Modeling of Rotary Tool Adapted Electrochemical Machining of AISI 202

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Abstract:
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Abstract:
Concurrent achievement of better material removal rate (MRR), surface roughness (Ra) and Overcut (OC) are still considered as one of the challenging tasks in Electrochemical Machining (ECM), particularly on the metals having high toughness. The traditional ECM machine was modified with indigenously designed rotary tool adapter to increase the performance of machining. Meanwhile, experimental design was done to conduct the experiments with different machining conditions. The responses of machining for different set of voltage, tool feed rate, electrolyte discharge rate and, rotary speed using 15% NaCl aqueous solution were observed and measured. Response Surface Methodology (RSM) model was then developed and validated through confirmatory experiments. The best response of rotary adopted machining under same operating conditions are: material removal rate of 361.410 mm3/min, surface roughness of 1.62 µm and overcut of 4.9 % at 18 V, 0.54 mm/min, 12 lit/min and 100 rpm. The results are 11.96% lower in surface roughness, 21.36% lower in overcut when compared to non-rotary tool.

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