



Effect of lead variation on surface roughness and optimization of cutting parameters in turning operation for Brass alloys

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Abstract: Surface roughness of Brass alloys is investigated practically by varying the machining parameters such as spindle speed, feed rate and depth of cut. The tool used is a carbide insert which is widely used in industry and easily available. The investigation was done under dry cutting conditions. This study involves the optimization of a combination of spindle speed, feed rate and depth of cut to have a best surface finish which will lead to reduced cost, less manufacturing time and better quality. The design of experiments was done using Taguchi method and L9 array was used. The Analysis of Variance (ANOVA) and Signal-to-Noise ratio were used to study the performance characteristics in turning operation. The analysis shows that the increase in amount of lead in the alloy leads to decrease in the surface roughness after turning. The analysis also shows that spindle speed has the minimum contribution towards Ra (surface roughness) for all three alloys under study and depth of cut has highest contribution towards Ra for all the alloys. There are two purposes of this research, first was to find out a particular combination of cutting parameters in turning operation to have the best surface roughness and second was to identify the effect of amount of lead in brass alloy on the characteristics of surface roughness.

Keywords: Surface roughness, ANOVA, Turning, Cutting parameters, Taguchi method.