AN EXPERIMENTAL INVESTIGATION OF WC-Co TOOL LIFE AND TOOL WEAR IN TURNING OF TITANIUM

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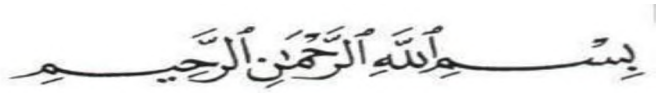

'In the name of Allah, the Most Gracious, the Most Merciful'

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ABSTRACT

Titanium alloys are widely used in many fields such as biomedical due to the strength-to-weight ratio and corrosion resistance. Although there has been a great advance in the development of machining processes, no equivalent development has been made in machining of titanium alloys due to its abnormal machining characteristics that make it difficult to cut. In this work, uncoated WC-Co cutting tool inserts has been used to study the machinability of titanium alloy, Ti-6AL-4V ELI. The surface roughness and the tool wear in relation with cutting speed are investigated. The experiments were performed under dry cutting condition at selected cutting speed which is 125 mm/min, 140 mm/min, and 185 mm/min. The feed rate and depth of cut are remain constant at 0.2 mm and 0.15 mm respectively. The wear mechanism was examined using scanning Electron Microscope (SEM) and the tool life was calculated based on V_B length. In addition, surface roughness was measured by using Portable Surface Roughness Surftest SJ-210. The result shows that the increasing in cutting speeds will increase the wear rate. Subsequently, decreases the tool life. On the other hand, the surface roughness, Ra is decreases as the cutting speed increases which indicate that high surface quality could be obtain at higher cutting speed. The observation from the SEM revealed the presence of two type of wear mechanism which flank wear and crater wear. The flank wear is seen to be more dominant as compared to crater wear.

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