
Effect of cutting direction on machining of carbon fibre reinforced plastic by electrical discharge machining process

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Abstract: In this study, the electrical discharge machining (EDM) characteristics and its removal mechanism for one and two directional carbon fibre reinforced plastic (CFRP) composite was evaluated. Also, an investigation about the influence of carbon fibre direction to machining direction was discussed to attain high performance of EDM process. Then EDM characteristics with two different combinations of machining direction and carbon fibre direction were compared. EDM machining characteristics such as material removal rate, electrode wear rate, surface roughness and SEM images were determined. Experimental results clarified that the material removal mechanism in the EDM for one directional CFRP when the machining direction is perpendicular to the fibre direction is different from that in parallel machining. Also, the EDM machining for two directional CFRP is different from that for one direction. Therefore, efficient EDM for CFRP is possible by selecting appropriate machining direction to fibre direction and the type of CFRP according to its fibre direction.

Keywords: electrical discharge machining; EDM; carbon fibre reinforced plastic; CFRP; material removal rate; electrode wear; surface roughness.

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Biographical notes: Sameh Habib is an Associate Professor of Non-traditional Machining. His research topics include electrical discharge machining (EDM) and electrochemical machining (ECM).