

INTERLAMINAR SHEAR STRENGTH OF COMPOSITE MANUFACTURED BY RESIN TRANSFER MOLDING

W. F. de Amorim Jr ^{(1)*}, G. Q. Chaves⁽²⁾, V. M. de A. Calado⁽³⁾, F. L. Bastian⁽¹⁾

(1) PEMM/COPPE/Universidade Federal do Rio de Janeiro, email: engenheiromec@yahoo.com.br

(2) Centro Tecnológico do Exército, Av. das Américas, 28705, Guaratiba, Rio de Janeiro, RJ.

(3) EQ/Universidade Federal do Rio de Janeiro - Ilha do Fundão -Rio de Janeiro,RJ.

* Corresponding author.

Abstract – The objective of this work is an experimental study of the fibre volume fraction influence in the interlaminar shear strength of composites manufactured by Resin Transfer Molding.(RTM). By the experiments, it can be concluded that: the fibre volume fraction of the composite manufactured by RTM controls the mold filling time and composite porosity. The preform with 30 layers presented no variation in Interlaminar Shear Strength, superior quality processing and minor filling time than preform with 32 layers and greater filling time than preform with 28 layers.

The objective of this work is the study of the fiber volumetric fraction variation influence in the composite Interlaminar Shear Strength manufactured by Resin Transfer Molding. Three different preforms were manufactured with vinylester resin and 32, 30 and 28 layers of fiber glass reinforcements, respectively. An experimental RTM set-up was proposed and installed. Various techniques were used in order to analyze the composite processing: digital images analyses, density and Interlaminar Shear Strength calculation by short-beam three-point bend test. The ILSS test specimens were removed along the composite plate from the edge up to center.

The composite with 30 layers presented shorter filling time than the 32 layers preform and greater filling time than 28 layers perform. The 28 and 32 layers composites density showed a reduction into the center of the plate. However the 30 layers composite presented no variation in the density. The 28 and 32 layers composites resin quantity showed a reduction into the center of the plate. However the 30 layers composite presented no variation in resin quantity. Figure 1 and Figure 2 present the composite Interlaminar Shear Strength (ILSS) test result and the ILSS especimes, respectively. The 28 and 32 layers composites Interlaminar Shear Strength dropped into the direction of the center of the plate, points 1 (plate edge) up to point 4 (center of the plate). However the 30 layers composite presented no variation in Interlaminar Shear Strength. The layers number variation controls the resin quantity injected in the preform, the mold filling time and the composite quality. The composite with 30 layers presented no variation in Interlaminar Shear Strength. The composite with 30 layers presented superior quality processing and minor filling time than the 32 layers preform and greater filling time than 28 layers preform.

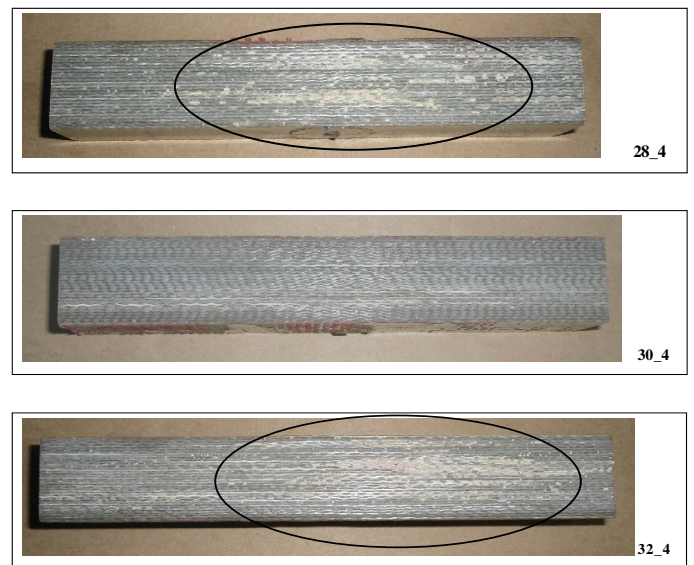
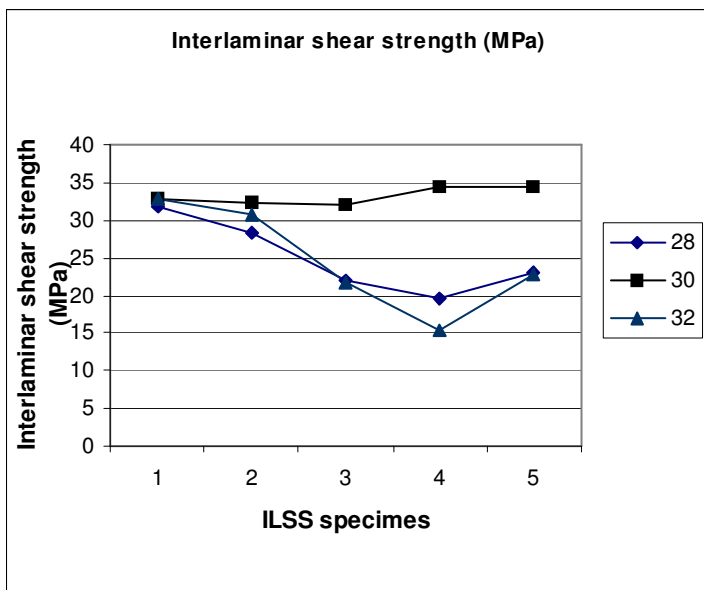


Figure 1: Interlaminar shear strength composite plate variation.

Figure 2: ILSS especimes.

[1] N. R. L Pearce, F. J Guild. and J Summerscales, Composites Part A29A, 1998.