Polymer Composites

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Adapted buckling support to investigate the compressive properties of long and thin specimen

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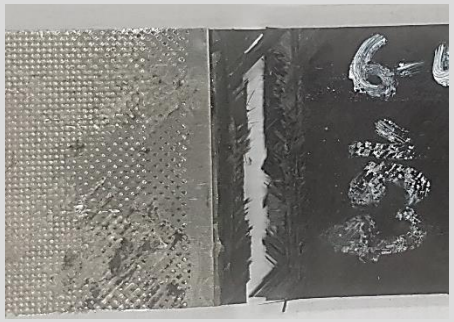
Conventional buckling support - ☹

Materials and specimen:
Brittle CFRP with different layer thicknesses
Specimens: 250 x 35 x 2,82 mm³
Layup: Quasi-isotropic

Failure with tabs:
- Delaminations at the edges of the specimen
- Delaminations starts at the tabs
- Edge delaminations grow with increased number of cycles

➢ Brittle failure near the tabs



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Failure without tabs:
- Delaminations at the edges of the specimen
- Delaminations starts near the wedges
- Edge delaminations grow with increased number of cycles

➢ Brittle failure in the load introduction area

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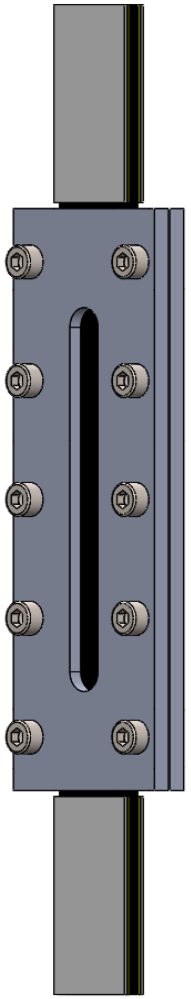
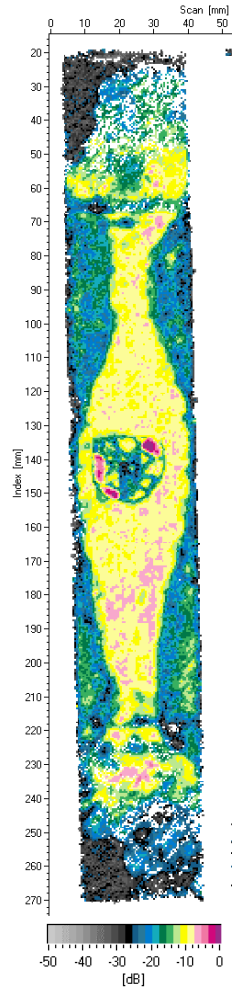
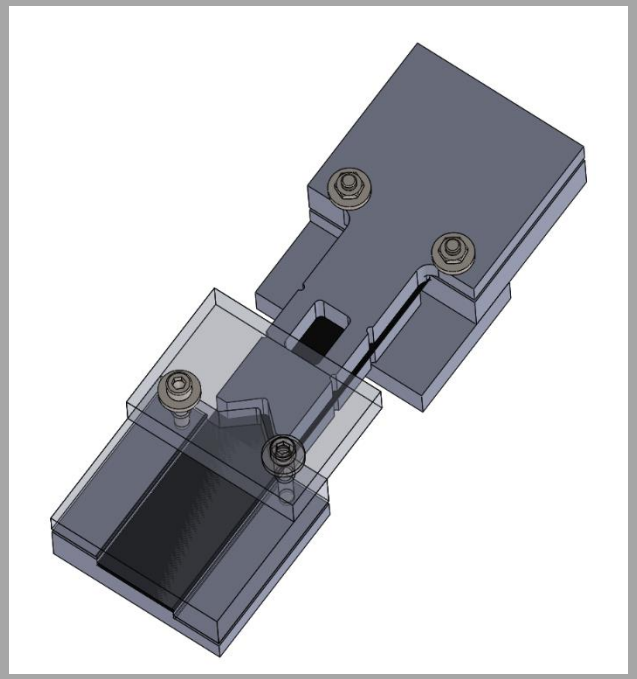


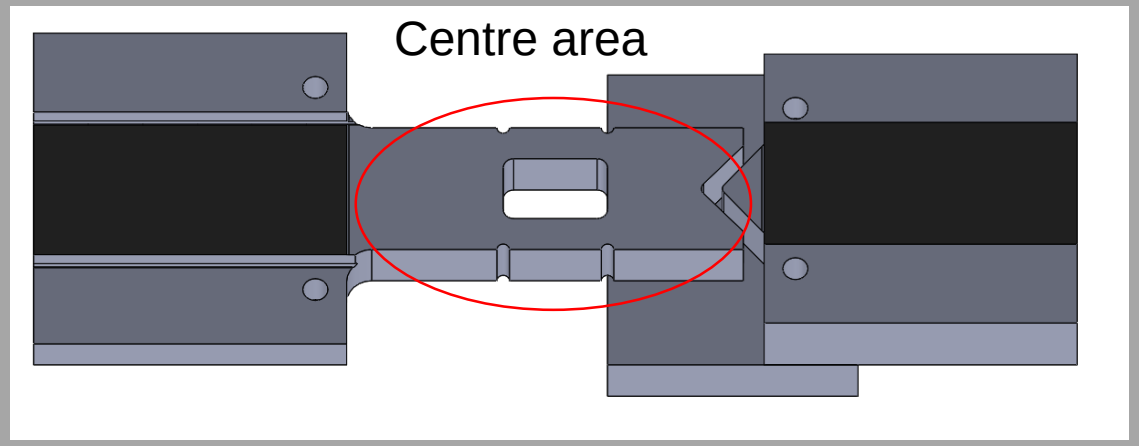


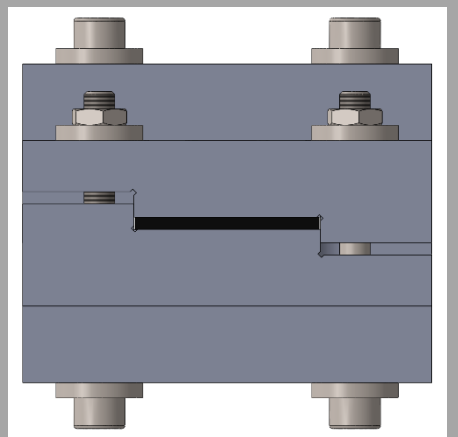
Adjusted buckling support (similar OHC, ASTM D6484)

Advantages of the adjusted buckling support:

- Mixed load introduction via end surfaces and shear stresses (black area, knurled surface)
- Free transversal contraction
- No stiffness jumps within the sample
- Buckling support over the entire length of the specimen (centre area 100 µm lower than the load introduction area)
- Cut-out for recording the surface temperature







Results: less influence of clamping effects

Results of the adjusted buckling support:

- Less edge delamination
- Less damage near the load introduction area
- Failure of the samples near the centre acc. standard

The adapted buckling support is a possibility to investigate the compressive properties of thin and long fiber composites