Article Abstract

Title:	Cutting power prediction model for turning of GFRP composites using response surface methodology
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Abstract:	Glass fiber reinforced plastic (GFRP) composite materials are replacing traditional engineering materials owing to their superior properties. Accordingly, the need for accurate machining of composites has increased enormously. This paper deals with the study of power consumption in machining of GFRP composite tubes of different fiber orientation angle vary from 30^0 to 90^0. Machining studies were carried out on an all geared lathe using three different cutting tools: namely Carbide (K-20), Cubic Boron Nitride (CBN) and Poly-Crystalline Diamond (PCD). Experiments were conducted based on the established Taguchi's Design of Experiments (DOE) L_{25} orthogonal array on an all geared lathe. The cutting parameters considered were cutting speed, feed, depth of cut, and work piece (fiber orientation). The data collected was statistically analyzed using Analysis of variance (ANOVA) technique, and a second order mathematical model in terms of cutting parameters was developed using Response surface methodology (RSM). The results indicated that the developed model is suitable for prediction of power consumption in machining of GFRP composites. The experimental results reveals that, lower power consumption was observed at low cutting speed, low feed, moderate depth of cut and low fiber orientation angle. PCD tool performing better compared to the other tools used in this investigation.
Keywords:	Response surface methodology (RSM), Cutting power, Glass fiber reinforced plastic (GFRP) composites, Analysis of variance (ANOVA).