

# Prediction and estimating the wear behaviour of polymer composites and alloys reinforced with coal ash and chemical composition using taguchi optimization using ANN

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**Abstract**— This research article presents the prediction and estimation of the wear behaviour of polymer composites and alloys reinforced with coal ash. The composites consist of epoxy polymer reinforced with three different compositions of coal ash, with 0.5%, 1%, and 1.5% coal ash content. The wear analysis was conducted using Taguchi optimization and the Signal-to-Noise (S/N) ratio was used to regulate the optimum condition to reduce the wear rate. Artificial Neural Network (ANN) was employed to forecast the responses and the results showed 100% accuracy. The use of coal ash as a reinforcing material in polymer composites is a promising solution to reduce waste while providing improved mechanical properties.

materials offer high strength, stiffness, and impact resistance, making them ideal for use in demanding sports applications. Infrastructure: Boron epoxy composites are used in the construction of infrastructure, such as bridges, buildings, and pipelines [3]–[5]. These materials offer high strength and stiffness, making them ideal for use in structural applications. Automotive: Boron epoxy composites are used in the automotive industry for the manufacture of high-performance components, such as engine blocks and transmission housings. These materials offer high strength and stiffness, making them ideal for use in demanding automotive applications [6]–[8].