Experimental Study of 3D Printing Density Effects on the Mechanical Properties of the Carbon-Fiber and Polylactic Acid Specimens

Abstract - Two 3D printed materials (Polylactic Acid and Carbon fiber) with variable printing density have been investigated due to their practical uses in engineering utilization. The effect of printing density composites was studied by the tensile test. The used materials stress-strain curves were analyzed to find modulus of elasticity and the ultimate tensile strength of the mentioned materials. The results manifested that carbon fiber has the highest strength-weight ratio. On the other hand, the carbon fiber showed more ductility than the Polylactic Acid. The results of this work will be aiding the researchers or engineering students to decide which material is suitable for 3D printing applications.

Keywords: 3D printing, Polylactic Acid, Carbon fiber reinforced polymer, Mechanical property.