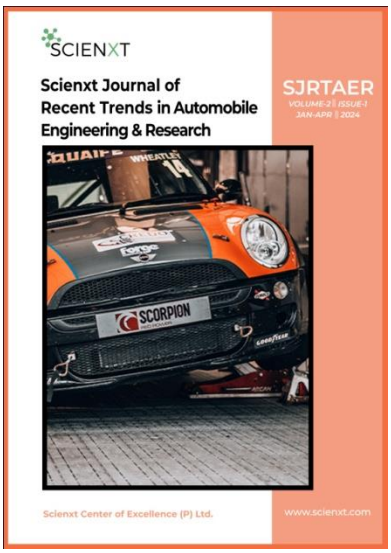

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Evaluation and optimisation of process parameters on quality features of al 7075 metal matrix composite during drilling with hss tool

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Abstract:

Machining metal matrix composite materials presents unique challenges compared to monolithic materials like steel and aluminum due to the abrasive nature of the reinforcement, causing wear on cutting tools and damage to the workpiece. This study focuses on the mechanical characteristics of silicon nitride (Si3N4)-reinforced Al 7075 metal matrix composites. Using the stir casting technique, composites were fabricated with Si3N4 particles ranging from 2.5% to 7.5% by weight. Mechanical characterization, including hardness tests and Taguchi analysis for process parameter optimization, was conducted. The investigation aimed to provide insights into the aggregation of silicon nitride within the Al 7075 matrix, offering valuable contributions to machining procedures and enhancing the industrial usability of Al-Si3N4 composites.

Keywords:

Metal matrix composites, silicon nitride (si3n4), al 7075, stir casting,mechanical characterization, hardness tests, taguchi analysis, process parameter.