

Investigations in Machining of Hot Work Tool Steel with Mixed Ceramic Tool

Authors : B. Varaprasad, C. Srinivasa Rao

Abstract : Hard turning has been explored as an alternative to the conventional one used for manufacture of Parts using tool steels. In the present study, the effects of cutting speed, feed rate and Depth of Cut (DOC) on cutting forces, specific cutting force, power and surface roughness in the hard turning are experimentally investigated. Experiments are carried out using mixed ceramic(Al_2O_3+TiC) cutting tool of corner radius 0.8mm, in turning operations on AISI H13 tool steel, heat treated to a hardness of 62 HRC. Based on Design of Experiments (DOE), a total of 20 tests are carried out. The range of each one of the three parameters is set at three different levels, viz, low, medium and high. The validity of the model is checked by Analysis of variance (ANOVA). Predicted models are derived from regression analysis. Comparison of experimental and predicted values of specific cutting force, power and surface roughness shows that good agreement has been achieved between them. Therefore, the developed model may be recommended to be used for predicting specific cutting force, power and surface roughness in hard turning of tool steel that is AISI H13 steel.

Keywords : hard turning, specific cutting force, power, surface roughness, AISI H13, mixed ceramic

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