Coating performance in high speed micro machining of H13 tool steel

ABSTRACT

The development and application of Titanium Aluminium Nitrate (TiAlN) coatings for cutting tools has led to dramatic tool life extension and the realisation of high speed machining for hardened materials. This results in longer tool life and makes it possible to employ higher cutting speeds and feed rates. In this study, a series of different TiAlN based coatings on micro grains solid carbides were tested on H13 Tool Steel. These advanced coatings are commercially available by coating manufacturer which are trade marks of Balzers UK. The aim of this experiment was to investigate the performance of micro tools coated with these coatings and compare with uncoated tools. The results will be used to determine whether coatings for micro tools will have any impact on the performance of the tools such as reducing cutting forces or improving machining quality. This will be achieved by means of analysing the cutting force data and 3-D surface roughness respectively. Result obtained shows that different coating had different performance, hence can be applied to specifically targeted machining operation. The results also highlight some of the differences in wear mechanism of micro tools.

Keyword: Coating; High speed micro machining; TiAlN