Analysis and Optimization of Cutting Parameters in Dry Turning of AISI 304 Stainless Steel by Using Taguchi and ANOVA Method

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ABSTRACT

The most common method to manufacture any part involves removal of excess material by machining process using a cutting tool. Turning operation is one of those machining process which aims at removing excess material from a cylindrical or non-cylindrical workpieces. In any machining process, it is most important to determine the optimal settings of control factors aiming at increase in production, reduction of production costs and achieving the desired product quality.

This paper presents an optimization method of the cutting parameters (cutting speed, depth of cut and feed) in rough turning of AISI 304 stainless steel to achieve Maximum Metal Removal Rate (MRR). The DOE was carried out according to Taguchi's Method. The experiment layout was designed based on Taguchi's L9 (3*3*3) Orthogonal Array Technique and analysis of S/N ratio was performed to identify the effect of the cutting parameters on the response variables. In this study Taguchi's method is used to optimize cutting parameters for material removal rate (MRR), main effect plots are generated and analyzed to find out relationship between cutting parameters and variables using ANOVA analysis. ANOVA analysis provides us the contribution percentage of each control factor upon the output i.e. MRR.

Keywords: Turning process, AISI 304 stainless steel, MRR, DOE, Taguchi, ANOVA method.