

Projects

Innovationsfond 2001

„CAD Construction of 3D fabrics with the aid of a standard CAD system“

April 2002 – May 2004

Aim of this project was the quick and cost-saving realization of seamless fabrics with the aid of a CAD simulation. Weave construction and optimization of three-dimensional fabrics can be done with this software easily.

Transferorientierte Forschung an Fachhochschulen (TRAFO)

„Simulation of seamless woven 3D shells for the construction of components made of fibre-reinforced composites“

June 2004 – May 2006

Considering loads, the construction of composites made of fibre-reinforced fabrics is possible. Stiffness of 3D fabrics can be calculated and depicted through an own calculation model.

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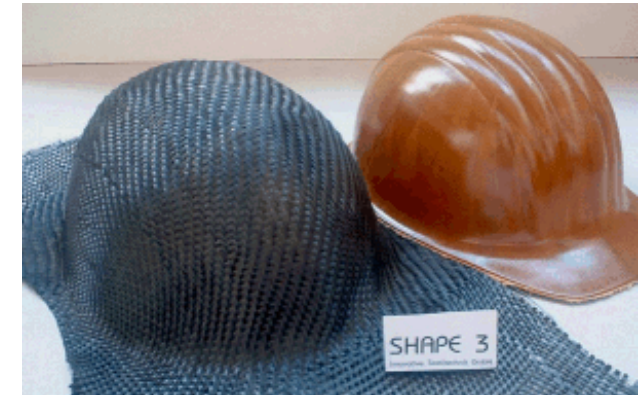
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RESEARCH

CAD Simulation



of seamless woven 3D shells

Shape Weaving

Shape Weaving was developed to avoid the disadvantages and limits of conventional shaping methods. Specific characteristics of this method are the individual thread lengths, -orientations and -distances, which are already realized on the loom and lead to a seamless formed fabric.

Advantages of seamless 3D shells:

- ❖ Decrease in manufacturing costs and cycle time
- ❖ Increase in reproducibility
- ❖ Reduction in weight and increased stability, caused by missing seams

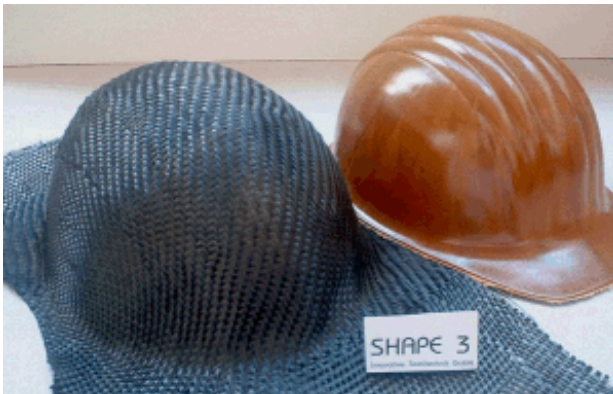


Fig. 1: Photo 3D helmet
(Source: Shape 3 Innovative Textiltechnik GmbH)

Fabric simulation

With this tool the simulation of seamless fabrics regarding geometry and fabric construction is possible. Different alternatives can be developed, compared to each other and optimized on the screen. The result is a data record to control the loom.

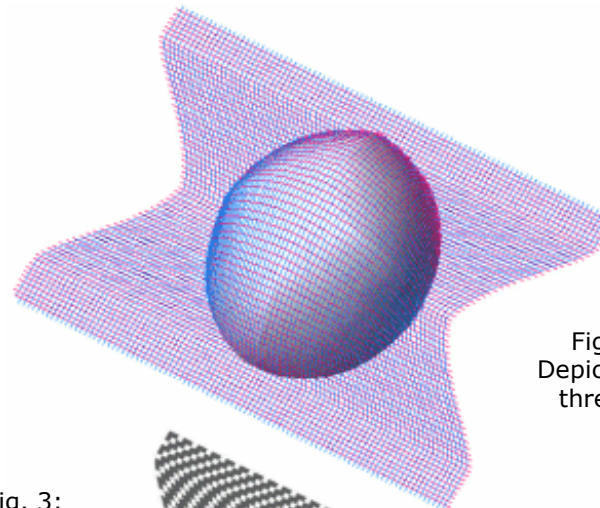


Fig. 2:
Depiction
threads

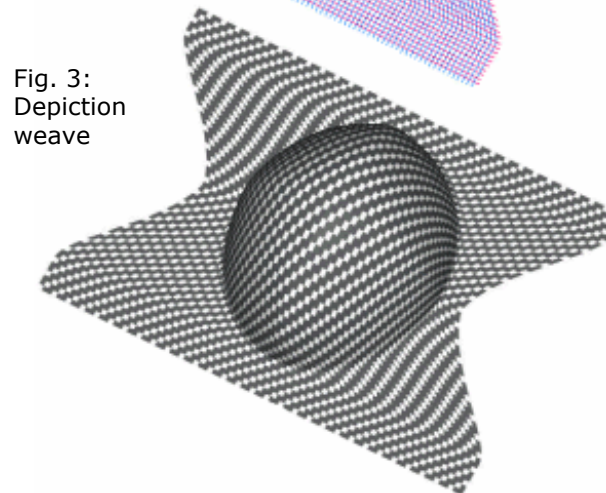


Fig. 3:
Depiction
weave

Stiffness

Building up on the fabric simulation a further module to calculate stiffness of seamless fabrics was developed. Caused by special thread orientations within these fabrics an own calculation model was necessary, which was realized with the software MathCAD®.

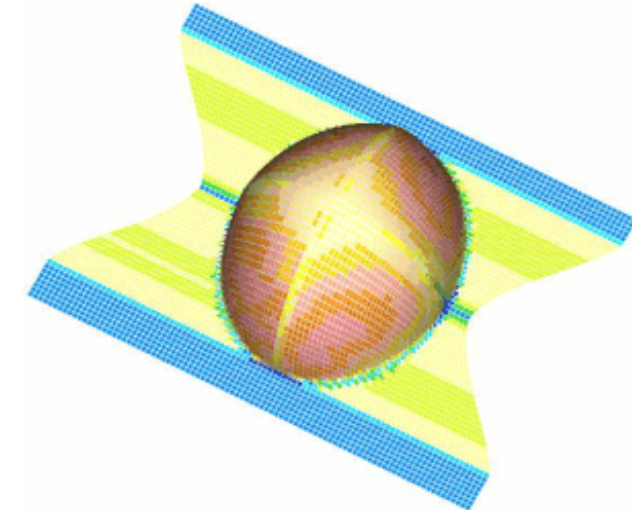


Fig. 4:
Depiction
stiffness