Implementation Of Metal Matrix Composite For Wear Resistant Applications

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Abstract : The byproducts released from production of alumina namely the oxides of iron, titanium, aluminum and silica along with some other minor constituents. Posed a series of challenges for the industrial world. Based on economics as well as environmental related issues, enormous efforts have been directed worldwide towards red mud management issues i.e. of utilization, storage and disposal. It is generally agreed that resistance to wear of MMCs is created by reinforcement and also the wear properties are improved remarkably by introducing hard intermetallic compound into the aluminium matrix. The reinforcing materials are generally SiC, Al_2O_3, TiB_2 etc and are costly. The present work has been undertaken with an objective to explore the use of red mud as a reinforcing material as a low cost option. Experiments have been conducted under laboratory condition to assess the wear characteristics of the aluminium red mud composite under different working conditions in pure sliding mode on a pin-on-disc machine. This has been possible by fabricating the samples through usual stir casting technique. To enhance the wear properties, the samples were also subjected to heat treatment. The worn surfaces of the wear out samples were studied under optical microscope to get an idea about the effect of particulate reinforcement on the wear behavior of the composite. The whole dissertation has been divided into six chapters to put the analysis independent of each other as far as possible. The major contribution of the present work relates to wear characteristics and validation of results through Artificial Neural Network (ANN) techniques.