



## **A novel method in the production and Optimization of Process Parameters in turning LM6 Aluminium alloy with Borosilicate Reinforcement**

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**Abstract:** This paper provides simple means for minimization of Surface Roughness in turning operation for Aluminium based Metal Matrix Composite (MMC) by taguchi method of optimization. The composite was produced by stir casting process using borosilicate powder as reinforcement and LM6 as the Matrix phase. Then turning operation was carried out using a CNC machine to find the optimal parameters that would yield a minimal surface roughness value. Microstructure analysis of the samples proved that there was homogeneous dispersion of the reinforced powder as that of LM6 alloy. The rods used for this turning operation are of 0% and 10% reinforcement of borosilicate powder respectively. Taguchi optimization method was used for the optimization of the surface roughness. Taguchi orthogonal array (L9) was used for the machining purpose. As per the orthogonal array, three levels with four parameters were chosen and according to which nine experiments were carried out. The four parameters used are Speed, Feed Rate, Depth of cut and tool nose radius. The effect of these parameters and their interactions were studied by creating contour plots using Design Expert Software. The optimum parameters are obtained for maintaining minimum roughness value. . The performance characteristics were studied using the Analysis of Variance (ANOVA) and Signal-Noise ratios.  
**Keywords.** :Metal Matrix Composite; Borosilicate, LM6, Taguchi, ANOVA, Signal - Noise ratios.

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