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Parameter Influence on the Tensile Properties of FDM Printed PLA/ Coconut Wood

R. Kumaresan*[1]*, *J. Kananathan*[2], *M. Samykano*[2]*, *K. Kadirgama*[3] *and* ***Avinash M. Badadhe[4]

[1]Faculty of Mechanical & Automotive Engineering Technology, Universiti Malaysia Pahang,26600 Pekan, Pahang, Malaysia.

[2]College of Engineering, Universiti Malaysia Pahang, 26300 Gambang, Pahang, Malaysia.

[3]Faculty of Mechanical & Automotive Engineering Technology, Universiti Malaysia Pahang,26600 Pekan, Pahang, Malaysia.

[4]JSPM's Rajarshi Shahu College of Engineering, Tathawade Pune Maharashtra India.

**Corresponding author:* rajan.m.kumaresan@gmail.com, Mahendran@ump.edu.my

Abstract

Due to its adaptability in allowing for individualized production, 3D printing technology has quickly become a viable option in the fabrication of parts. Recent years have seen a plethora of research devoted to enhancing the quality of 3D printed components. However, the performance of the printed part depends heavily on the correct selection of process parameters for Fused deposition modeling (FDM), making it a significant task. Therefore, studying how different process parameters affect the final product's quality characteristics is essential. So, it's helpful if a good option for customizing the mechanical properties of 3D-printed components. This study aims to determine how factors affect the tensile properties of a composite made from PLA and coconut wood. The material in the form of a filament, such as thermoplastic polymers, was used. Coconut wood has been prized for centuries for its durability, beauty, and ecological friendliness. This research aims to create and compare the tensile properties of specimens featuring different infill patterns (concentric, cubic, gyroid, and triangle) and infill percentages (25%, 50%, 75%). Ultimate tensile strength of 37.21 MPa and elastic modulus of 1.12 GPa were achieved with the concentric infill pattern at 75% infill

Keywords: Fused deposition modeling; Tensile properties; PLA; Coconut wood; Infill density.