

VISUALIZATION AND SIMULATION OF RESIN FLOW BEHAVIOR OF VARTM PARTS

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Dry spot is one of the most critical defects in composite parts fabricated by liquid composite molding (LCM) processes such as vacuum assisted resin transfer molding (VaRTM) and resin transfer molding (RTM). According to Darcy's law, lower preform permeability, lower pressure difference and higher resin viscosity are typical causes for insufficient resin infiltration. In addition to those main factors, prevention of undesirable resin flow pattern induced by race tracking is also important to eliminate air entrapment condition.

In this study, resin flow behavior was closely investigated for rib-type parts both experimentally and analytically. Resin flow was visualized using transparent mold and race tracking was observed not only along the edges of the preform but also in small gap between mold and preform in corner areas. The resin flow behavior was reproduced in numerical simulation by appropriate modelling of the race tracking condition.