

Optimization of End Milling Process Parameters for Minimization of Surface Roughness of AISI D2 Steel

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Abstract : The present work analyses different parameters of end milling to minimize the surface roughness for AISI D2 steel. D2 Steel is generally used for stamping or forming dies, punches, forming rolls, knives, slitters, shear blades, tools, scrap choppers, tyre shredders etc. Surface roughness is one of the main indices that determines the quality of machined products and is influenced by various cutting parameters. In machining operations, achieving desired surface quality by optimization of machining parameters, is a challenging job. In case of mating components the surface roughness become more essential and is influenced by the cutting parameters, because, these quality structures are highly correlated and are expected to be influenced directly or indirectly by the direct effect of process parameters or their interactive effects (i.e. on process environment). In this work, the effects of selected process parameters on surface roughness and subsequent setting of parameters with the levels have been accomplished by Taguchi's parameter design approach. The experiments have been performed as per the combination of levels of different process parameters suggested by L9 orthogonal array. Experimental investigation of the end milling of AISI D2 steel with carbide tool by varying feed, speed and depth of cut and the surface roughness has been measured using surface roughness tester. Analyses of variance have been performed for mean and signal-to-noise ratio to estimate the contribution of the different process parameters on the process.

Keywords : D2 steel, orthogonal array, optimization, surface roughness, Taguchi methodology

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