

On the Role of Cutting Conditions on Surface Roughness in High-Speed Thread Milling of Brass C3600

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Abstract : One of the important factors in manufacturing processes especially machining operations is surface quality. Improving this parameter results in improving fatigue strength, corrosion resistance, creep life and surface friction. The reliability and clearance of removable joints such as thread and nuts are highly related to the surface roughness. In this work, the effect of different cutting parameters such as cutting fluid pressure, feed rate and cutting speed on the surface quality of the crest of thread in the high-speed milling of Brass C3600 have been determined. Two popular neural networks containing MLP and RBF coupling with Taguchi L32 have been used to model surface roughness which was shown to be highly adept for such tasks. The contribution of this work is modelling surface roughness on the crest of the thread by using precise profilometer with nanoscale resolution. Experimental tests have been carried out for validation and approved suitable accuracy of the proposed model. Also analysing the interaction of parameters two by two showed that the most effective cutting parameter on the surface value is feed rate followed by cutting speed and cutting fluid pressure.

Keywords : artificial neural networks, cutting conditions, high-speed machining, surface roughness, thread milling

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