

Evaluation of the Vibration Assisted RTM technique in the production of real parts

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ABSTRACT

To promote the intermixing between micro and macro flows using dynamic means few ideas have been proposed such as audio frequency flow vibrations applied to the injection pressure and the VIARTM technique where the mould and the preform are vibrated together during the filling process by applying external mechanical vibrations to the mould. Hence, air traps are eliminated as well as wetting improves considerable. For the evaluation of the VIARTM technique and the identification of the flow phenomena a new improved test rig has been developed to perform a new round of tests with the aim to explore the repeatability of the process and the dependence of the performance on the frequency that the mould is vibrated. Parameters that could affect the process and need to be studied are the frequency, the magnitude and the direction of the external vibrations with respect to the cavity shape. At the present study the mechanical vibrations are generated using a conventional AC motor coupled with a cam mechanism where the frequency of the vibrations may vary from 1 to 30 Hz but the magnitude of the oscillations was kept constant at 2 mm.

Results indicated that there is an obvious change in the flow of the resin through the fibres indicating that vibrations contribute towards the increase of the capillary pressure and as a result effective resin impregnation through the fibres is attained. Further studies will be presented to the conference with respect to the production of a real composite part.