IIE Transactions ›
Volume 46, 2014 - Issue 3: Design & Manufacturing

Original Articles

A comparison of make-to-stock and make-to-order in multi-product manufacturing systems with variable due dates

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Pages 197-212 | Received 01 Nov 2011, Accepted 01 Apr 2013, Accepted author version posted online: 29 May 2013, Published online: 07 Dec 2013

Cite this article https://doi.org/10.1080/0740817X.2013.803638

Abstract

This article models a single-stage hybrid production system, which can be regarded as a Make To Order (MTO) production system with safety stocks or a Make To Stock (MTS) production system with advance demand information. In an environment with multiple products and variable customer due dates, optimality conditions for safety stocks (base stocks) and safety lead times (work-ahead window) that minimize inventory and backorder costs are derived. For a simplified M/M/1 system with exponentially distributed customer required lead time, an explicit comparison between MTO and MTS is conducted. A pure MTO policy gets relatively more favorable to a pure MTS policy if inventory holding costs increase, backorder costs decrease, the mean customer required lead time increases, or the processing rate increases. In a numerical study, the

influence of variance, the behavior of optimal parameters, and the cost reduction potential of this hybrid policy are shown.

Keywords:

Manufacturing system design | manufacturing system control | multi-product production system | make-to-order | make-to-stock | variable due dates | queuing

Acknowledgement

The authors thank the two anonymous reviewers for their helpful suggestions that improved the quality of the manuscript.

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