ABSTRACT

FDM optimization is important role in controlling the quality of the resulting product such as surface roughness and product strength. The method used in this study is the Taguchi Method, a statistical method that influences the process of reduction of processes using parameters and levels. The purpose of this study was to find the optimum point of each parameter layer height, establish plate temperature, print speed, and print temperature. Where each of these parameters has several different levels. High layer parameters with levels of 0,1 mm, 0,2 mm, and 0,3 mm. The second parameter is to build a plate temperature of 95ºC, 107ºC, and 120ºC. The subsequent parameters print speeds of 30 mm/s, 60 mm/s, and 100 mm/s. While to print the temperature with the selected level around 230º C, 240ºC, and 250ºC. From these parameters, there are nine combinations with three repetitions. The design of this specimen is based on ASTM D638 type V standard and passes using HIPS material. The specimens that have been carried out are then tested for tensile and roughness. The test results revealed the optimum point obtained for surface roughness are 0,1 mm height, 120˚C build plate temperature, print speed 30 mm/s, and printing temperature 250˚C. And the optimum point for tensile strength is 0,1 mm height layer, build plate temperature 107˚C, print speed 30 mm/s, and printing temperature at 230˚C.

Keywords: Fused Deposition Modeling, HIPS, Optimization, Tensile Strength, Surface Roughness.