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Analysis and Simulation of Temperature Distribution and Stress Development in Wire EDM of Tungsten Carbide

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Abstract

Indexed keywords

Abstract

The main objectives of this research are to investigate the performance of temperature distribution and equivalent Von- Mises stress development on tungsten carbide , determine the effect of different machining parameters on the tungsten carbide workpiece, prepare a set of parameters, temperature distribution and stress development that can be compared with the experimental result and to optimize the machining parameters for machining tungsten carbide using wire EDM . However, wire EDM is a complicated stochastic nature process mechanism and it has a very large number of parameters that should be considered. It is quite hard to select the best set of parameters in experimenting. In this research, the Ansys software was used to simulate the maximum temperature and maximum equivalent (Von-Mises) stress result of machining the tungsten carbide by wire EDM . The input parameters selected in

A novel detecting and controlling strategy of the discharge status in high speed wire electrical discharge machining

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conducting the simulation are pulse- on time and servo voltage. The wire diameter, convective coefficient, thermal expansion coefficient, current, thickness of the workpiece and wire material is taken as fixed parameters. By using Taguchi's L9 orthogonal array, the optimal value is obtained for maximum temperature and maximum equivalent (Von-Mises) stress . Additionally, the analysis of variance (ANOVA) is a useful technique to identify the most important factor that affecting the output response. © Published under licence by IOP Publishing Ltd.

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