



Pulsed CO₂ Laser Cutting of Al/SiCp Composite sheets

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Abstract: Metal matrix composites (MMCs) are widely used in aerospace and automotive industries. Attaining a decent surface texture while cutting these advanced materials is challenging and hence the research attention is focused towards the application of pulsed CO₂ laser cutting process on Al/SiCp composite. The process parameters in laser cutting like power, frequency, cutting speed and gas pressure affect the quality of cut surface. Surface finish and kerf width are observed as the quality characteristics for various combinations of input parameters with the experimental trials planned as per Taguchi's L₉ orthogonal array. A combined technique of grey desirability analysis (GDA) is presented for multi response optimization. Significant improvements in the responses are observed with the optimal setting of parameters permitting the usage of GDA technique in experimental welding optimization. Laser power and pulsing frequency are found to significantly affect the quality characteristics studied in the process.

Keywords: Grey relational analysis; Desirability analysis; Laser cutting; Optimization; Al/SiCp composite.

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