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Analysis in Drilling of Al6061/20%SiCp Composites using Grey Taguchi based TOPSIS (GT-TOPSIS)

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Abstract: Drilling is an important metal removal process for the final fabrication stage particularly in cases of components joined by mechanical fasteners. The selection of drilling parameters like drill bit speed, feed and the cutting point angle is vital, while drilling holes in ceramic based composites. The objective of research work is to perform drilling on Al6061/20%SiCp compositeand observe the responses like surface finish and drilling induced thrust force. Taguchi's L_9orthogonal arrayis used to conduct the machining trials and a new integrated approach of the grey Taguchi based technique for order performance by similarity to ideal solution (GT-TOPSIS) is disclosed to predict the optimal drilling conditions. The confirmation experiment is conducted at the best input setting identified by the proposed algorithm for demonstrating the accuracy of the approach.Feed rate is identified as the prime factor affecting the quality of drilled holes.
Keywords: Al/SiCp composite;Optimization; Drilling; Grey relational analysis;TOPSIS; Taguchi; Surface finish.

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