

MSc Assignment

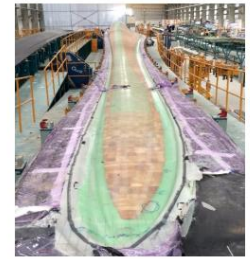
Adhesive characterization and bond design for shells and shearweb bonding in wind turbine blades

During manufacturing the pre-fabricated parts such as shells (X & O from Suzlon terminology) and shear web are bonded using epoxy based adhesive. These are then cured at an elevated temperature to make a complete blade. Application of large amount of paste (adhesive) on a large blade takes longer time and once adhesive components mixed together it starts to react. Therefore, it has a very small window of workable time, where application of adhesive and closing of blade must be performed. Beyond the workable time, the adhesive cured and cannot be squeeze (and flow). The application time, squeeze behaviour and after closing the curing of adhesive has profound effect on final product. Therefore it is important to optimize the processing window.



Approach

In order to understand processing boundaries, it is required to understand rheology and curing characteristics of the current adhesive system. The characterization techniques should be used to perform experiments and modelling. This will eventually be used to optimize the workable time and curing time. The master student will explore characterization of the adhesive at the University and Suzlon Energy limited-NL. A brief overview is shown in the figure.



Research group & Company

The **Surface Technology and Tribology** (STT) group will organize the research with a focus on surfaces and interfaces in an engineering context, as well as degradation mechanisms occurring at these surfaces and interfaces. The researcher will closely collaborate with the process department at **Suzlon Energy Limited** in Hengelo. Throughout these activities, Suzlon Energy Limited will provide specific knowledge and infrastructure to assist the researcher.

We offer:

- Work in a challenging, international and multidisciplinary environment.
- Work with all kinds of analysis tools (process monitoring sensors, rheometer, DSC)
- Financial support from Suzlon.

Tasks:

- Literature survey
- Designing experimental test procedures
- Manufacturing specimens and benchmarking
- Analyzing and discussing the obtained results
- Writing a scientific report

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