

Impact of agile, condition-based maintenance strategy on cost efficiency of production systems

Bányai, Á.^{a,*}

^aInstitute of Logistics, University of Miskolc, Miskolc, Hungary

ABSTRACT

Maintenance plays an increasingly important role in the life of production companies, as professional maintenance is an important prerequisite for the reliable operation of resources. A well-chosen maintenance strategy can make a major contribution to increased efficiency of production processes. The main goal of this research is to propose a novel optimization approach to define optimal maintenance strategy that ensures the efficient operation of the production process while reducing maintenance costs. The developed optimization method is based on Howard's policy iteration and describes the objective of the planning as a Markov decision process. The novelty and the scientific contribution of the presented study is the application of Howard's policy iteration methodology in a Markov decision process for agile, condition-based maintenance strategy optimization. As the results of the numerical analysis of the scenarios shows, the implementation of an optimized maintenance strategy based on the proposed approach can significantly increase the maintenance efficiency of the production process. The main reason for this is that the level and type of maintenance is always implemented depending on the current state of the system components, which reduces both the maintenance cost and the losses due to production downtime.

ARTICLE INFO

Keywords:
Agile maintenance strategy;
Productivity;
Process control;
Markov decision process;
Maintenance strategy;
Optimization;
Smart manufacturing

***Corresponding author:**
agota.banyaine@uni-miskolc.hu
(Bányai, Á.)

Article history:
Received 9 May 2023
Revised 17 October 2023
Accepted 13 November 2023



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