MULTI-RESPONSES OPTIMIZATION OF EDM SINKING PROCESS OF AISI D2 STEEL USING TAGUCHI–FUZZY METHOD

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ABSTRACT

A research was conducted for the optimization of the electrical discharge machining (EDM) sinking process of AISI D2 steel (SKD 11), with multiple performance characteristics based on the orthogonal array with Taguchi-fuzzy method. The experimental studies were conducted under varying EDM sinking process variables, i.e., gap voltage, pulse current, on time and duty factor. The optimized multiple performance characteristics were surface roughness and material removal rate (MRR). The quality characteristic of surface roughness was smaller-is-better, while the quality characteristic of MRR was larger-is-better. Since gap voltage had two levels while the other three factors studied had three levels, the experiment design used $L_{18}$ orthogonal array with replication. Experimental results have shown that machining performance in the EDM sinking process can be improved effectively through this method. The EDM sinking process variables which significantly affected surface roughness and MRR are gap voltage and pulse current.

Keywords: AISI D2 steel, EDM sinking, optimization, material removal rate, surface roughness, Taguchi-fuzzy method