

# Integrated production and maintenance policy for manufacturing systems prone to products' quality degradation

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## ABSTRACT

This paper proposes an integrated production planning and preventive maintenance strategy for manufacturing systems prone to quality degradation. The production planning focus on the regulation of production rates and the sizing of finished product's safety stock to meet customer's demand. The safety stock is built to palliate shortages when the manufacturing operation begins generating non-conforming products and is shutdown to perform restoration action. In the other hand, preventive maintenance activities are also planned to minimise the quantity of non-conforming products. Mathematical models are proposed and consider all sub-policies and scenarios contingent on the production control policy as well as the entire range of possible values for the safety stock level. A numerical procedure has been established to ascertain the optimal integrated policy, aiming to minimize the total accrued cost per time unit along an infinite horizon. A simulation model has also been created to check and validate the analytical results. Finally, a comparative analysis is presented to prove that the proposed joint policy outperforms other strategies considered in the literature and practice and can result in substantial economic gains.

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