International Journal of Production Research ›
Volume 42, 2004 - Issue 4

Original Articles

Accounting for idle capacity cost in the scheduling of economic lot sizes

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Pages 677-691 | Published online: 21 Feb 2007

Cite this article https://doi.org/10.1080/00207540310001643384

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Abstract

This paper considers the issue of idle capacity cost in determining economic lot sizes. Two mathematical models are developed for the economic lot scheduling problem (ELSP). In Model I, the ELSP with fixed production rates is formulated under both the common cycle and time-varying lot sizes approaches. The associated constrained optimization problem in the time-varying lot sizes approach is reduced to solving a parametric quadratic programming problem. In Model II, the modified ELSP (or MELSP) is treated with variable production rates and unit production cost of each item as a function of its production rate. An upper bound and a lower bound on the MELSP are derived. Lot-sizing decisions of the proposed models are obtained and their dependencies on the idle capacity cost are examined with numerical examples.

Acknowledgements

The research of Ilkyeong Moon has been supported by a Pusan National University Research Grant.

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