-based modeling methodology strives to maintain a 1:1 relationship between the simulation data and the manufacturing process, independent of solver. The latest developments of this methodology will be presented as a workflow in the new Composite Browser, available in HyperWorks.

Rob Jopson, Altair

Improved Workflow with Integrated Composite Stress Toolbox and Certification

10:30am – 11:00am

Classical composite analysis and certification methods continue to be used in a significant share of the composite design process. In particular, applying classical methods early in design, and integrating them with finite methods as soon as possible can allow faster decisions which will be rewarded when it comes time for certification. Altair's latest developments to respond to those needs will be presented, covering the Integrated Composite Stress Toolbox and a Certification framework available in HyperWorks.

André Mönicke, Altair

Development of Computational Tools for Composite Design and Manufacturing

11:00am – 11:30am

An integrated, state-of-the-art, computational modeling tools based on an integrated computational materials engineering (ICME) methodology that are critically needed to enable structural carbon fiber (CF) applications in automobiles were developed including stochastic effects. These models were calibrated and validated against coupon and component level test results and made sure that the difference between the experiments and numerical predictions are within 15%. From the manufacturing side, the development efforts were focused on high-pressure resin transfer molding (HP-RTM). On the structural performance side, models were developed for crashworthiness of CF structures. Using these integrated tools, an automotive underbody assembly currently manufactured in steel (2016 GM Malibu) was redesigned using advanced CF composites for the critical load case of side pole impact.

Dr. Venkat Aitharaju, General Motors

VABS: Modeling Composite Beam-like Structures with 3D FEA Fidelity

11:30am – 12:00pm

Variational asymptotic beam section (VABS) is a unique technology continuously funded by the US Army since 1988 and it has become a tool of choice in the helicopter and wind turbine industries for modeling composite rotor blades. With analysis of a finite element meshed cross section, VABS can compute the best set of beam properties for 1D beam analysis and also accurately recover 3D stress/strain distribution over the cross section. VABS has been integrated with HyperWorks and OptiStruct for Altair users to take advantage of this powerful technology for better design and analysis of composite beam-like structures.

Dr. Wenbin Yu, AnalySwift

Ask the Experts 12:00pm – 12:30pm

Workshops 1:30pm – 3:00pm

End-to-end Workflow for Modeling Layered Composites in HyperWorks

Rob Jopson, Altair

Material Characterization / Virtual Testing

Jeff Wollschlager, Altair

Questions? Please contact AltairGlobalEvents