
COMPREHENSIVE ANALYSIS OF SELECTIVE LASER SINTERING (SLS) IN PROTOTYPING: MATERIAL SELECTION, TENSILE STRENGTH, HARDNESS AND DENSIMETER EVALUATION

Vivek Deshmukh¹, Sumit. S. Mangave², Sudesh. D. Mane³, Prasad. A. Pati⁴, Aditya. S. Patil⁵

¹Department of Mechanical Engineering, MITAOE, Pune, India

^{2,3,4,5}Sharad Institute of Technology, Yadrav, Maharashtra, India

Abstract

Rapid prototyping has surfaced as a conducting technology in recent moments, permitting the immediate metamorphosis of computer-aided design files into operative prototypes. This invention significantly reduces the supereminent time for producing physical prototypes pivotal for design verification and functional analysis. The quality of RP prototypes relies heavily on parameters like door cure depth, subcaste consistency, exposure, ray power, temperature, and door distance. This study employs the Taguchi experimental design fashion to optimize these process parameters, aiming to understand their influence on part characteristics. Specifically, the exploration focuses on three crucial parameters: ray power, temperature, and part orientation. An orthogonal array of trials is designed using the Taguchi system, minimizing the number of experimental runs. The statistical analysis tools similar as analysis of variance (ANOVA) are applied to assess the impact of these parameters on dimensional delicacy and micro-hardness of SLS-produced corridor.

Received:26.4.2024; Accepted: 30.06.2024

Keywords: Rapid prototyping, additive manufacturing, selective laser sintering, Taguchi

*Corresponding author name and email: Vivek Deshmukh, vndeshmukh@mitaoe.ac.in

How to cite this article: Vivek Deshmukh, Sumit. S. Mangav, Sudesh. D. Mane, Prasad. A. Pati, Aditya. S. Patil, Comprehensive Analysis of Selective Laser Sintering (SLS) in Prototyping: Material Selection, Tensile Strength, Hardness and Densimeter Evaluation, 1, 2024,9-20

Published Online: 2024