MASS LOSS PREDICTION OF NEWLY DEVELOPED ALUMINIUM-BASED ALLOYS USING ARTIFICIAL NEURAL NETWORK

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Abstract: The purpose of this study is to predict the mass loss of newly developed aluminium based alloy. Two different alloys are prepared by cladding process and the sliding friction and wear properties of this alloy against high carbon high chromium steel are investigated at different normal loads (50 N, 60 N and 70 N) under different sliding distances. Tests are carried at a constant speed of 1 m/sec under oil lubricated conditions by preheating the circulating engine oil 20w40 at a temperature of 80^0C. The mass losses are measured and recorded for every interval. An artificial neural network (ANN) model is developed to predict the mass loss of newly developed aluminium-based alloy. It is observed that the predicted values have shown good agreement with experimental values with a correlation coefficient of 0.999973. This model can also be used to predict the mass loss of any material.

Key words: *Mass loss, aluminium-based alloy, sliding wear, ANN*

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1. Introduction

Aluminium alloys and other lightweight materials have emergent applications in the automotive industry, with respect to reducing the fuel consumption and shielding the environment, where they can successfully put back steel and cast iron parts. These alloys are widely used in buildings and constructions, containers and packaging, marine, aviation, aerospace and electrical industries because of their lightweights, corrosion resistance in most environments or combination of these properties [1]. Aluminum alloys have higher conductivities (electrical and thermal) than most other metals, and they are usually cheaper than the alloys that are superior conductors (copper, silver, gold, and so on) [2]. Aluminium based alloy provides good combination of strength, corrosion resistance, together with fluidity and freedom from hot shortness [3].

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