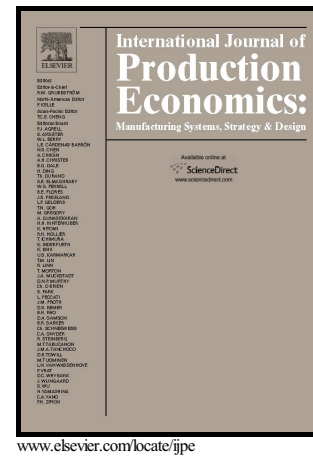


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PII: S0925-5273(16)30058-5
DOI: <http://dx.doi.org/10.1016/j.ijpe.2016.04.024>
Reference: PROECO6400

To appear in: *Intern. Journal of Production Economics*

Received date: 5 February 2016
Revised date: 22 April 2016
Accepted date: 29 April 2016

Cite this article as: A. Ben Mabrouk, A. Chelbi and M. Radhoui, Optimal imperfect maintenance strategy for leased equipment, *Intern. Journal of Production Economics*, <http://dx.doi.org/10.1016/j.ijpe.2016.04.024>

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Optimal Imperfect Maintenance Strategy for leased equipment

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Abstract:

This paper presents a preventive maintenance (PM) policy for leased equipment over a finite lease period L . Maintenance is entrusted to the lessor. The purpose is to determine the PM period T minimizing the expected total cost over the lease period in a context where repairs and PM actions are imperfect and have non-negligible durations. The leased equipment is periodically subjected to imperfect PM restoring it to the state ‘as good as new’ with probability p and keeping it at state ‘as bad as old’ with probability q . In case of failures between successive PM actions, imperfect repairs are performed with a given efficiency following a decreasing quasi-renewal process. Besides the maintenance costs, the lessor may incur a penalty cost if the total expected equipment downtime due to repair and PM during the lease period exceeds a pre-specified threshold. A mathematical model and a numerical algorithm are developed to find the optimal maintenance strategy T^* over the lease period for any given set of input parameters (equipment reliability, the lease period length, the repair and PM efficiency levels, and the maintenance and penalty costs). A numerical example is presented and the obtained results are discussed.

Keywords: Leasing, PM, Imperfect maintenance, Quasi-renewal process, (p, q) model.

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