

Investigating the Fiber Content, Fiber Length, and Curing Characteristics of 3D Printed Recycled Carbon Fiber

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Abstract : As composite materials continue to gain popularity in the aerospace industry; large airframe sections made out of composite materials are becoming the standard for aerospace manufacturers. However, the heavy utilization of these composite materials also increases the importance of the recycling of these composite materials. A team of Purdue University School of Aviation and Transportation Technology (SATT) faculty and students have partnered to investigate the characteristics of 3D printed recycled carbon fiber. A prototype of a 3D printed recycled carbon fiber part was provided by an industry partner and different sections of the prototype were used to create specimens. A furnace was utilized in order to remove the polymer from the specimens and the specimen's fiber content and fiber length was calculated from the remaining fibers. A differential scanning calorimetry (DSC) and dynamic mechanical analysis (DMA) test was also conducted on the 3D printed recycled carbon fiber prototype in order to determine the prototype's degree of cure at different locations. The data collected from this study provided valuable information in the process improvement and understanding of 3D printed recycled carbon fiber.

Keywords : 3D printed, carbon fiber, fiber content, recycling

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