BI 02 Predicting surface roughness and evaluating the suitability of vegetable-based metal working fluids in turning operations using Taguchi methods

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In this paper, the effects of cutting parameters on the surface roughness are investigated in turning mild steel and stainless steel. Further, the effects of using coconut oil as a metal working fluid are investigated. Taguchi orthogonal array L9 was used for planning the experiments. Spindle speed, feed rate and depth of cut were selected as the cutting parameters and coconut oil and soluble oil were selected as the Metal Working Fluid (MWF). The variation of the surface roughness was tracked respective to the four variable control parameters depth of cut, feed rate, cutting speed and MWF. Plotting method and Analysis of variance (ANOVA) were used for analyzing the results to obtain the significance on the surface roughness. For the two types of steels, two mathematical models were developed to predict the surface roughness. The models were validated through the confirmation experiments.

Keywords: Taguchi orthogonal array, ANOVA, surface roughness