

Resin Film Infusion Processing of Cyclic PBT Composites: A Fundamental Study

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ABSTRACT

The processes involved in the isothermal consolidation of glass fibre reinforced Polybutylene Terephthalate (PBT) have been studied. The main objective is to investigate the effects of process parameters on the quality of thermoplastic composite parts manufactured by the resin film infusion process. A numerical model has been developed to simulate and analyse the mechanisms dealing with heat transfer, resin flow, polymerisation and consolidation of Cyclic Polybutylene Terephthalate (CBT) glass fibre composites during resin film infusion processing. The effect of processing conditions on consolidation and through thickness flow of the material was studied experimentally, using a circular flat plate compression mould, set up on a hydraulic Instron machine. This analysis leads to the prediction of temperature distribution through the thickness of the laminate and a consolidation model. This overall aim of this research is to outline the most effective processing window for the resin-film infusion of thick thermoplastic composite parts, in the manufacture of large structures such as wind turbine blades.