Ain Shams University
Faculty of Engineering

Inventory Control Under Uncertainty

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In Partial Fulfillment of the
Requirements for the Degree of
Master of Science

In
Mechanical Engineering (Production)

By
Abdel Rahman Mohamed Abdel Rahman Hassan
B.Sc., Mechanical Engineering, 1978

1995

بسم الله الرحمن الرحيم

بِسم ا لله الرَحمن الرَحِيم

" وقُل رَبِ زِدْنى ِعلماً"

صدق ا لله العظيم

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Statement

This dissertation is submitted to Faculty of Engineering, Ain Shams University for the Master degree of Science in Mechanical Engineering (Production).

The work included in this thesis was carried out by the author in the Department of Design and Production Engineering, Ain Shams University, from Mars 1991 to Sept. 1995.

No part of this thesis has been submitted for a degree or a qualification at any other University or Institution.

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Summary

of the M.Sc. Thesis Titled

Inventory Control Under Uncertainty

by

Abdel Rahman Mohamed Abdel Rahman Hassan

Investments in stock items present a major problem to management.

The problem becomes even clear in case of uncertainty environments. Inventory control techniques especially those which, consider stochastic behavior offer a tool for management to effectively plan their inventory activities.

This thesis presents a single item continuous review stochastic inventory model (r,Q). The model is structured and designed to account for eight different uncertainty cases. Two policies are considered which are: backorders are allowed and demand not covered from stock is lost.

These two policies are incorporating two measures of service namely the fraction of demand covered from stock and the average number of shortage occurrences. The Laplace and Logistic distributions are used with the above four cases.

These cases are mathematically formulated with the objective to minimize the total sum of the ordering, the holding and the shortage costs subject to some constrains. These models are nonlinear and Kuhn-Tucker conditions are used to solve them.

A series of experimentations is carried out to test these models such as, the total cost, the reorder point, the reorder quantity and the service level.

Results indicate that the effect of uncertainty is noticeable where the service level is high. The total cost is high and the reorder quantity is high.

The feasible range of quantities is narrowed as the service level is lowered depending on the distribution adopted. The interrelationships of these elements for the eight cases are thoroughly analysed, discussed and conclusions are drawn.

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