



Ingenieurbüro Schumacher
Faserverbundkonstruktion & **L**eichtbau

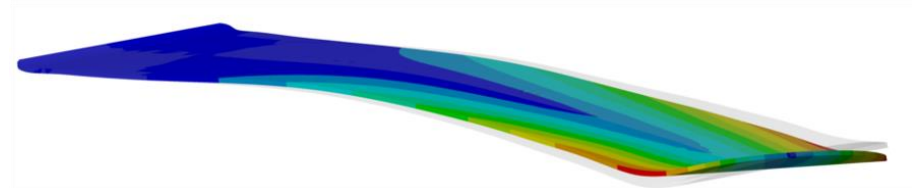
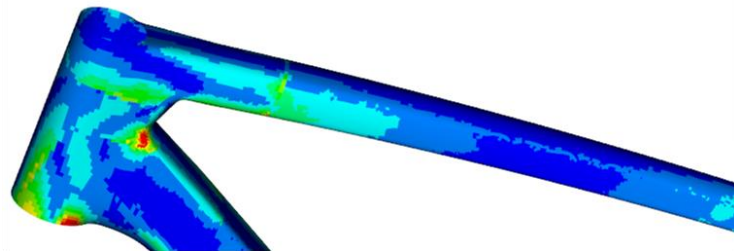
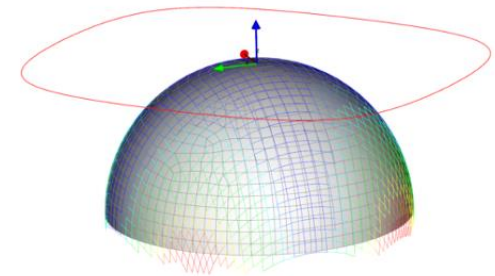
Company Profile

FkL Ingenieurbüro Schumacher
M.Sc. Jana Schumacher

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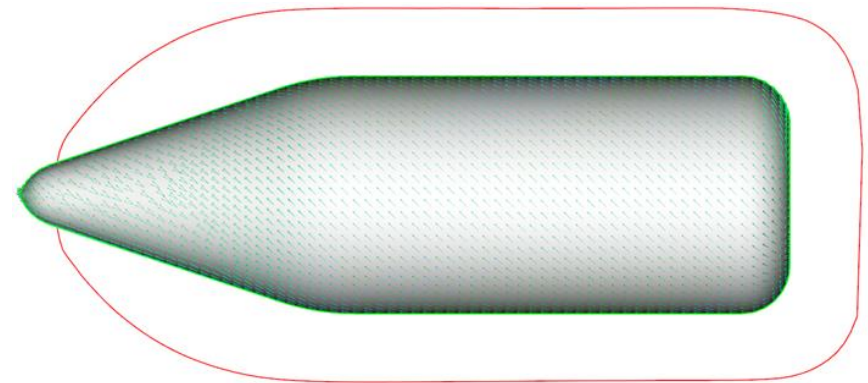
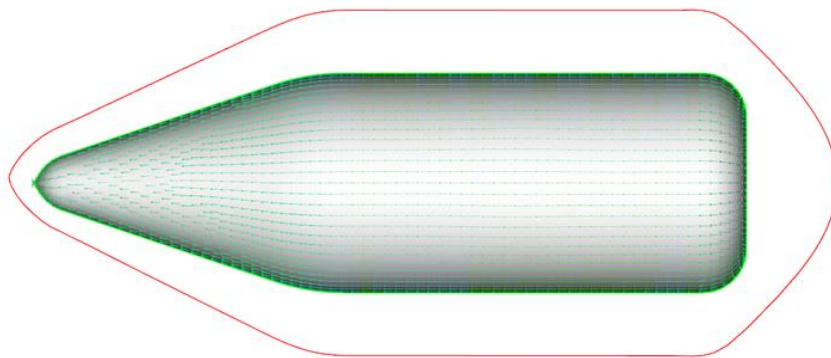
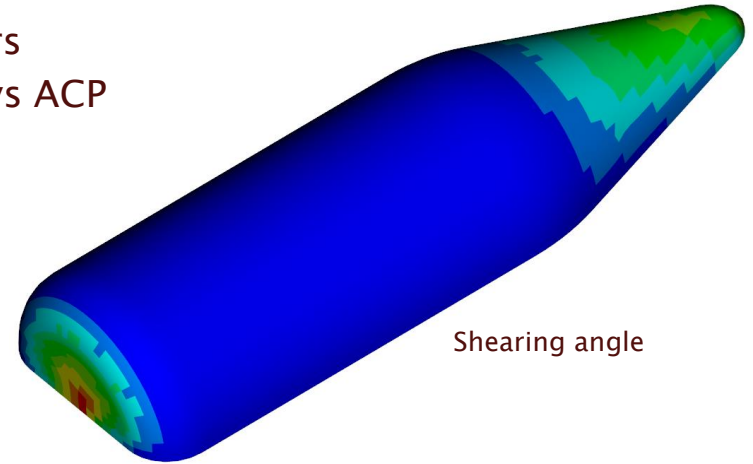
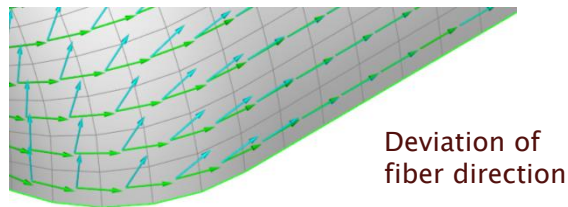
Construction and calculation of composite parts

