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Optimization of Cutting Forces in Drilling of Polimer Composites via Taguchi Methodology

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Abstract : In this study, drilling behavior of multi-layer orthotropic polyester composites reinforced with woven polyester fiber and PTFE particle was investigated. Conventional drilling methods have low cost and ease of use. Therefore, it is one of the most preferred machining methods. The increasing range of use of composite materials in many areas has led to the investigation of the machinability performance of these materials. The drilling capability of the synthetic polymer composite material was investigated by measuring the cutting forces using different tool diameters, feed rate and high cutting speed parameters. Cutting forces were measured using a dynamometer in the experiments. In order to evaluate the results of the experiment, the Taguchi experimental design method was used. According to the results, the optimum cutting parameters were obtained for 0.1 mm/rev, 1070 rpm and 2 mm diameter drill bit. Verification tests were performed for the optimum cutting parameters obtained according to the model. Verification experiments showed the success of the established model.

Keywords : cutting force, drilling, polimer composite, Taguchi
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