



# Compression after impact strength of non-conventional laminates

Thesis / Internship

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<b>Contact:</b>	Thore Roepman	Laminance Technologies	<a href="mailto:t.roepman@laminance.com">t.roepman@laminance.com</a>
	Tim Panis	NLR	<a href="mailto:tim.panis@nlr.nl">tim.panis@nlr.nl</a>

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The use of fiber-reinforced composites in the aerospace, automotive and maritime industries has seen a rapid increase over the past decades thanks to their high specific properties. At the same time, the potential of these materials has not been fully utilized due to the complexity in the analysis and the large design space of non-conventional fibre orientations.

In aerospace many shell structures are driven by compression after impact (CAI) requirements. Semi-analytical models to estimate the remaining strength have been developed for the conventional fibre orientations of 0/45/90 degrees. However, it is currently unknown whether these same models can be used to estimate the performance of laminates using non-conventional orientations.

## Objective

The objective of this work is to investigate the accuracy of existing CAI models for non-conventional laminates by comparing experimental results to approximations generated using existing models.

## Activities

To reach the objective the following activities are envisioned:

1. Research existing CAI models to extrapolate estimates to non-conventional laminates
2. Determine stacking sequences representative for non-conventional laminates
3. Manufacture and test 3 different non-conventional laminates for CAI strength
4. Conclude on the accuracy of existing models for non-conventional laminates

## Deliverables

The following deliverables are envisioned:

1. Test results of compression after impact strength for non-conventional laminates
2. A report on the accuracy of existing models for non-conventional laminates