# OPTIMIZING THE INVENTORY COST OF CARBON DUST

A PROJECT REPORT PRESENTED BY

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# ABSTRACT

## OPTIMIZING THE INVENTORY COST OF CARBON DUST

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Carbon dust is one of the most important components used in the manufacturing of tyres. Carbon dust comprises a large proportion of the cost of production in the tyre industry. Inventory system can be used to manage the inventory to reduce the inventory cost. To manage inventory, the classical Economic Order Quantity (EOQ) can be used to decide how much to order. The EOQ is the order quantity that theoretically minimizes the total cost of ordering and holding inventory and it assumes that the demand is constant, or does not vary over time. It is possible to optimize the inventory cost by predicting the future demands of carbon dust. For such predictions Artificial Neural Networks (ANNs) can be used.

In this project, a generalized relationship between the demands, the ratio of the ordering cost and the inventory holding cost is derived when the total of the ordering and holding costs is minimized. The results of EOQ model shows that, a reduction in the per-unit holding cost under certain situations depend on the values of the model parameters. Hence, it is possible to reduce total cost by reducing the holding cost and increasing the order quantity.

A Focused Time-Delay Neural Network (FTDNN) was developed using MATLAB and used for one-step-ahead for existing data set, and multistep-ahead predictions for future weekly demand by feeding series of one-step-ahead predictions back to the input of the network and continuing to iterate. The result of one-step-ahead predictions showed that the proposed network can attain promising performance of less than 5% of Mean Absolute Percentage Error for existing data set. Using this model, future demand of Carbon dust for five weeks was predicted.