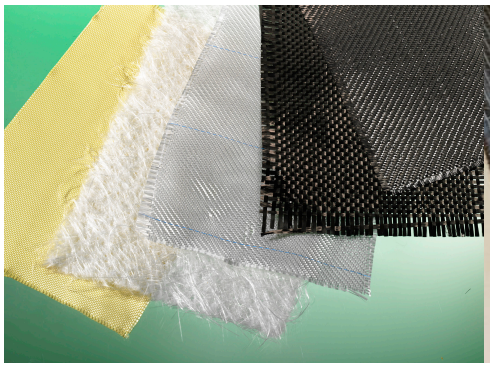
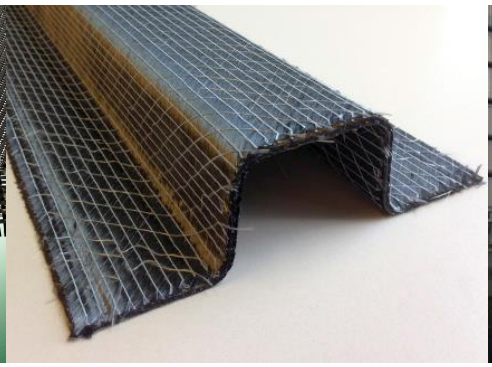
Fraunhofer Project Centre @ Western

Fiber Preforming





What is Fiber Preforming?

Fiber preforming is the missing link between high volume and high property structural composites. This support technology eliminates the manual fiber processes previously required for structural composites which use continuous fibers. With this equipment, the fiber cutting, stacking, draping and forming of these textiles is completely automated. The whole system is capable of eliminating waste and reducing defects while achieving a low part-to-part cycle time. Fiber preforming offers economical production of dimensionally stable and complex 3D shaped preforms using simple, modular operational principles.

Simulation tools

The key to successful fiber preforming is in regards to understanding the fiber orientation. Stitched, woven, and non-crimp fabrics all drape differently in parts with complex curvature. Together with the equipment are the CAD systems which predict the draping process and tailor the blank shape. Preforms can be optimized by adjusting binder application, fixation, lamina sequence, or the use of darts. Thus a part designer can be enabled to create a structural composite with knowledge that it can be fabricated accordingly.

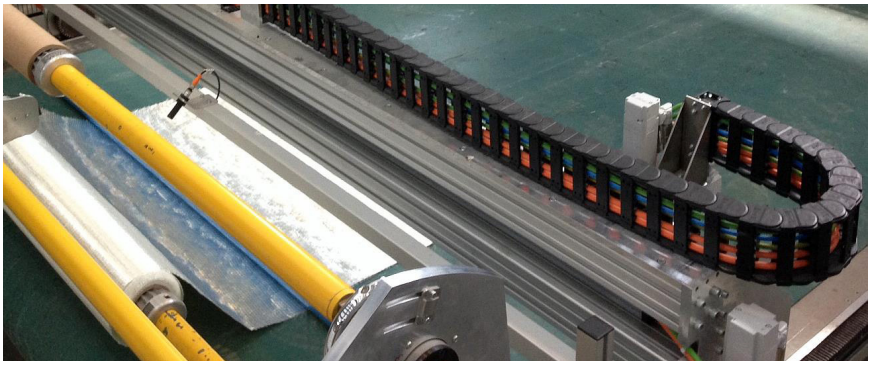
Key Research Topics in the Field of Automated Preforming

- Minimizing blade wear to improve cutting accuracy
- Waste reduction with net-shape, no-trim preforming
- Fiber handling and gripping improvements to eliminate damage
- Minimizing binder application with variable spray control
- Wrinkle prediction tools and mitigation techniques
- Prototyping of demonstrator parts or short production runs

Western UNIVERSITY · CANADA

in cooperation with

Fraunhofer



Equipment and Facilities

- Dieffenbacher Preform Center for fully automated fiber cutting, handling, and preforming up to 250 kN closing force
- Optimum material utilization with continuous endless cutting and net-shape preforming
- Capable of processing a wide range of areal fabric weights with roll widths up to 2.6 meters and preforms up to 2.5 meters square (projected area)
- Robotic handling of individual fabric layers between cutting table, binder station, and draping belt
- Optional variable spray binder application of either thermoplastic or thermoset binders
- Front and rear draping belts with three axis adjustibility
- Simulation tools available to determine blank shape and fiber orientation

Fraunhofer Project Centre for Composites Research
Western University
2520 Advanced Ave., London ON N6M 1E1
t. 519.661.2111 ext. 86975 e. vugresi@uwo.ca
eng.uwo.ca/fraunhofer

Fraunhofer Project Centre @ Western

Western University and the Fraunhofer Institute of Chemical Technology ICT have partnered to provide joint expertise for industry needs.

Together, Western and Fraunhofer will develop lightweight composites for the transportation and building materials sectors, focusing on applied research in the fields of methods, materials and manufacturing technologies for composite materials.

Collaborations

With Industry

- Develop industrial processes
- Apply developed innovative processes
- Optimize existing processes and materials

With Fraunhofer

- Process and material development
- Scientific research at intermediate level
- Transfer from basic research to industrial scale

With Universities

- Basic research on fibre matrix phenomena
- Simulation and design
- Investigation of fundamental interests