

The analysis of coating performance on stainless steel in high speed machining

ABSTRACT

This paper describes the performance of coated tools inserts (TiAlN, Al₂O₃ and TiCN) when machining stainless steel AISI 416 at high cutting speed. The effects of cutting speed and feed rate on the surface roughness and tool life were studied experimentally. The settings of machining parameters were determined by using general full factorial design method. For tested range of milling conditions, the result shows that the surface roughness is highly affected by the feed rate, while tool life is highly affected by combination of cutting speed and feed rate. TiAlN coating performs better followed by Al₂O₃ coating and TiCN coating. Slow wear rate were observed at the combination of cutting parameters which are low cutting speed (260m/min) and feed rate (0.24mm/rev). Meanwhile, interaction between low value of feed rate (0.24mm/rev) and high value of cutting speed (320m/min) that produce good surface finish. Generally, TiAlN coated tool perform better than another coated tools, in terms of surface finish and tool life with current parameters.

Keyword: TiAlN; Al₂O₃; TiCN; Coated tools; Tool wear; Tool life; Surface roughness