

MASTER THESIS

Adhesive bonding selection and validation for automotive applications

Research domain

Lightweight materials

Topic

Context: Automotive OEM's, suppliers as well as companies in the TBI-sector (trucks, buses and industrial vehicles) experience the trend to switch to multimaterial constructions, in which the material is selected for each component to optimise performance, weight and cost. On the other hand, this trend creates new challenges towards the joining of different materials and open opportunities for the application of new joining technologies. Within this context, adhesive bonding is gaining popularity as joining technique for multimaterial constructions, also as structural joint. At the same time, a successful application of adhesive bonding requires in-depth knowledge within the complete product development process, starting from requirements identification up to introduction into production.

Aim: A collective research project will be initiated at Flanders' DRIVE with the objective to create guidelines that the companies can use for the successful replacement of conventional joining techniques with adhesive bonding, or for the introduction of adhesive bonding in new products. These guidelines will deal with all steps of product development: system requirements analysis, joint design, test and simulation, validation at application level, adaption and qualification of the production process. The guidelines, workflows, and procedures are verified and validated by means of specific industrial applications provided by the industrial partners of the project. The scope of the master thesis is the identification of the optimal adhesive system (from surface treatment up to curing method) for one or more of the defined industrial applications. To this aim, potential adhesive bonding candidates will be selected using existing adhesive selectors, whose evaluation and comparison is also part of the thesis objective, and through contact and discussion with adhesive suppliers. Afterwards, the selected adhesives and surface treatments will be tested on sample level. The test set-up and configuration will be defined based on the product and process requirements for the applications.

Profile

Master of (Applied) Electromechanical Engineering

Term

Q3 2010 / Q1 2011

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