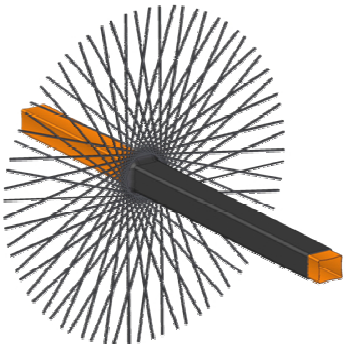
Fachhochschule Nordwestschweiz
Hochschule für Technik

FX Core Compression Resin Transfer Moulding

A novel approach for combining processing technologies is of exploratory interest at the Institut für Kunststofftechnik (Institute of Polymer Engineering). An internal pressure induced resin transfer process has been incorporated with functional braiding technologies. The technology utilises a single mandrel to provide dimensional stability to the braiding process and also to act as a cavity for the application of the consolidation process.



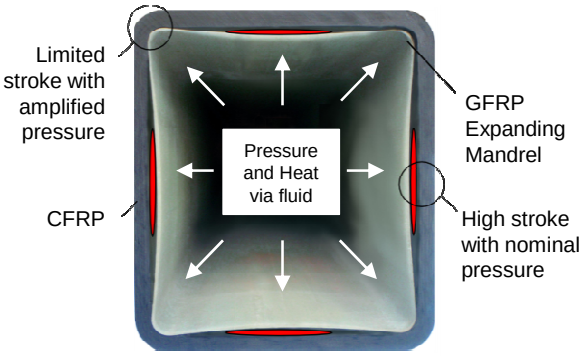
Braiding process on the infusion mandrel ensures good alignment in the composite material.

Working on an EU funded research programme, the Institut für Kunststofftechnik at the Fachochschule Nordwestschweiz has developed this multifunctional mandrel.

The produced structures are of superior properties to conventional manufacturing techniques with reductions in part costs and cycle time.

Assembly used to seal mandrel, introduce resin to the fibre reinforcement and temperature control to the mandrel.

The mandrel is used for both the braiding process and to enable compression RTM through the thickness of the section. By using an expandable mandrel, a high level of fibre orientation can be achieved. The concave profile of the mandrel that provides a high internal stroke as an internal pressure is applied, allowing impregnation of the resin through the thickness of the fibre reinforcement.



Schematic of impregnation and curing concept that has been implemented.

Future work will exploit this mandrel technology to produce more complex geometries using this fast and efficient processing technique.

Advantages

- Combination of functional braiding, compression RTM and curing-under pressure
- Manufacture of net shape parts; no trimming process required
- Well defined, compacted corner geometry in comparison to bladder inflation
- Uniform internal pressure and controlled resin flow
- Short infusions times through the composite thickness
- Highly orientated fibres from the braiding process and expanding mandrel
- Low cost for mass production, minimal resin wastage, re-usable mould.
- Uniform wall thickness and well defined profiles
- High fibre volume fraction (55%) and low porosity

Institut für Kunststofftechnik
Klosterzelgstrasse 2
5210 Windisch
T +41 56 462 45 90
F +41 56 462 45 50
clemens.dransfeld@fhnw.ch
www.fhnw.ch/technik/ikt