

# **An Investigation Into The Effects Of Fabric Architecture On The Processing And Properties Of Fibre Reinforced Composites Produced By RTM**

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The use of resin transfer moulding as an economic and efficient means of producing high performance fibre reinforced composites is critically limited by the permeability of the fabrics employed. Commercial fabrics are available where the architecture of their reinforcement is designed to cluster the fibres, giving higher permeabilities than conventional fabrics. This has been shown to improve processing times but there is evidence that such clustering is detrimental to the mechanical performance of the resulting composite materials.

The objective of this work was to relate variations in permeability and mechanical performance to differences in microstructure. This was achieved by producing carbon/epoxy plates of differing weave styles by RTM in a transparent mould. The progress of the resin was recorded on video during injection, thus allowing the permeabilities of the fabrics to be calculated.

The plates were subsequently sectioned for image analysis and mechanical testing to CRAG standards. Relationships were sought between measured permeabilities and finished microstructures using a Quantimet 570 automatic image analyser. It has been shown that variabilities in mechanical properties can be related to observed differences in microstructure.

## **CONCLUSIONS**

It has been shown that resin transfer moulding can produce high quality composites. If a woven fabric is positioned between the mould halves and the resin is injected through the fabric, the resin will flow through the fabric and fill the mould. The resin will flow through the fabric and fill the mould. The resin will flow through the fabric and fill the mould.