

ORDER LEVEL INVENTORY SYSTEM WITH RAMP TYPE DEMAND RATE AND RANDOM DETERIORATION

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Abstract: The present paper deals with an order level inventory system for items with time dependent random deterioration and demand rate which is a ramp type function of time. Both deterministic and stochastic situations have been considered. Finally a numerical example has been given to illustrate the results derived along with its sensitivity analysis.

Keywords and Phrases: Inventory, EOQ model, random deterioration, infinite replenishment rate, ramp type demand rate

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1. Introduction

In many inventory systems, deterioration of the item stored plays an important role. Deterioration is defined as decay or damage such that the item cannot be used for its original purpose. Food items, drugs, pharmaceuticals radioactive substances, human blood, etc., are examples of items in which appreciable deterioration can occur during the normal storage period of the units and consequently this loss must be taken into account while analyzing the system. Attempts in analyzing mathematical models of inventory in which a constant or a variable proportion of the on-hand inventory deteriorates with time have been undertaken by Ghare and Schrader [3], Covert and Philip [1], Misra [7], Datta and Pal [2], Pal and Mandal [8], etc., to name only a few.

In the present paper, attempts have been made to investigate an EOQ model with demand rate a ramp type function of time along with a random deterioration. Such type of demand pattern is generally seen in the case of any consumer goods coming to the market. The demand rate for such items increases with time (in the present model, we have assumed a linear trend) up to a certain time and then ultimately stabilizes and becomes constant. It is believed that such type of demand rate is quite realistic. Inventory models with such type of demand pattern have been discussed by Hill [4], Mandal and Pal [5], etc.