Tool Wear Performance Investigation of Stellram Indexable Milling Cutter (XDLT09-D41) for Machining Ti-6Al-4V

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An extensive experimental investigation was carried out to study the performance of Stellram Indexable Milling Cutter (XDLT09-D41), used for rough down milling of Ti-6Al-4V alloy. The machining performance was investigated for small depth of cut under different combinations of the operating parameters; like application of high pressure coolant and their impact in terms of tool wear, tool life, thermal crack, etc. The range of operating parameters were broadened, to get comprehensive results in comparison with previous work. The critical observations of the tool wear were at the tool tip/nose and at the bottom part of tool; where thermal deformations were most likely to be propagated with time. It has been noticed that the flank wears were owing to scratching of the cutting chips and diffusion wears were because of high thermal stresses at the bottom of the cutting tool. These findings are in consistent with literature; moreover, the optimum operating parameters were further enhanced to achieve superior performance. Integrated methodology maximized tool life to the moderate speed of 40m.min^{-1}, feed rate of 358 mm.min^{-1} and depth of cut of 0.8mm. It is generally concluded that the cutting performance has poor relation with alloy properties compared to the operating conditions.

Keywords: Tool Wear, Titanium Alloy, High Coolant Pressure, Cutting Speed, Flank Wear, Tool Life

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