



COMPOSITES PRE-FORMING AND PREPREG FORMING

WITH PAM-FORM FOR COMPOSITES

KEY BENEFITS

- Evaluate different forming and tooling strategies without any physical prototype
- Select the most appropriate material, the right tooling design and the best process parameters to get it right the first time
- Optimize manufactured part quality
- Reduce overall development time and cost

“PAM-FORM helped us achieve our project goals: lower weight and cost of production while preserving the mechanical properties of the part. Additionally, it provided us with more information on optimizing our production process which can be reapplied to similar projects.”

Josef Krena, Development Manager,
LETOV LETECKA VYROBA, Ltd.,
GROUPE LATECOERE.

PAM-FORM is the first virtual manufacturing solution dedicated to non-metallic forming processes. The software was developed through industrial partnerships and projects in various fields such as automotive, aeronautics, aerospace and defense. PAM-FORM enables realistic and predictive pre-forming and forming (simulation) of laminated composites.

COMPOSITES PRE-FORMING AND FORMING

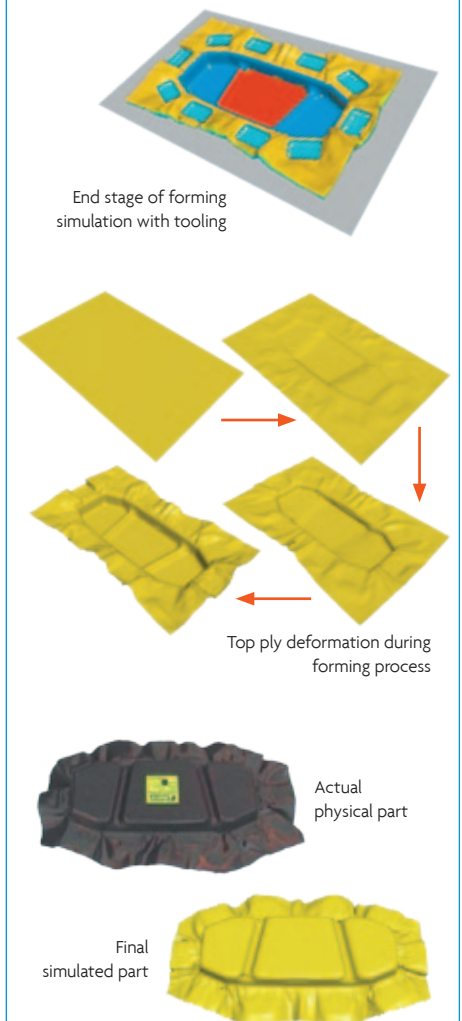
PAM-FORM simulates the entire forming process, allowing engineers to select the most appropriate material, the right tooling design, and the best process parameters.

Taking into account the physics of the forming process, PAM-FORM enables the user to predict manufacturing defects such as wrinkling and to correct these by optimizing the process parameters. It's a ready-to-use industrial tool to assist professionals in the composite manufacturing industry.

Most of composite manufacturing processes including stamping, diaphragm forming, thermoforming, hand lay-up and rubber pad can be simulated with PAM-FORM. It is also available for a wide range of materials such as UD, fabrics or NCF reinforcement, thermoset and thermoplastic matrix.

PAM-FORM allows for the optimization of different process parameters such as tool geometry, clamping conditions, punch velocity...

Wing box forming simulation with PAM-FORM



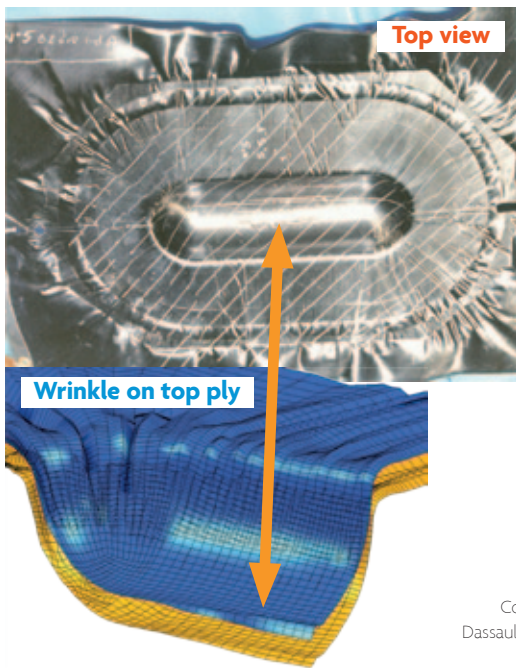
Courtesy of Airbus UK

OPTIMIZING THE MANUFACTURING PROCESS

The FE analysis is where PAM-FORM makes a difference; its advanced technology gives accurate results in composite forming. It offers a unique comprehensive library of material models well suited for traditional and advanced non-metallic materials. Easy-to-use advanced graphical interface and numerical techniques help the designer progress smoothly towards the best solution. Any type of process can be modeled virtually.

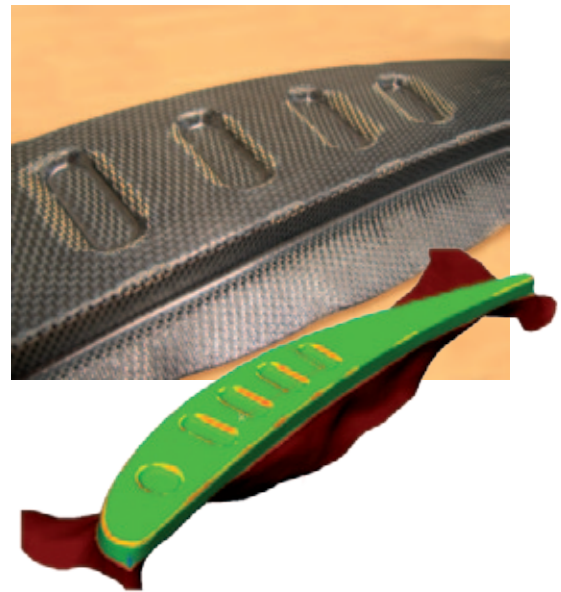
Thanks to PAM-FORM, the best manufacturing strategy and parameters can be determined before any physical test through the prediction of wrinkling, bridging, thicknesses and fiber orientations.

Wrinkle prediction at laminate and ply level with PAM-FORM



Courtesy of Dassault Aviation

Bridging prediction in the radii (red area) with PAM-FORM



Courtesy of Delft University of Technology

ABOUT ESI GROUP

ESI is a pioneer and world-leading provider in virtual prototyping that takes into account the physics of materials. ESI has developed an extensive suite of coherent, industry-oriented applications to realistically simulate a product's behavior during testing, to fine-tune manufacturing processes in accordance with desired product performance, and to evaluate the environment's impact on performance. ESI's solutions fit into a single collaborative and open environment for End-to-End Virtual Prototyping, thus eliminating the need for physical prototypes during product development. The company employs over 800 high-level specialists worldwide covering more than 30 countries.



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