

ESAComp 4.1 RELEASE NOTES

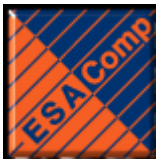
Version 4.1.086 for MS Windows, June 8, 2010

NEW ANALYSIS CAPABILITIES

- **Curved plates** extend the old analysis capability for rectangular plates to singly curved plates defined by the plate dimensions and the radius of curvature. Stiffeners can be placed in the axial direction. The boundary conditions can be independently defined for each edge of the plate. Linear-static load response and failure analysis can be performed under pressure and point loads. Buckling and natural frequency analyses are introduced in future ESAComp releases. As a special case of curved plates, flat plates can also be defined. The new implementation will fully replace the old plate analysis in the future.
- **Hat stiffeners** can be defined for curved plates besides the beam type stiffeners supported by earlier ESAComp versions. The hat stiffener types include bonded and integral stiffeners. The capabilities for defining both stiffener types are extensive. For instance, besides the hat laminate there are possibilities to define additional reinforcing layers for the sides and top part of the hat. In the analyses hat stiffeners are modeled using shell elements.
- **Cylindrical shell** add-on module allows analyses of cylinder and tube like structures. The cylinder may have a constant diameter or it may be conical. The laminate lay-up may vary in the axial direction by assigning different laminates for ring type cylinder segments. The boundary conditions at the ends of the structure are defined using an innovative and simple to use approach. Forces and moments can be applied at the ends of the cylinder. In addition, a pressure load or inertial loads due to linear acceleration or rotation may be applied. The analysis types include static load response and failure, as well as buckling and natural frequency analyses based on linear eigenvalue approach.
- **Stiffened cylindrical shell** add-on module is a further extension of the cylindrical shell module. Beam type stiffeners can be placed in the axial and circumferential directions. The locations are specified independently for each stiffener. The stiffeners may be on the inside or outside of the cylinder. The analysis possibilities are identical to the standard cylindrical shell module.
- **Elmer FE solver** by CSC, The Finnish IT Center for Science (www.csc.fi/elmer) is now included as a standard module in the ESAComp distribution. It is used for realizing the curved plate and cylindrical shell analyses and it also provides a basis for introducing advanced nonlinear analyses in the future ESAComp releases.
- **New 3D result viewer** is introduced for viewing the results of curved plate and cylindrical shell analyses. Versatile capabilities for model rotation and zooming are included. The selected result item can be viewed as a contour plot with optional annotations for failure modes and critical layers. The features include also deformed plots and animation of eigenmodes. For a selected element, layer level stresses, strains and reserve factors can be viewed as layer charts and in numeric format.

NEW DATA EXCHANGE CAPABILITIES

- **FE export to ANSYS Composite PrePost (ACP)**. ACP supports data exchange with ESAComp using the ESAComp XML format. The new export capability improves the possibilities by writing an ACP specific Python script which can be simply copied and pasted to the ACP command prompt. Both ply



materials and laminate lay-ups can be exported. Laminate lay-ups from ESAComp can be interpreted as Sub Laminates or Stack-ups in ACP.

- **FE export to ANSYS Workbench** allows creation of an ANSYS specific XML file that can be read in by the WB Engineering Data module. Isotropic and orthotropic ply materials can be exported.
- **FE export to ComPoLyX** allows transfer of ESAComp ply material data in the form of a ComPoLyX Python script. The typically incomplete material data from FE models can be completed with the material description from ESAComp before performing advanced failure analyses in ComPoLyX.
- **ABAQUS export** has been improved for ABAQUS SHELL elements through the use of ESAComp extension variables (Edit -> Extension variables...). For each ply of the active case, an FEA related material ID can be specified. Similarly, for each laminate an FEA related section type ID and reference plane data can be set. Consequently, these ID's are used when export is made.
- **Support for unit systems in ESAComp XML.** In the earlier versions all ESAComp XML data exchange was done in basic SI units. Now, the FE import/export unit options can be used for selecting the unit system. If imported XML includes a header indicating the unit system, this information is used instead of the selected unit options.

DATA BANK UPDATE

- **ESAComp Data Bank** has been updated extensively. The update covers the following material types: foam cores, honeycomb cores, other cores, carbon fibers, glass fibers, typical aramid fibers, polyester resins, vinylester resins, some epoxy resins including typical classes, homogeneous plies, typical FRP, CSM, Spray up rovings, MMC, and plywood.

LICENSING AND INSTALLATION

- **RLM license manager** by Reprise Software, Inc. has replaced the earlier used FLEXlm in ESAComp licensing. To the IT administrator and ESAComp end-user, RLM provides a user-friendly web browser interface for configuring the license server and for monitoring license usage. Node-locked licenses are handled with very simple license file based approach. No license server is needed for node-locked licenses. Old license files are not compatible with the new licensing system. ESAComp users that are eligible for the version upgrade will receive new license files.
- **Release date based version number** has been taken in use with the new licensing. In the license file, the highest supported version number is shown, for example, as "2010.12". This indicates that the license is valid for all versions released in December 2010 or before that. The release date based version number is shown on the ESAComp start-up screen besides the "normal version number", e.g. "4.1.086 (2010.06)". When a customer renews maintenance, a new license file with the updated version number (maintenance end date) is provided. This approach increases transparency of the licensing and makes it easy to take in use new software upgrades when available.
- **The new installation system** allows flexible installation of ESAComp and RLM license server from the same installation package. The new installation procedure supports multiple users on the same PC. The user specific ESAComp files are by default placed under each user's home directory ("\$USERPROFILE\ESAComp\ ...").
- In addition, many smaller enhancements have been made.