- Supporting the compilation of the performance specifications
- Choosing suitable materials and production processes
- Material-coped geometry-design
- Draping simulation and deduction of pre-cup parts
- FEA stress analysis according to VDI 2014
- Stiffness analysis and calculation natural frequencies
- Workshops around the subject „calculation and simulation of composites“
- Used software: Ansys Mechanical and Ansys Composite PrepPost (ACP)



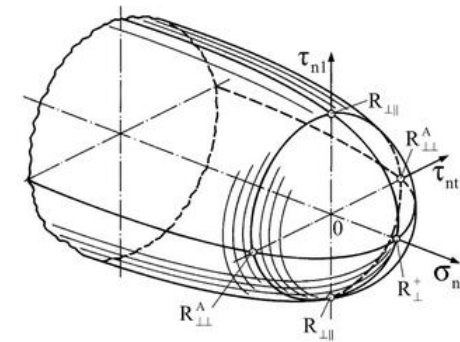
Draping simulation

- Determination of fabric specific draping parameters
- Adding the parameter to the material cards of Ansys ACP
- Define the draping points
- Determination of the draped fiber direction
- Deduction of pre-cut parts as 2D-Scatch (.dxf)



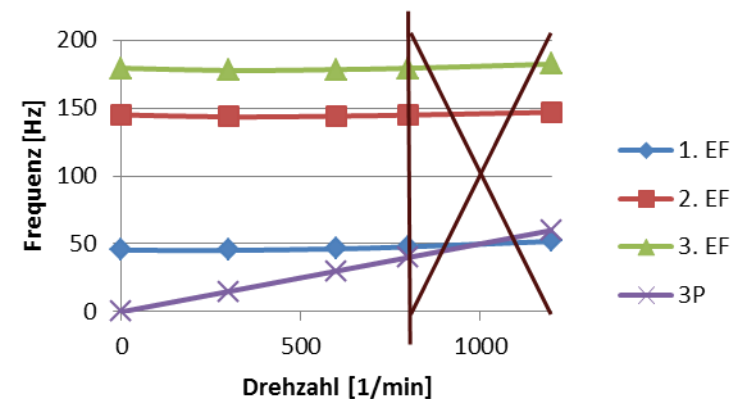
FEA-Calculation

- Layer by layer setup in the ACP pre-processor
- Optimization of the whole laminate, including fiber angle of the single layers, pertaining to the following aspects:
 - Inverse reserve factor (fiber and inter-fiber failure)
 - Stability
 - Stiffness
 - Natural frequencies
 - Weight
 - Feasibility
 - Costs



