



## RECENT DEVELOPMENT IN THE ROBOTIC STITCHING TECHNOLOGY FOR TEXTILE STRUCTURAL COMPOSITES

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### ABSTRACT

*Dry preform production is gaining increasing importance due to the widespread availability of modern resin infusion techniques. This requires reproducible structural preforms of high accuracy which have to be manufactured on automated systems at low costs. Shaping of the structure, fixation of patches or layers and reinforcement of the parts in z – direction are the main tasks for this process step. Stitching is therefore the ideal solution. ALTIN Naehtechnik has developed a stitching process, where 3–dimensional preforms can be produced by the application of unique stitching technologies. For the achievement of high accuracy numeric controlled industrial robots are used to carry special designed stitching heads along the seam path. The exchangeable heads are designed to operate with all modern high performance yarns including carbon. The patented One Side Stitching- and the Tufting – heads allow to stitch and to reinforce special structures with access from only one side. The paper gives an overview of major developments and achievements in preform stitching.*

**KEY WORDS:** One Side Stitching, Robotics/Automation, Three Dimensional Stitching

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### 1. INTRODUCTION

The stitching of several textile partial structures whose fiber alignment is optimized according to the stress lines in the non-impregnated state is gaining increasingly attraction in the composite industry. An additional essential part of this strategy is the direct reinforcement of the FRP components for the improvement of their mechanical characteristics by inserting reinforcement of fibers in Z-direction.

Although stitching as a technology for connecting two or several individual textile

parts together has been well known for a long time, the previously known stitching techniques are not efficient or cannot be applied in the majority of the cases, mostly due to the large dimensions and the three-dimensional structure of the FRP components.

To overcome stitching technique limitations the ALTIN Nähtechnik has developed a technology where stitching heads, which have been especially designed for the processing of FRP performs, are continuously carried along the seam line of a resting work piece by a robot.