

## MSc Graduation Assignment:

### Optimization of angled laminate production for wind turbine blades

Light-weight and high-strength fiber reinforced polymer composites are key structural materials in aviation, automotive, off-shore, wind energy, construction and biomedical sectors. Currently, composites face a pressing challenge: manufacturing induced residual stresses which result in defects in the product such as delamination. By eliminating manufacturing induced defects, product quality increases, thereby increasing performance reliability and efficiency.

#### Challenge:

Depending on the complex mould geometry of the angled composite laminate used in wind turbine blades and number of fiber reinforcement layers, the defect-free infusion and curing of the polyester resin is very difficult.

#### Aim:

The goal is to evaluate process-induced residual stresses and how these develop into interlaminar delaminations as a function of geometry, layup and processing conditions during vacuum infusion of relatively thick angled laminates made of glass/polyester.

#### Tasks:

- Literature survey on residual stresses in vacuum infusion process
- Designing a comprehensive experimental test procedure
- Building the test-setup
- Performing experiments with measuring the relevant data in-situ (e.g. temperature, strain)
- Conducting a quality check, i.e. microscopy analysis and final shape distortions.
- Analyzing and discussing the obtained results
- Writing a scientific report (MSc thesis)

#### Contact:

Dr.ir. Ismet Baran, email: [i.baran@utwente.nl](mailto:i.baran@utwente.nl), room: N-206

