Effect of Process Issues on Material Properties in RTM

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ABSTRACT

Resin Transfer Molding (RTM) is used to manufacture fiber reinforced polymeric composite parts. A thermoset resin is injected into a mold cavity filled with a reinforcing porous fabric preform. After complete filling and resin cure, composite part is taken out of the mold. Both resin flow and mechanical properties are significantly affected by improper selection, design and preparation of material and process parameters. In this work, several process issues and their effects on resin flow and mechanical properties were studied: (i) inadequate compaction and high resin pressure that cause wash-out (ii) bending of mold parts causing nonuniform thickness and fiber volume fraction and (iii) resin life. Mechanical strength was measured at different sections of manufactured composite parts made of plain weave e-glass fabric and polyester resin. The results are very indicative of a significant effect of these process issues on the final mechanical properties of composite parts.