

Bachelor's Thesis, Term project, Master's Thesis

Characterization of Sheet Molding Compound (SMC) materials for automotive applications.

Sheet Molding Compound (SMC) with carbon fibers is a type of composites very attractive for the automotive industry. The material is made of carbon fibers cut into chips (typical length of 25 mm) and randomly dispersed in a resin system. SMC can be processed into complex components in a short period of time by compression molding. This allows engineers to readily use the existing parts design knowhow and achieve lighter components with higher strength. Automakers have already adopted SMC for automotive doors, inner panels and structural components. One of the greatest advantages of SMC is that fibers remaining from other processes can be chopped to the necessary length and recycled into a new SMC material.

In a current project we aim at building new parts with SMC obtained from the scrap of the winding process. Due to logistical difficulties, the material obtained from winding by our project partner in Argentina has to be replicated here. In order to evaluate the transferability of the results obtained from tests performed here, tests have to be performed to characterize the material and compare the results to the results obtained for the Argentinian material. To this purpose, suitable tests such as tensile testing and squeeze flow tests have to be identified, performed and the results shall be directly compared.



Figure 1: Rear door frame made of SMC[Toyota]



Figure 2: Lightweight wheel rims[Blackwave]

Research Focus of the Thesis

- Literature research on the SMC material and material testing for SMC
- Selection and design of experiments for the necessary tests
- Measurement and evaluation of relevant properties
- Assessment of the comparison of the Argentinian and our material
- Documentation

Requirements

- Structured and precise way of working
- Experience with characterization methods is an advantage, but not a requirement

Starting date: Now

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