NEWS RELEASE

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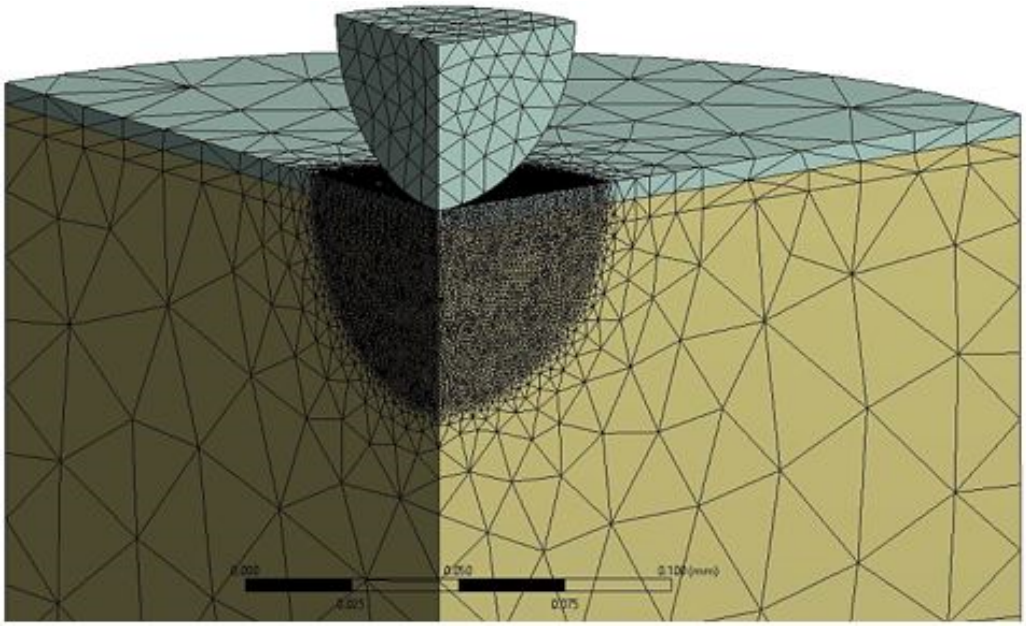
University of Illinois at Chicago Leverages SwiftComp Software to Improve Understanding of Porous Coatings

Software to accelerate development and adoption of new materials for manufacturing by predicting effects of porosity level on strength



West Lafayette, Indiana (USA) - AnalySwift, LLC, a provider of efficient high-fidelity modeling software for composites, announced today that University of Illinois at Chicago (UIC) is participating in its Academic Partner Program (APP), and it is using its SwiftComp simulation software for researching new porous coatings for use in manufacturing. The APP offers participating universities no-cost licenses of engineering software programs SwiftComp and VABS so students, researchers, and faculty can leverage the tools in their academic research.

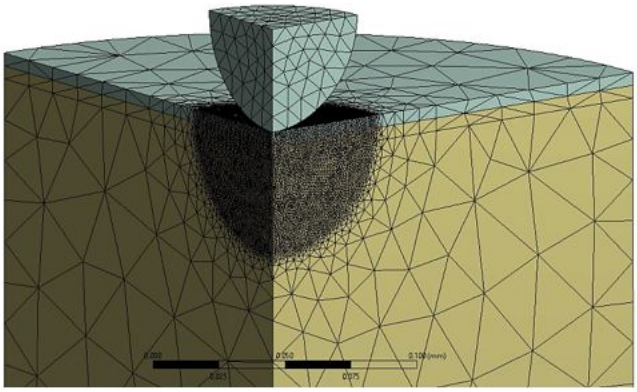
The SwiftComp program is a general-purpose, truly multiscale modeling code for composites and other heterogenous materials. It directly and seamlessly links detailed microstructure and structural behavior for composite structures including beams, plates/shells, and 3D structures. Broad applications include high strain composites in deployable space structures, printed circuit boards (PCBs), high-end fishing rods, honeycomb sandwich structures, and many more.

“We are excited by the work being done by the University of Illinois at Chicago on new materials for manufacturing and pleased they have selected SwiftComp as part of their simulation efforts,” said Allan Wood, president & CEO of AnalySwift.

“We use nano-to-macroscale simulation tools to accelerate the development and adoption of new materials for manufacturing,” said Santanu Chaudhuri, professor of materials engineering at the University of Illinois at Chicago. “Our group, Accelerated Materials Research Lab (AMRL), is in the Civil, Materials, and Environmental engineering department at UIC. AMRL connects materials design to materials manufacturing and performance. Using computational and experimental methods, we develop novel methods for accelerating the transition of materials from design inception to deployment. AMRL tools and capabilities help realize the goals of computational materials design and connect synthesis to scalable materials processing for a circular economy.”

“We used the Mechanics of Structure Genome concept, implemented in SwiftComp, to calculate the effective elastic and mechanical properties of porous coatings under different loading conditions,” said Dr. Arash Samaei, researcher at AMRL. “The test case for our study was Zirconia-Silica bilayer coating on aluminum alloy. The simulation results enabled us to understand the effects of porosity level on the strength of the macroscale structure. The local stress, strain fields helped us to study the failure mechanisms in such coatings under nanoindentation tips. SwiftComp allowed us to determine the effective properties of the materials that enabled us to accurately simulate the mechanical response of the components.”

“In general, Zirconia-Silica conversion coatings are considered as a potential alternative to Chromium-based conversion coatings, which are fabricated with toxic chemicals,” continued Dr. Samaei. “Not only can zirconia-silica-based conversion coatings provide excellent corrosion protection for metals and alloys used in aerospace applications, but they can also be manufactured using non-toxic chemicals via a plasma-based deposition process.”



Coating/substrate structure under a nanoindentation tip to measure the mechanical response of the component

"SwiftComp is a general-purpose multiscale modeling code that enables users to perform efficient and accurate modeling of composites," said Dr. Wenbin Yu, CTO of AnalySwift. "It can be used either independently as a tool for virtual testing of composites or as a plugin to power conventional FEA codes with high-fidelity multiscale modeling for composites. It saves hours in computing time and resources with accuracy comparable to modeling all the microstructural details using 3D FEA. SwiftComp quickly calculates the complete set of effective properties needed for use in macroscopic structural analysis. It can also predict accurate local stresses and strains in the microstructure for the purpose of predicting strengths, as well as thermal expansion of composites."

About AnalySwift

AnalySwift, LLC is a provider of composite simulation software, which enables an unprecedented combination of efficiency and accuracy, including multiphysics structural analysis and micromechanics modeling. Drawing on cutting edge university technology, AnalySwift's powerful solutions provide customers a competitive advantage through drastic reductions in engineering time, virtual testing earlier in the design process, and handling of more complex composite structures. The company's technologies deliver the accuracy of detailed 3D FEA at the efficiency of simple engineering models, cutting analysis time by orders of magnitude. SwiftComp is licensed from Purdue Research Foundation. VABS is licensed from Utah State University, Georgia Institute of Technology, and Purdue University. Find out more at analyswift.com.

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