



ADVANCING THERMOPLASTIC COMPOSITE TECHNOLOGIES

The ThermoPlastic composites Research Center (www.tprc.nl) is an open research center for fiber reinforced thermoplastic composites. TPRC performs research in co-operation with national and international partners, such as Fokker and Boeing, on the processing and performance of thermoplastic composites. TPRC would like to reinforce its research team with an intern or graduation student on the topic of:

DESIGN FOR OVERMOULDING

Overmoulding is a technology in which a thermoplastic composite laminate is thermoformed and subsequently injection overmoulded. This near-net-shape manufacturing process is well suited for automated large series production of complex 3D structures with excellent structural performance and a high level of function integration.



In particular, the process is suited to manufacture grid stiffened panels. Currently, no straightforward design rules have been formulated for such structures, specifying the optimum grid dimensions and density, subject to the process constraints imposed by the injection moulding process. This makes the design of such structures cumbersome, requiring extensive structural analysis of many different designs by e.g. FE analysis.

Tasks

The objective of the assignment is to optimise the design of injection overmoulded grid stiffened panels. The work can roughly be subdivided into the following tasks:

- Review of literature on smeared stiffener theories for global and local buckling analysis of grid stiffened panels
- Implementation of the homogenization methods in e.g. Matlab
- Formulation and implementation of design constraints for injection mouldings
- Analysis of the interface loads in grid stiffened flat and curved shells
- Formulation and implementation of optimization criteria
- Validation and demonstration of the developed optimisation strategy on an industrially relevant component.
- Discussion of the results in a written scientific report.

Practical information

The project is to be performed within a timeframe of nine months. Your office space is subject to current safety measures (TPRC, UT or at home), and you will receive a monthly trainee remuneration of 250 Euro.

Please contact Remko Akkerman (r.akkerman@utwente.nl) for additional information.