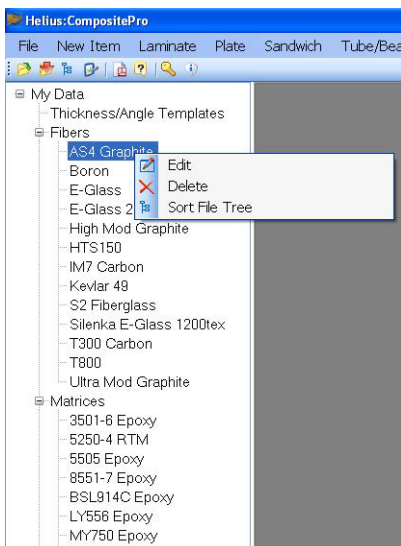
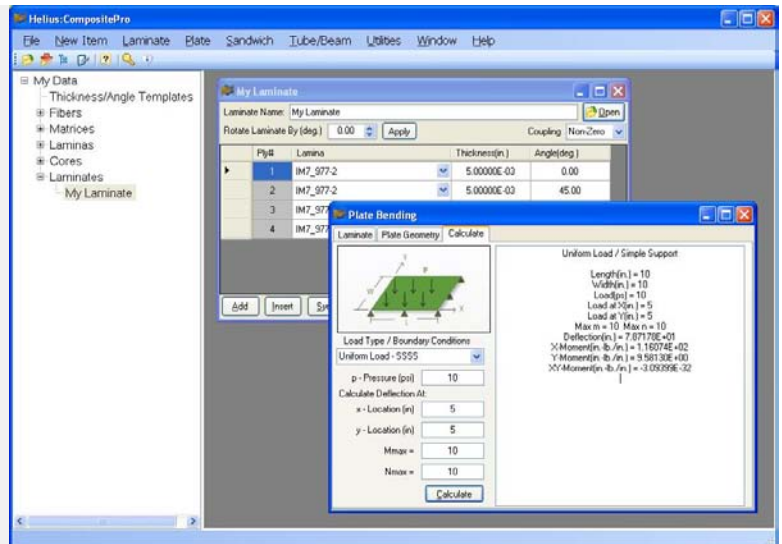


## The *must-have* software for the Composite Design Engineer

Firehole Technologies is happy to announce the newest release of the popular CompositePro design and analysis software for fiber-reinforced composite materials, laminates and structures. Newly revised and completely updated, Helius:CompositePro™ permits fast and easy access to a multitude of composite analysis tools that are based on Classical Laminate Theory (CLT), micromechanics and leading failure criterion. The new Helius:CompositePro retains the functionality of previous versions with the following enhancements:

### New in Helius:CompositePro :

- Compatible with Windows XP, Windows Vista, Windows 7, and 64-bit Operating Systems
- A Re-Designed Graphical User Interface
- An Extended Material Library
- New Failure Prediction Functionality
- Advanced Failure Criteria
- New Micromechanics Calculations
- Advanced Plotting and Data-Exporting Features
- Revised User Documentation
- Demonstration Videos



### Re-Designed Graphical User Interface

The new Helius:CompositePro graphical user interface has been updated to look more like a mini-FEA package. One main difference between Helius:CompositePro and CompositePro 3.0 is the addition of a material data file tree. The data tree is used to view or manipulate the material database, laminates or constituent materials.

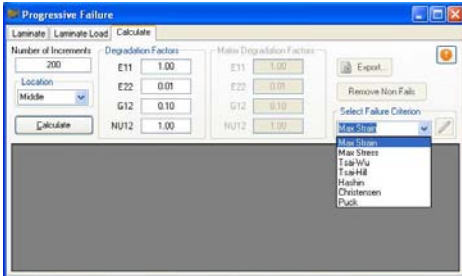
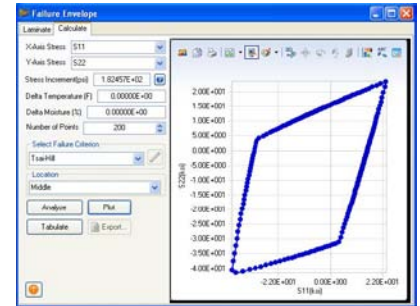
### Extended Material Library with Data Sources Provided

Helius:CompositePro comes with an expanded material database of 77 pre-characterized material files including 13 fiber, 10 matrix, 26 lamina, and 28 core materials that can be used to create new composite materials, composite laminates and sandwich panels. A list of the materials found in Helius:CompositePro, along with their data sources, are included in the User's Guide.

