

## **Optimization of Surface Roughness and Material Removal Rate in CNC Turning of AA6063 Using Taguchi and ANOVA**

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### **ABSTRACT**

In today's customer oriented market scenario organizations have to maintain both quality and production rate. In CNC turning operation, cutting parameters plays a vital role in obtaining the required surface finish. However, optimizing only the surface finish of the specimen will affect the metal removal rate. AA6063 is the most widely used aluminum alloys for a variety of applications. Optimizing the metal cutting parameters and balancing both surface finish and MRR is a crucial problem in turning operation.

This paper addresses the optimization of cutting parameters with minimization of surface roughness and maximization of MRR as objective, in CNC turning of AA 6063 with carbide tipped tool. Experiments were conducted based on the Taguchi design of experiments (DOE) with L9 orthogonal array. S/N ratio and Analysis of Variance (ANOVA) are used to find the optimum combinations for MRR and surface roughness. Three levels have been considered for each cutting parameter and their effect on the objective functions have been studied. Experimental investigation revealed that, cutting speed is the most influencing parameter on surface roughness, whereas depth of cut has major impact on MRR.

*Keywords: Surface Roughness, MRR, Taguchi, ANOVA.*