**Comparative analysis for the Prediction of WEDM responses for machining Spark Plasma Sintered Boron Carbide ceramic sample by RSM and ANFIS**

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**ABSTRACT**

Wire electrical discharge machining (WEDM) process successfully used to cut different metals, alloys, composites and recent addition is engineered ceramics which possess sufficient electrical conductivity. Boron carbide is one of hardest ceramic material that unable to process with conventional machine tools and can be machined by WEDM compulsorily with proper selection of machine parameters. In this work boron carbide samples were prepared using spark plasma sintering (SPS) furnace and machined with WEDM by varying 5 machining parameters namely pulse on time, pulse off time, peak current, water pressure and servo feed rate. The machining response parameters were considered as machining speed and surface roughness (*Ra*) and design of experiment was derived using central composite design (CCD) of response surface method (RSM) with 32 numbers of different test runs. Adaptive neuro-fuzzy inference system (ANFIS) was used with a new set of 16 numbers of experiments to predict results and seen to be more reliable than predicted results of response surface method.

*Keywords: Boron carbide, CCD, WEDM, RSM, ANFIS*