

Optimization of high-pressure jet assisted turning process by Taguchi method

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ABSTRACT

This paper outlines the Taguchi optimization methodology, which is applied to optimize cutting parameters in high-pressure jet assisted turning when machining Inconel 718. Turning parameters evaluated are the diameter of the nozzle D_n , the pressure of the jet P , the cutting speed V_c , the feed rate f and the distance between the impact point of the jet and the cutting edge d . The experiments were conducted by using $L_{27}(3^{13})$ orthogonal array as suggested by Taguchi. Signal-to-Noise (S/N) ratio and Analysis of Variance (ANOVA) are employed to analyze the effect of high-pressure jet assisted turning parameters on the main cutting force and surface roughness, in other words to find optimal levels of the process parameters. The study shows that the Taguchi method is suitable to solve the stated problem with minimum number of trials.

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