

INVESTIGATION OF TRIBOLOGICAL BEHAVIOR AND ITS RELATION WITH PROCESSING AND MICROSTRUCTURES OF AL6061 METAL MATRIX COMPOSITES

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ABSTRACT

The present study deals with the investigation of wear behaviour of Al6061MMCs and its relation with Processing & microstructure. Al 6061 MMC composite containing different weight percentages of Al₂O₃ & keeping 2 weight % graphite constant have been fabricated using a Vortex method (stir casting method). A pin-on-disc wear testing tribometer was used to carry out the dry sliding wear tests on both Aluminum 6061 alloy composites and Aluminium 6061 monolithic alloy over a load range of 10-50N and sliding velocity of 1.88–5.65 m/s for various sliding distances of 1-3km. The SEM micrographs taken for the micro structure analysis of the reinforced composite specimens produced by casting show that the graphite and Al₂O₃ particulates are uniformly distributed in the matrix. The SEM of wear surfaces showed that the large grooved regions and cavities with Al₂O₃ particles were found on the worn surface of the composite.

Also worn surface of the Al 6061 composite is rougher than unreinforced Al6061 alloy, this indicates an abrasive wear mechanism results due to presence of Al₂O₃. Further, it was understood from the experimentation that the wear rate and coefficient of friction decreased linearly with increasing weight percentage of Al₂O₃. The wear rate increase as the sliding speed increases. The best results of minimum wear have been obtained at 8% weight fraction of Al₂O₃

KEYWORDS: Aluminium 6061 Alloy MMC, Vortex Method, Dry Sliding, Friction, Wear