

DRAPABILITY EVALUATION OF ADHESIVE-BONDED NCF BY MEANS OF LOW-FIDELITY SIMULATION

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Motivation

- Large scale production series for tailored non-crimp fabrics (NCF)
 - Layer bonding achieved by in-line feeding of adhesive binder
 - Adhesive web binder added in layered form
 - Omission of stitching process
- Need for drapability characterization for holistic process optimization
 - Draping mechanisms
 - Material characterization
 - Low-fidelity approaches required





Adhesive-bonded NCF



Thermoplastic grid to ensure integrity of layer

Backside of the UD-Layer without thermoplastic grid

Thermoplastic adhesive web between two layers

UD-Layer, Panex PX 35, 80g/m²

- Forming mechanisms:
 - Shearing and fibre slippage
 - Degree of slippage dependant on binder distribution
 - Rather high bending stiffness

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Material characterization



Cantilever test for bending stiffness



- Study of influence of:
 - Binder quantity
 - Consolidation pressure
 - stacking-sequence

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Continuum Model FEM-Simulation

- Material data fed to FE-model
- Comparison between membrane, pre-integrated shell and experiment
- Comparison of draw-in behavior



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Thank you for your attention!

Are there any questions?

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