

Infill parameters influence over strength of 3D printed samples by Fused Filament Fabrication

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Abstract. Fused Filament Fabrication (FFF) is an extrusion-based technology that uses molten thermoplastic material to build 3D models additively. Each part is built in a layer-wise fashion and is composed of walls, bottom/top layers, and internal structure. Regarding the internal structure, also known as infill, many studies adopted 100 percent infill density for the tested samples, which logically, is the strongest. However, there are still other infill parameters that were not thoroughly studied. Thus, this research aimed to investigate the influence of nine infill parameters and two travel parameters over the tensile properties of 3D printed samples. The experiment was designed using a mixed Taguchi L36 matrix. All samples were printed with gyroid infill without bottom and top layers using a polylactic-acid-based (PLA) material. The results show that the strength of samples can be increased by multiplying the infill line along with an increased overlap between the infill line and the inner wall.

Keywords: Fused Filament Fabrication, infill, infill parameters, tensile strength
