

## Investigation of the Effects of Processing Parameters on Pla Based 3D Printed Tensile Samples

**Authors :** Saifullah Karimullah

**Abstract :** Additive manufacturing techniques are becoming more common with the latest technological advancements. It is composed to bring a revolution in the way products are designed, planned, manufactured, and distributed to end users. Fused deposition modeling (FDM) based 3D printing is one of those promising aspects that have revolutionized the prototyping processes. The purpose of this design and study project is to design a customized laboratory-scale FDM-based 3D printer from locally available sources. The primary goal is to design and fabricate the FDM-based 3D printer. After the fabrication, a tensile test specimen would be designed in Solid Works or [Creo computer-aided design (CAD)] software. A .stl file is generated of the tensile test specimen through slicing software and the G-codes are inserted via a computer for the test specimen to be printed. Different parameters were under studies like printing speed, layer thickness and infill density of the printed object. Some parameters were kept constant such as temperature, extrusion rate, raster orientation etc. Different tensile test specimens were printed for a different sets of parameters of the FDM-based 3d printer. The tensile test specimen were subjected to tensile tests using a universal testing machine (UTM). Design Expert software has been used for analyses, So Different results were obtained from the different tensile test specimens. The best, average and worst specimen were also observed under a compound microscope to investigate the layer bonding in between.

**Keywords :** additive manufacturing techniques, 3D printing, CAD software, UTM machine

**Conference Title :** ICAME 2022 : International Conference on Aerodynamics and Mechanical Engineering

**Conference Location :** Barcelona, Spain

**Conference Dates :** December 15-16, 2022