

APPLICATION AND COMPARISON OF TAGUCHI AND RESPONSE SURFACE METHODOLOGIES IN MODELING AND OPTIMIZATION OF SURFACE GRINDING PROCESS PARAMETERS

DR. M. JANARDHAN

Principal & Professor, Department of Mechanical. Engg,
Abdul Kalam Institute of Technological Sciences,
Kothagudem, Khammam DT, T.S, India PIN 507120

Abstract

In this paper, the application and comparison of taguchi and response surface methodologies (RSM) in modeling and optimization of surface grinding process parameters has been presented in machining of AISI 4340 steel to determine the effect of process parameters such table speed, wheel speed and depth of cut on the responses *viz.* surface roughness(Ra) and material removal rate(MRR). The effects of each process parameter on the responses were studied individually using S/N ratio graphs of taguchi method. The second order polynomial model and 3D surface plots in terms of process parameters were developed and studied for the responses on the basis of experimental results and has been validated with F-test & ANOVA using RSM. The responses are mainly influenced by depth of cut followed by table speed and wheel speed. Optimal combination of process parameters to obtain better responses has been found using multi-response optimization of taguchi and RSM. Though both the techniques predicted near values of average error, the RSM technique seems to be more promising in predicting the response over the taguchi technique.

Keywords: Surface grinding, Taguchi method, RSM, surface roughness, MRR.