Abstract

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Investigation into the effect of cutting fluid concentration on the machinability of Ti-6Al-4V using vegetable oil-based cutting fluids

This paper describes experimental results when turning Ti-6Al-4V using water-miscible vegetable oil (VOs)-based cutting fluid. The effects of cutting fluid concentration and machining conditions on average surface roughness (Ra) and micro-hardness were evaluated. L27 fractional factorial Taguchi array was utilised. This study found that a combination of VOs-based fluid concentration (10%), high cutting speed (146 m/min), feed rate (0.1 mm/rev) produced the lowest average surface roughness (Ra). However, 10% concentration showed a marginal improvement in Ra compared to 5%. Cutting fluid concentration is a significant factor for reducing Ra.