

Optimizing of the Micro EDM Parameters in Drilling of Titanium Ti-6Al-4V Alloy for Higher Machining Accuracy-Fuzzy Modelling

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Abstract : Ti6Al4V alloy is highly used in the automotive and aerospace industry due to its good machining characteristics. Micro EDM drilling is commonly used to drill micro hole on extremely hard material with very high depth to diameter ratio. In this study, the parameters of micro-electrical discharge machining (EDM) in drilling of Ti6Al4V alloy is optimized for higher machining accuracy with less hole-dilation and hole taper ratio. The micro-EDM machining parameters includes, peak current and pulse on time. Fuzzy analysis was developed to evaluate the machining accuracy. The analysis shows that hole-dilation and hole-taper ratio are increased with the increasing of peak current and pulse on time. However, the surface quality deteriorates as the peak current and pulse on time increase. The combination that gives the optimum result for hole dilation is medium peak current and short pulse on time. Meanwhile, the optimum result for hole taper ratio is low peak current and short pulse on time.

Keywords : Micro EDM, Ti-6Al-4V alloy, fuzzy logic based analysis, optimization, machining accuracy

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