

OPTIMAL ORDER POLICY FOR DETERIORATING ITEMS UNDER PRICE DISCOUNT LINKED TO ORDER QUANTITY WITH SALVAGE VALUE

Dr. Rayappan Mohan*

* College of Military Engineering, Mathematics Department, Pune, India

E-mail: mohan_rayappan@yahoo.com.

ABSTRACT

Purpose

This paper presents the possible effects of a temporary price discount offered by a supplier on a retailer's replenishment policy with linear time dependent demand rate for the deteriorating items. Salvage value is considered for the deteriorated items. The purpose of this paper is to study optimal order quantity by maximising the total cost saving during the length of depletion time for special order quantity.

Design/methodology/approach

The modelling of the inventory items with decay processes by the differential is utilized. where $I(t)$ is inventory level at time 't', $f(t)$ is demand rate at time 't'. θ is the decay rate. This paper presents in three cases for the function $f(t)$ in (i) linear demand, (ii) quadratic demand and (iii) time dependent deterioration with quadratic demand. Salvage value for the deteriorated items is considered in all cases.

$$\frac{d(I(t))}{dt} + \theta I(t) = -f(t)$$

Findings

In this paper, a study has been carried out as mentioned cases, to investigate the possible effects of a temporary price discount on a retailer's replenishment policy for deteriorating items with salvage value. Numerical examples are presented using MathCAD software to illustrate theoretical results.

Research limitations/implications

This paper can be further extended to investigate using Weibull rate of deterioration with/without salvage value. This paper further suggests by incorporating shortages in demand.

Practical implications

This paper suggests a decision process to assist retailers in deciding whether to adopt special order or regular order policy. For the case if special order policy is adopted, the optimal order quantity for the retailers is determined by maximizing the total cost saving between special and regular order during special order period.

Originality/value

Three cases of deteriorating inventory models are developed with salvage value. The maximum cost savings in linear and quadratic demand models with salvage value is very