AUTOMATED PRODUCTION OF COMPLEX CFRP-COMPONENTS

Rolf Sundermann *

* Composite Technology Center GmbH (CTC)
Airbus-Strasse 1, 21684 Stade, Germany
e-mail: rolf-georg.sundermann@airbus.com, web: http://www.ctc-gmbh.com

Keywords: automation, process simulation, cfrp-components, resin transfer moulding, robotics, complex automated performing

Summary:

Due to the requirement to produce complex 3D-cfrp-profiles with variation of height, radius and local reinforcement in great quantities (application in aerospace and automotive), concepts for a fully automated production had to be developed.

In a first step, the manual RTM-process was transferred into a completely automated process chain. This was realized within the project “Auto-RTM”. The focus was put on the handling of dry fabrics, use of microwave technology, new coupling systems for one-component-resins and process technology including an extensive process simulation program.

The project was successfully finished in 2006/2007 and provides now the basis for further developments. Due to the fact, that the target cfrp-profiles are much more complex than the sample parts used within “Auto-RTM”, the emphasis is now put on the preforming process.

To understand the coherences and interdependencies during the draping and preforming of dry fabrics, a detailed analysis of the manual preform process was performed. In the second step and based on the results, tools like robot effectors, special-machines for handling and auxiliary devices, RTM-moulds, etc. are now developed. Simultaneously, digital plant models are provided for an estimation of recurrent and non-recurrent costs.

The third step is to validate the concepts of fully automated preforming of complex cfrp-profiles with installation of the designed machines, implementation of on-line quality assurance and with producing of sample-parts. Additionally, low-cost RTM-moulds have to be developed. With this validation, the automated manufacturing of complex cfrp-profiles in great quantities is ensured and available, not only for Aerospace applications, but also for applications in automotive.