

International Journal of Production Research >

Volume 49, 2011 - [Issue 3](#)

498 | 37 | 0
Views | CrossRef citations to date | Altmetric

Original Articles

Economic production quantity model for deteriorating inventory with random machine unavailability and shortage

Chun-Jen Chung, Gede Agus Widyadana & Hui Ming Wee ✉

Pages 883-902 | Received 29 Apr 2009, Accepted 01 Nov 2009, Published online: 24 Feb 2010

🗨️ Cite this article 🔗 <https://doi.org/10.1080/00207540903460232>

Sample our
Economics, Finance,
Business & Industry Journals
>> [Sign in here](#) to start your access
to the latest two volumes for 14 days

📄 Full Article 📊 Figures & data 📖 References 🗨️ Citations 📈 Metrics

📄 Reprints & Permissions

Read this article

🔗 Share

Abstract

Both random machine unavailability and shortage are common occurrences in manufacturing industries. In this paper, machine unavailability is considered in deriving an economic production quantity (EPQ) model for deteriorating items. We develop four EPQ models for deteriorating inventory with random machine unavailability and shortage. The study considers lost sales, backorder and two kinds of machine unavailability distributions. Numerical examples are provided to illustrate the theory. Key parameter changes that affect costs are shown in the sensitivity analysis. From the results of the sensitivity analysis, it is shown that the random machine unavailability parameter and holding cost have significant effects on the optimal total cost and production down-time.

Keywords:

Related Research Data

An optimal production run time with imperfect production processes and allowable shortages

Source: Computers & Operations Research

Production planning for a deteriorating item with stochastic demand and consumer choice

Source: International Journal of Production Economics

An economic order quantity model with defective items and shortages

Source: International Journal of Production Economics

Integrating quality and maintenance decisions in a production-inventory model for deteriorating items

Source: International Journal of Production Research

A replenishment policy for items with a price-dependent demand and a varying rate of deterioration

Source: Production Planning & Control

Optimal inventory model for items with imperfect quality and shortage backordering

Related research

People also read

Recommended articles

Cited by
37

Information for

[Authors](#)

[R&D professionals](#)

[Editors](#)

[Librarians](#)

[Societies](#)

Opportunities

[Reprints and e-prints](#)

[Advertising solutions](#)

[Accelerated publication](#)

[Corporate access solutions](#)

Open access

[Overview](#)

[Open journals](#)

[Open Select](#)

[Dove Medical Press](#)

[F1000Research](#)

Help and information

[Help and contact](#)

[Newsroom](#)

[All journals](#)

[Books](#)

Keep up to date

Register to receive personalised research and resources by email



Sign me up



Copyright © 2026 Informa UK Limited [Privacy policy](#)

[Cookies](#) [Terms & conditions](#) [Accessibility](#)

Registered in England & Wales No. 01072954
5 Howick Place | London | SW1P 1WG



Taylor & Francis
by informa