Insights for the Selection of the Machining Parameters in the Turning of Difficult-To-Cut Coatings

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Usually, the coatings used in industrial applications require post-processing to reach their final shape. However, some of these coatings are difficult-to-cut, mainly because of their high hardness. The present study provides a revision of some experimental investigations on the turning of WC-Co, Stellite, and Fe-based and NiAl alloys. The materials are used for both coatings and sintered workpieces providing insights for conducting turning tests. For the success of the turning process, the selection of the machining parameters is a critical issue. Based on the reviewed investigations, the surface roughness is clearly influenced by the feed rate, expecting higher values than the ones predicted by the theoretical equations. Besides, the increase of both the cutting speed and feed rate leads to a high tool wear. Likewise, the increase of the feed rate leads to higher machining forces. In general, the influence of the cutting speed and depth of cut is less evident. Regarding the machining parameters, usually their maximum values are fixed at low levels: 100 m/min, 0.35 mm/rev and 0.3 mm, for the cutting speed, feed rate and depth of cut, respectively.

Keywords: difficult-to-cut coatings, machining force, machining parameters, surface quality, tool wear, turning

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