

**OPTIMIZING MULTIPLE-MATERIALS INVENTORY AND Q/R OPERATING DOCTRINE  
WITH RESPECT TO FUNCTION: THE CASE OF INNOSON TECHNICAL AND  
INDUSTRIAL COMPANY LIMITED, ENUGU, NIGERIA**

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**ABSTRACT**

The study focused on optimizing multiple-materials inventory control system for resource allocation in the Plastic Manufacturing Industry in Nigeria with a focus on Innoson Technical and Industrial Company Limited, Enugu. Effective inventory management is concerned with making pertinent policies that border on inventory procurement and allocation of resources. The objective of the study was to optimize cost and production efficiencies of inventory materials for the production of Honour plastic chair. The study employed a statistical design, of which secondary production and cost data were used. Data collected were estimated using regression models. Ordinary Least Square (OLS) formed the basis for estimation. The study showed that the optimal values for Copolymer, Homopolymer, Filler, and Colour were 2,704.90kg, 25,058.20kg, 1,022.11kg, and 1,661.891kg, respectively. Furthermore, under optimality condition, Filler as an inventory material minimized most the total cost of inventory, followed by Colour, Copolymer, and Homopolymer in that order. The optimal (functional) values were compared to, and contrasted from the discrete EOQ values. The comparison did suggest that the Economic Order Quantity (EOQ) values obtained using the discrete methods overestimated the “optimal” values. The study concluded that optimization method minimized the total cost of inventory relative to discrete Economic Order Quantity (EOQ).

**KEYWORDS:** Optimization, Economic Order Quantity (EOQ), Inventory, Q/R Operating System, Plastic, Ordering Cost, Carrying Cost, Total Cost, Polynomial