

Taguchi Method Applied to Parametric Appraisal of Tool Wear of Different Coating Micro-End-Milling

梁有燈, 邱奕契

Mechanical Engineering

Engineering

chiou@chu.edu.tw

Abstract

In this study, a series of dry milling experiments of Al-alloy using single edge rhombus micro-end-mills were performed. The purpose was to examine the influences of various control factors on tool wear. Examined control factors included coating layer, side clearance angle, feed rate, and spindle speed. We applied the Taguchi method to design the experiment to rapidly derive an optimum combination of cutting parameters. During the milling test, we fixed the depth of cut at 0.2 mm and width of cut at 0.50 mm to explore the correlation among side clearance angle, feed rate, spindle speed and coating layer. On completion of each milling test, the cutting-edge wear and flank wear were measured in offline by the aforementioned tool microscope. The experimental results show among the four control factors, side clearance is the most important. By using TiCN-coating and setting side clearance angle at 10 degrees, spindle speed at 6000 rpm, and feed rate at 0.0125 mm/rev, the micro-end-mills generate the least wear and thus have longer tool life.

Keyword : Dry milling, Taguchi method, Micro-end-milling, Tool wear, Different coating