



Parametric Optimization of High Speed CNC Turning Operation for Improving the Surface Quality of (AA6063-T6) Aluminium Alloy Components

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Abstract: This paper elucidates the effect of high speed CNC turning parameters cutting speed, feed rate and depth of cut on the surface quality of AA6063-T6 aluminium alloy. The experiments are conducted based on the three level full factorial design (3^3) and surface finish was tested on the finished components machined by high speed CNC turning centre. A mathematical expression representing surface roughness was developed using non-linear regression analysis. The optimization techniques namely Taguchi method and genetic algorithm have been used to optimize the turning parameters for obtaining best surface roughness of the components. The optimum parametric conditions of turning operation have been tested with the confirmation experiments. It has been well-known from the results that the optimum condition obtained by genetic algorithm outperformed the results obtained from experimental design and Taguchi method.

Keywords: AA6063-T6 aluminium alloy, High speed CNC turning operation, Surface roughness, Taguchi method, Genetic algorithm.

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