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

Klaus Altendorfer & Stefan Minner

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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

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