Experimental Study and Neural Network Modeling in Prediction of Surface Roughness on Dry Turning Using Two Different Cutting Tool Nose Radii

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Abstract : Surface finish is an important product quality in machining. At first, experiments were carried out to investigate the effect of the cutting tool nose radius (considering 1mm and 0.65mm) in prediction of surface finish with process parameters of cutting speed, feed and depth of cut. For all possible cutting conditions, full factorial design was considered as two levels four parameters. Commercial Mild Steel bar and High Speed Steel (HSS) material were considered as work-piece and cutting tool material respectively. In order to obtain functional relationship between process parameters and surface roughness, neural network was used which was found to be capable for the prediction of surface roughness within a reasonable degree of accuracy. It was observed that tool nose radius of 1mm provides better surface finish in comparison to 0.65 mm. Also, it was observed that feed rate has a significant influence on surface finish.

Keywords : full factorial design, neural network, nose radius, surface finish

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