Partner Spotlight: Anaglyph

Dr. George Kretsis, Managing Director, discusses composite design and analysis software, LAP and CoDA, available through the Altair Partner Alliance.

APA: What prompted the development of your software? What problem(s) are LAP and CoDA meant to solve?

Dr. Kretsis: The first version of LAP was developed in a DOS environment in the late 80s. Based on Classical Laminate Theories, LAP was the first ever commercial software on the market dealing with composites properties in a graphical user-interface. Over the years, the product has continually evolved, modules were added with non-linear analysis, a design module and additional failure criteria. It proved to be a practical tool for composites preliminary analysis, so much so that Airbus UK adopted it as their standard composite laminate analysis tool for a number of projects.

LAP deals with the analysis of any type of composite laminate subjected to in-plane and transverse loads and moments. The flat laminate has no fixed size apart from its thickness, so that the analysis can be applied to any composite component, at a precise location where loadings or deformations are known.

For CoDA, we were approached by the Composites Section of the Centre for Materials Measurement and Technology at the National Physical Laboratory (NPL), who asked us to develop a commercial software, based upon several years of their research and validated experiments. The increasing use of composites in aerospace, automotive, renewable and athletics has opened up growing markets for both applications.

CoDA handles preliminary analysis of sub-components with specific geometries, such as plate, beam, joint, flange or laminate, taken into consideration as a whole. CoDA can also synthesize the properties of composite materials, laminates and sandwich structures, which can be used in a seamless manner within the design modules.

APA: What are the benefits of using LAP and CoDA for composite design and analysis?

Dr. Kretsis: Both LAP and CoDA are stand-alone applications and provide instant proven results, in the form of graphics or tables, in a user-friendly interface. They are very easy to learn and use, yet very powerful. LAP can be applied to any laminate, regardless of size or shape, whereas CoDA deals with sub-components as a whole, producing a wide range of results (effective stiffness, strength, critical loads or stresses, max. deflection, hygrothermal profiles, parametric response, etc.)

APA: Are there any unique applications that LAP and CoDA work for that your competition cannot?

Dr. Kretsis: LAP offers a number of unique features, such as the powerful Design module algorithm and the notched (damaged) Compressive Strength theory. CoDA similarly offers several unique features, such as the bolted Joints and Flange module calculations, the 3D material property synthesizer, as well as the PREDICT algorithms for thick laminates. Unique parametric modules instantly allow “what if” scenarios to be evaluated graphically, showing the effect of any change in input parameter (ex. Fiber properties) or laminate parameter (fiber angle, skin thickness).

APA: How much time does it take to learn and start using LAP and CoDA?

Dr. Kretsis: Both LAP and CoDA are intuitive, provided the user has a basic understanding of composites. No training is required to use them.

APA: What are the biggest challenges or problems that customers in your target market face and how do you address their needs?

Dr. Kretsis: The biggest challenge for a composites design engineer is to optimize the stack, or laminate layer size, location and orientation. Prior to lengthy analyses, LAP and CoDA can give invaluable insight into what can be achieved with the available candidate materials, by breaking down and idealizing the structure into manageable sub-components or critical regions, for preliminary design and analysis using LAP and CoDA.

APA: Describe a typical workflow using LAP and CoDA.

Dr. Kretsis: LAP and CoDA data are typically created in the GUI, or imported via text interface. Drag and drop operations are also possible between LAP and CoDA. Where necessary, data can be exported to HW via text export in a suitable format. In most cases, data are self-contained within LAP and CoDA. Typical operations involve the investigation of layer stresses for given load conditions that may originate in HW, failure analysis, material and laminate optimization. Results of such operations to be used in HW would typically be in the form of laminate definitions.

For more information about LAP and CoDA, visit the solution pages.