

## **SENSITIVITY ANALYSIS FOR THE MATHEMATICAL MODEL OF SURFACE ROUGHNESS AND TOOL WEAR WHILE MACHINING OF HCHCR USING PVD COATED END MILLING CUTTERS**

**BIRADAR S. K.<sup>1</sup> AND G. S. LATHKAR<sup>2</sup>**

<sup>1</sup>Research Scholar, MGM's College of Engineering, Nanded, India.

<sup>2</sup>Director, MGM's College of Engineering, Nanded, India.

### **Abstract**

This paper investigate machining of high carbon high chromium steel(HCHCr) using AlCrN PVD coated end milling cutter to achieve fine surface finish and minimum tool wear. Solid lubricant MoS<sub>2</sub> mixed with SAE 20 base oil is used as coolant. Full factorial design is used to investigate the effect of input variables like cutting speed, feed, depth of cut & %C on surface roughness and tool wear. The empirical linear mathematical models are developed by regression method. The results obtained from mathematical model are validated using sensitivity analysis which predicts the critical parameters. Multi-objective optimization is carried out with the help of Response Surface Methodology (RSM) to optimize both the responses taken together. It is found that cutting speed and depth of cut are the most influencing factors on surface roughness and tool wear respectively.

-----  
**Keywords** : End Milling, Full Factorial, DOE, RSM, PVD Coating, Solid lubricant, HCHCr, Response Optimizer.