Optimization of CNC Laser Cutting on Non-Metal Materials

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ABSTRACT

The aims of this study were: (1) to analyze the use of various machining parameters in the laser cutting process, especially cutting speed and power, (2) to identify the surface roughness of the cutting results of CNC laser cutting machines, and (3) to analyze the level of precision of the dimensions of the cutting results in the laser cutting process. CNC.
This study used an experimental method with Simplex Centroid Design and multiresponse plot optimization techniques to optimize the level setting power (30 A, 40 A, and 50 A) and cutting speed (5, 8, and 11 mm/sec) of the Zaiku laser CNC machine. CNC LS 3020 with acrylic material with a thickness of 2 mm, 3 mm and 4 mm. With three variations of cutting speed, three variations of current, and three variations of specimen thickness, the experimental design resulted in 27 treatment variations. Research instruments used: digital caliper and digital microscope. Data analysis used descriptive comparative analysis.
The results showed: (1) parameters for the cutting process with cutting speeds of 5 to 11 m/sec, and current parameters between 30 to 50 amperes; (2) The surface of the cutting result is still relatively rough with the presence of strips of 0.2 mm; (3) the dimensions of the cutting result are larger than the dimensions of the specimen image which should be at a deviation value between 0.4 to 0.7 mm, and there is no effect of cutting speed and current on the accuracy of the cutting results if the size tolerance used is 0.05 mm or 0.1mm.

Kata Kunci: *machine, cutting, laser, CNC, non-conventional*