COMPARISON OF CARBON FIBER AND EPOXY RESIN COMPOSITES PROCESSED BY RTM AND COMPRESSION

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Abstract: Composites are considered a class of synergic material by using two or more different constituents in order to obtain a final product, in which properties are impossible to obtain using only one of components. The choice of processing type is one of main factors in a project development, aiming in an appropriate impregnation, ease and speed of processing and analysis of parameters to accomplish it. This work has been developed for comparative purposes in relation to the processing of carbon fiber reinforcement composite wrapped by an epoxy resin matrix processed by Resin Transfer Moulding (RTM) and Compression Moulding (CM) techniques. Before processing them, it was needed the kinetic and rheological tests by TGA, dual scan and isothermal DSC and Brooksfield viscosimetry to determine the ideal conditions for processing. After their manufacturing, specimens of each technique were submitted to mechanical tests by Interlaminar Shear Stress (ILSS) and after the failure, it was aimed the quantitably and qualitatively analysis, through the optical microscopy analysis, conditions that have led to quality of each processing. By results analysis of the mechanical test, CM specimens presented a value of shear stress of 10 MPa less than RTM results and, through optical microscopy it was observed the presence of macro-porosity, which induced the connection of delamination, causing the speeding up of crack propagation. This failure may have occurred due to the manual impregnation in the CM process, inducing a heterogeneous impregnation. On other hand, RTM specimens presented no macro-porosity in their structure, characterizing an appropriate impregnation of the resin through the fiber. RTM resulted in higher values of shear stress and was suitable for primary structural application.

Keywords: Composites, RTM, Compression Moulding, ILSS