# New in Helius:CompositePro

## New Failure Prediction Functionality

The ability to create and visualize laminate failure envelopes has been added to Helius:CompositePro. The failure envelopes display all possible combinations of two user-specified in-plane loads that cause first ply failure within a laminate structure.

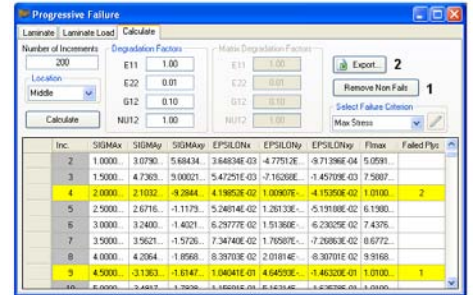


## Advanced Failure Criteria

Five advanced failure criteria have been added to Helius:CompositePro including Tsai-Wu, Hashin, Christensen, Puck and MultiContinuum Theory (MCT). The addition of more advanced failure criteria gives the user the ability to identify different modes of failure (fiber or matrix) for the composite material. The user also has the ability to adjust different failure criterion parameters, i.e. the  $f^*$  parameter for Tsai-Wu, to better predict experimental results.

## Advanced Plotting and Data-Exporting Features

Leading visualization software ChartFX has been integrated into Helius:CompositePro to give the user advanced plotting options. Within certain modules, users also have the option to export results to a .csv file that is compatible with Microsoft Excel.



5.5 Laminating Engineering Properties

The effective engineering properties of a laminate are computed by selecting the **Laminating Engineering Props** feature from the Laminating drop-down menu or by right clicking on an existing laminate in the file tree and selecting Laminating Engineering Props. Helius CompositePro responds by bringing up the Laminating Properties window which has two tabs: Laminating and Properties. The Laminating tab allows the user to define the laminate for which the laminating engineering properties will be computed. See Section 5.1 for a discussion of using the Laminating tab to define a laminate.

After the laminate has been defined, the laminating engineering properties can be computed by clicking the Show Properties button near the bottom of the Properties tab. Helius CompositePro computes the laminate's 2-D and 3-D properties and displays the results in the 2-D and 3-D display windows of the Properties tab (see Figure 5.7).

2-D	Value	3-D	Value
E11	1.9175E+07	E11	1.1419E+07
E22	1.9175E+08	E22	1.1177E+08
G12	5.9131E+05	G12	1.1177E+06
M13	2.7680E-08	M13	5.9131E-05
M14	2.4497E-08	M14	9.1181E-05
E13	1.9175E+07	E13	5.9131E+05
E14	1.9175E+08	E14	2.1066E+01

Figure 5.7. Laminating Engineering Properties Window

After the laminating engineering properties are displayed, there are three different options that can be invoked within the Properties tab.

- 1) **Modal** - This button displays a bar graph of the extensional and bending modal as well as the shear modulus. This is particularly handy for visualizing the magnitude of the differences in the modal.

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## New Micromechanics Calculations

Helius:CompositePro calculates lamina material properties from input fiber and matrix material properties through a high fidelity micromechanics model. The micromechanics model idealizes the geometry of a unidirectional composite as a hexagonally packed unit cell to predict the multi-axial properties and response of a composite material.

## Revised User Documentation

The comprehensive user's guide has been revised, walking the user through every menu item and function. It details function inputs and outputs and discusses some of the theory behind the functions.

## Demonstration Videos

You can now watch demonstration videos to help you become acquainted with Helius:CompositePro. Learn how to calculate stresses and strains due to thermal loads, determine progressive failure response of a laminate, and learn to re-design a part from metallic to composite material. Demonstration videos are located on Firehole Technologies website at <http://www.fireholetech.com/CompositePro>