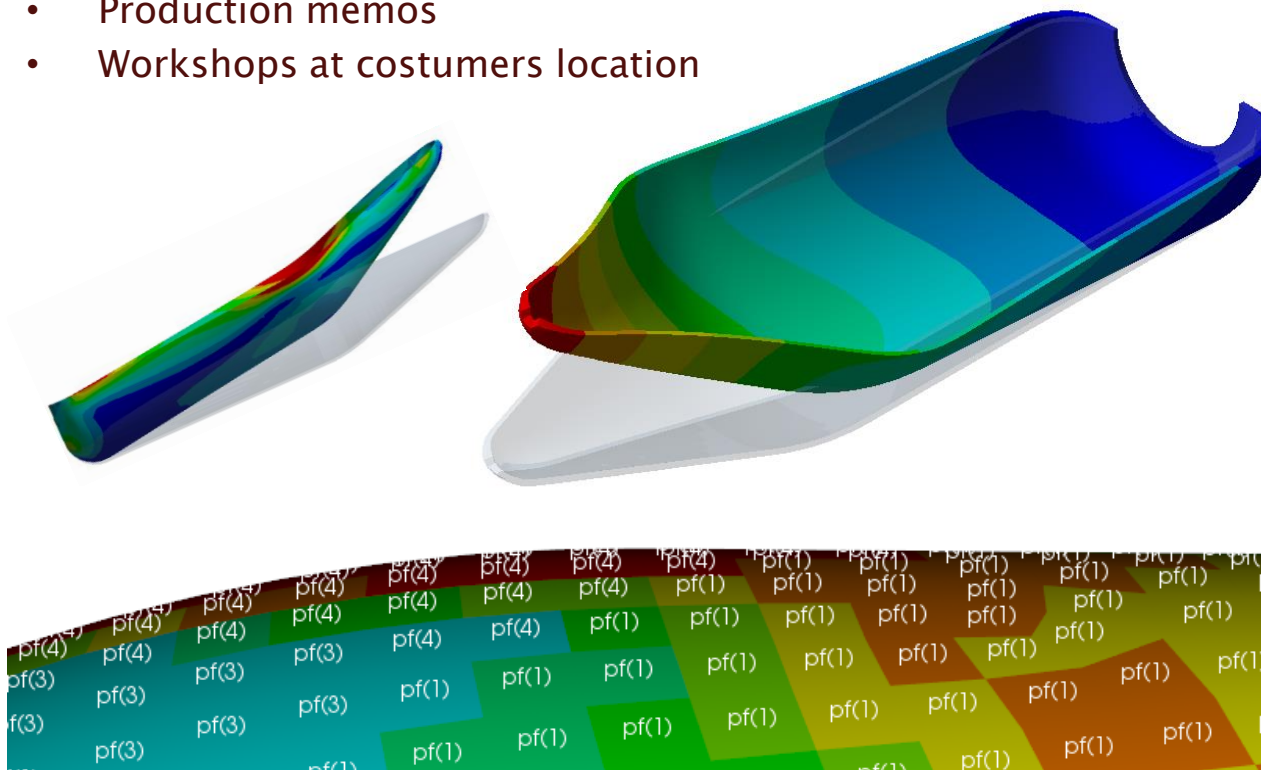
SamplingPoint.1 MP,PP

0.8	Carbon Woven (MP_1), a=0.0, t=0.1	Carbon Woven, a=0.0, t=0.1
0.7	Carbon Woven (MP_2), a=45.0, t=0.1	Carbon Woven, a=45.0, t=0.1
0.6		
0.5		
0.4	Core (MP_3), a=0.0, t=0.5	Core, a=0.0, t=0.5
0.3		
0.2		E-Glass UD, a=15.0, t=0.13
0.1		E-Glass UD, a=15.0, t=0.13
0	E-Glass UD (MP_4), a=15.0, t=0.39	E-Glass UD, a=15.0, t=0.13
-0.1		E-Glass UD, a=15.0, t=0.13
-0.2		



FEA-Calculation Evaluation

- Custom-made report of the results
- Documentation in form of presentations
- Lay-up plans
- Production memos
- Workshops at costumers location



