**Optimization of Process Parameters for Fused Deposition Modelling (FDM) Process**

**Dr. Md. Aleem Pasha**

Chaitanya Bharathi Institute of Technology, Hyderabad, India

*aleemphd2013@gmail.com*

**Dr. P. Ravinder reddy**

Chaitanya Bharathi Institute of Technology, Hyderabad, India

*Reddy.prr@gmail.com*

**ABSTRACT**

Rapid prototyping (RP) is a group of techniques used to quickly fabricate a scale of model of a physical part or assembly using computer-aided design (CAD). Construction is carried out using 3D printing or additive layer manufacturing. Out of all the RP techniques, fused Deposition Modelling (FDM) (also referred as 3D printing) is widely used to fabricate prototypes. Now a day’s FDM process is not only restricted to build models but also it is used to fabricate several functionable parts. This process has found to serve various applications in medical, pharmaceutical and other major industries. So, there is need to have a good surface finish (which in turn enhances few mechanical properties) and minimum part building time.

Surface finish and build time of the part depends on several process parameters. In this paper, experiments were conducted using layer thickness, print speed, travel speed, extrusion temperature as input variable parameters for evaluating surface finish, build time and to study mechanical properties. The raw material used is Poly Lactic Acid (PLA). Design of experimentation is planned as per Taguchi L9 orthogonal array [1-2]. The optimization technique used is Taguchi algorithm [1-2].The optimum parameters for surface finish, build time, tensile strength and bending strength are found.

*Keywords: Fused deposition modeling, PLA, Taguchi DOE.*

**References**

[1] Anitha, R., Arunachalam, S., Radhakrishnan, P , Critical parameters influencing the quality of prototypes in fused deposition modeling, Journal of materials processing technology. 2001, 118, 385-388.

[2] Thrimurthulu, K., Pulak M., Pandey, Venkata Reddy,N, Optimum part deposition orientation in fused deposition modelling, International Journal of Machine Tools & Manufacture. 2004, 44, 585–594.