A Unique integrated solution for the manufacturing of composites structural components

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Abstract

ESI Group has developed over the past 10 years a unique Finite Element (FE) simulation chain for the manufacturing of parts made of continuous fibers (Carbon or Glass fabric, Unidirectional or Non-Crimp-Fabric) and a thermoset or thermoplastic matrix. The three main products that are PAM-FORM (for preforming of dry textiles or thermoforming of pre-pregs), PAM-RTM (for resin injection or infusion in a pre-preg and curing) and PAM-DISTORTION (for prediction of residual stresses and shape spring-in/warpage) communicate with each other by transferring material information (Shearing, Temperature, Degree of cure,...) from one stage of the process to the other one. These three products are embedded in a solution within Visual-Environment that allows the definition and optimization of process parameters to minimize manufacturing defects and increase final product quality.

During this presentation we will first review challenges encountered with the manufacturing of composites parts. Examples of manufacturing defects and ESI solution to prevent these defects will then be presented. Several industrial examples and a list of references will conclude this talk.