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**Measurement & Multiresponse Optimisation of Turning Parameters for Magnesium Alloy using Hybrid Combination of Taguchi-GRA-PCA Technique**

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**Abstract**

The requirement for magnesium alloys has been rising constantly over the years because of the thrust towards weight reduction in various fields that demand fuel-efficient automobile, low-priced electronics, hand-held compact devices and biodegradable medical implants. Hence machinability studies of magnesium alloys contribute significantly to use them in appropriate applications. The present work is aimed to investigate the cutting force (Fz), material removal rate (MRR), tool flank wear (VB) and surface roughness (Ra) in turning of magnesium alloy with physical vapour deposition (PVD) coated carbide insert in dry conditions. The tests were carried out on the basis of the orthogonal array of Taguchi’s L27. To identify the optimal parameters setting, a combination of principal component analysis (PCA) and grey relational analysis (GRA) has been conducted. From the analysis of variance, it was revealed that depth of cut is the significant contributing parameter on this multiple performance characteristics process.

**Keywords:**

Cutting force, Magnesium, Optimization, Turning, GRA, PCA

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