Study On Erosion Behaviour Of Hybrid Aluminium Composite

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Abstract. The origin of the light metals, as compared to other metals in this century, is noticeable and an exciting area of expansion for innovation. Light metals, are need of the day in engineering, among them application of aluminium and its alloys is enormous. we observe that these metals tend to have a progressive loss of metal from having contact surface with other metals. Erosion is one such wear process, where damage occurs by the repeated application of high localised stresses. Erosion due to impact of solid particle, is a significant problem. In the present work, the erosion behaviour of hybrid aluminium composite is studied. AL 6061 is used as the base alloy. AL 6061 alloy has excellent corrosion resistance but poor wear resistance. So, in order to have improved properties, it is reinforced with Tungsten Chromium Nickel powder in varied proportions by the method of stir casting. The results are compared with the as-cast Al-alloy to determine the improvement in mechanical properties. The tests were conducted in ASTM G76 setup, to determine solid particle erosion behaviour and the results of the hybrid composite were compared with that of as-cast AL 6061 alloy. It was evident that mass loss was maximum at 30^0 inclinations, which is a characteristic of ductile materials. It was observed that upon increasing the percentages of reinforcement (wt.%), the wear resistance of the hybrid composite increased significantly. It was also observed that the inclusion of tungsten-chromium-nickel powder increased the hardness of the hybrid composite significantly.

INTRODUCTION

Within the last twenty years erosive wear has become an increasing interest and a considerable research effort has been directed towards elucidating the mechanisms of erosion. Erosive wear is characterized by a very short sliding motion and occurs in a very small interval of time. It happens by the impingement of solid particles or fluids on the surface of a material. The material is removed due to severe plastic deformation as a result of cutting action of the particles. Erosive wear depends on a number of parameters. The rate of erosive wear is dependent upon a number of factors. The grain size of the erodent, erodent shape, erodent velocity, erodent inclination and also the type of surface being eroded all contribute in their own way to erosive wear. The material characteristics of the particles, such as their shape, hardness, impact velocity and impingement inclination are primary factors along with the properties of the surface being eroded. Erosion studies carried out all over the world have confirmed that erodent inclination or particle impingement inclination is the most Important parameter influencing erosive wear. It has been

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