

Tool deterioration of 316 stainless steel in dry down-milling using carbide insert

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ABSTRACT

Machining of difficult-to-cut material such as 316 Stainless Steel has become a vital concern in machining industry. This is due to its mechanical properties of high hardness which leads to the high tendency of cutting tool breakage. Hence, the understanding of thorough progression of cutting tool deterioration is crucial, so that a better improvement of machining 316 Stainless Steel could be established. Thus, a series of documented experiments had been conducted to monitor and understand the tool deterioration of coated tungsten carbide insert in dry down-milling of 316 Stainless Steel. It was observed that the cutting tool started to deteriorate after the second pass of milling experiments and achieved $VB = 0.3$ mm after the sixth pass on average. Two types of tool deterioration mechanisms were identified which were tool wear and chipping. However, it was observed that the most predominant mode of tool deterioration was flank wear (tool wear). Cutting tools deteriorated gradually due to blunting and rubbing of tool edge over the surface of machined workpiece.

KEYWORDS

316 stainless steel; Carbide insert; Down-milling; Flank wear; Tool deterioration

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