

## **The influence of cutting fluid conditions and machining parameters on cutting performance and wear mechanism of coated carbide tools**

M. J. Mir, M. F. Wani \*

Centre for Tribology, Department of Mechanical Engineering, National Institute of Technology Srinagar, 190006 INDIA.

\*Corresponding author: [mfwani@nitsri.net](mailto:mfwani@nitsri.net)

KEYWORD	ABSTRACT
Cutting fluid conditions Coated carbide tool Tool wear Surface roughness Wear mechanism	<p>The present study investigates the effect of various cutting fluid cooling conditions and machining parameters on tool flank wear (VB) and surface roughness (Ra) in hard turning of AISI D2 steel using multilayer coated carbide inserts. Response surface methodology with Face centered composite design was adopted to reduce the number of tests. Analysis of variance was employed to check the validity of regression models and to determine the effects, contribution and significance of process parameters on desired responses. The analysis of variance results indicates that the effect of machining time (72.5%) and cutting speed (16.02%) were found to be the most dominant factors contributing to tool wear of the inserts. Alternatively, machining time (63.36%) and feed rate (17.66%) were the main factors influencing surface roughness (Ra) of the work material. On the other hand, application of low flow high velocity cutting fluid condition (LFHV) showed a substantial contribution in reducing tool wear and increasing surface finish. It was observed that adhesion, abrasion along with chipping were the most dominant tool failure modes of coated carbide inserts. Finally, Desirability function approach (DFA) was used to find out the optimal cutting parameters for minimum tool wear with maximum surface finish.</p>

Received 7 February 2018; received in revised form 16 June 2018; accepted 1 July 2018.

To cite this article: Mir et al. (2018). The Influence of cutting fluid conditions and machining parameters on cutting performance and wear mechanism of coated carbide tools. Jurnal Tribologi 18, pp.58-80.