

Characterization of Carbon/Polyamide 6,6 (C/PA66) Composite Material for Dry and Wet Conditions

Authors : Tariq Bashir, Muhammad Waseem Tahir, Ulf Stigh, Behnaz Baghaie, Mikael Skrifvars

Abstract : Absorption of moisture may cause many problems in a composite material, such as delamination, degradation of the strength and increase in the weight. For small coupons, the increase in weight may be negligible, however, for large structures increase in weight due to moisture absorption may be quite significant. Polyamides (PA6, PA66) absorb more moisture as compared to other thermoplastics. There are many parameters which affect the moisture absorption of the composite material for example temperature, pressure, type of matrix and fibers, thickness of the material and relative humidity (RH) etc. So, it is utmost important to investigate the impact of moisture on PA66 based composites which can be done by characterizing the mechanical properties of composite materials both for dry and wet conditions. In this study, laminates of C/PA66 composite are manufactured by first heating the commingled material in conventional oven at a temperature of 220 °C followed by pressing in a manual hot press for 20 minutes with preheated platen at 220 °C. To observe the moisture absorption of the composite, coupons of the material were placed in a climate chamber at five different conditions 0, 25, 50, 75 and 100% RH for 24 hours. Five specimens were used for each condition. These coupons were weighed before placing in the climate chamber and just after removing from the chamber to observe the moisture absorption of the material. The mechanical characterization such as tensile strength, flexural modulus, impact strength and DMTA of C/PA66 material are performed at 0, 50 and 100 % RH. The work is going on for the testing of the material and results will be presented in full paper.

Keywords : Carbon/Polyamide 66 composites, structural composites, mechanical characterizations, wet and dry conditions

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020