

# Micro-end-milling Wear Automatic Inspection System Based on Effective Corner Detection Method

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## Abstract

The objective of this study is to measure flank wear of dry milling 6061 aluminum alloy of different PVD (Physical Vapour Deposition) multilayer coatings (including TiN, TiCN, and TiAlN) single edge rhombus micro-end-milling tools. All of the experiments were designed using the Taguchi method in order to obtain robust results. In order to realize the level of importance of each machining parameter, the L 9 (3<sup>4</sup>) orthogonal array, analysis of variance (ANOVA), and signal-to-noise (S/N) ratio were determined. The tool wear images are captured using a machine vision system incorporated with an effective corner detection algorithm. During the milling test, we fixed spindle speed at 6000 rpm and feed rate at 0.0125 mm/rev to investigate the correlation between side clearance angle and coating materials. The experimental results show that TiCN-coating mills generate minimum flank wear and longest tool life.

Keyword : Rhombus Micro-end-mill, Machine Vision, Corner Detection, Taguchi Method, SPC, Inspection Technique