

OPTIMISATION OF PROPERTIES AND DIMENSIONAL STABILITY OF COMPOSITES BY CONTROLLED FIBRE PLACEMENT

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Manufacturing of multi-material composite structures using integrated processing is a novel concept that offers the unique possibility to combine different materials in a rational and cost effective way. The structural advantages of aligned, continuous fibre materials can be combined with the geometrical advantages offered by net shape flow based processes, such as injection and compression moulding. Use of the more costly continuous fibre materials is limited and these are efficiently used, thus minimising material cost. The potential of this novel concept is generating considerable interest, especially from the automotive industry.

However, the labour, time and expense needed for experimental optimisation of this process and resulting material behaviour, will be very high due to the wide range of possible process and material parameters. Thus, the ability to simulate and optimise this process, based on a system of models, is therefore very desirable.

The aim of this research project is to develop models, that based on processing and material parameters, can predict potential mechanical performance, part cost and weight, of structures manufactured by using integrated processing. Based on those models, optimisation of performance / cost and performance / weight ratios will be carried out. Such an optimisation is regarded to be essential for successful large-scale industrial implementation.