Part of the „Ingenieursgemeinschaft FMS“



Dr.-Ing. Daniela Feldten



Dr.-Ing. Christoph Möller



M. Sc. Jana Schumacher

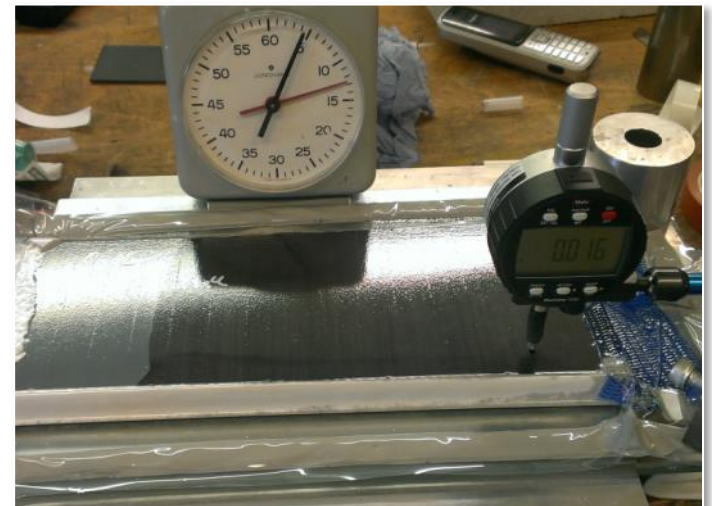
Shared address:

Egerländer Str. 6
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Germany

More activities of the „Ingenieurgemeinschaft FMS“

Production processes and prototype building:

- Material and production process testing
- Construction of samples and prototypes

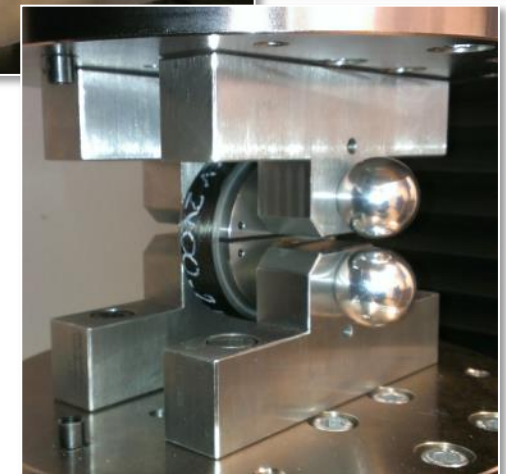
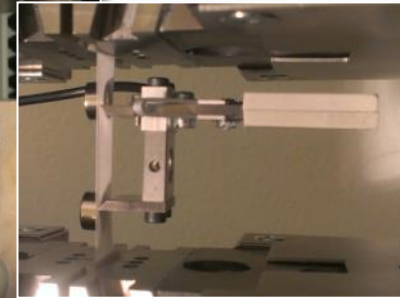
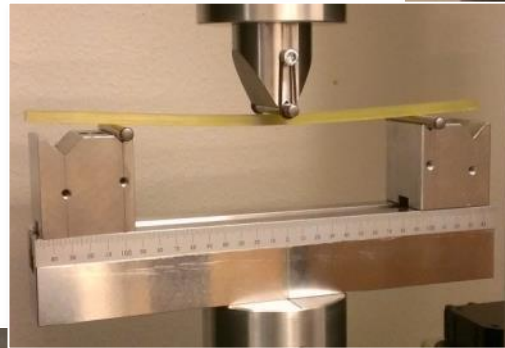
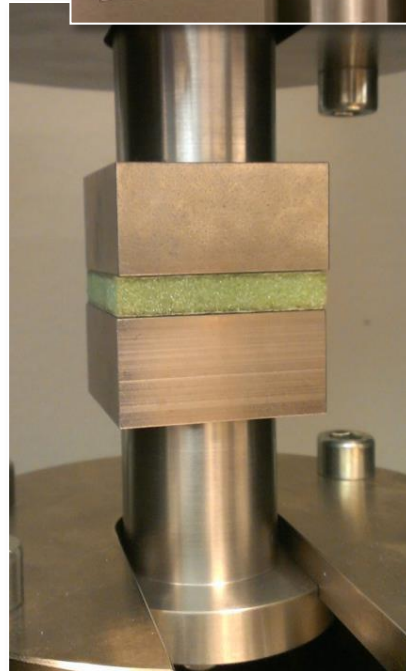


More activities of the „Ingenieursgemeinschaft FMS“

Material and component testing:

Zwick 1475

- $F_{\max} = \pm 110 \text{ kN}$
- $v_{\text{test}} = 0,001\text{--}1000 \text{ mm/min}$
- $s_{\text{test_max}} = 1750 \text{ mm}$
- Klasse 0,5 (DIN EN 7005 / 9513)



We're looking forward for your inquiry

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