

Analysis of Drilling Parameters for Al-Mg₂-Si Metal Matrix Composite

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Abstract : In this work, drilling responses and behavior of MMC was investigated in Al-Mg₂Si composites. For the purpose Al-15% wt. Mg₂Si, was selected from the hypereutectic region of Al- Mg₂Si phase diagram. Based on hardness and tensile strength, drill bit of appropriate material and morphology was selected. The performance of different drill bits of different morphology and material was studied and analysed using experimental data. For theoretical calculations of axial thrust force and required power calculation, material factor "K" was obtained from different data charts and at the same time cutting forces (drilling forces) were practically obtained using a Peizo electric force dynamometer. These results show the role of reinforcement particles on the machinability of MMCs and provide a useful guide for a better control and optimized drilling parameters for the drilling process. Furthermore, in this work, comparison of MMC with non -reinforced Aluminum Alloy regarding drilling operation was also studied.

Keywords : drilling, metal matrix composite (MMC), cutting forces, thrust force

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