عنوان مقاله:

Using a P control chart for joint optimization of maintenance, quality, and buffer stock policies in single machine production systems

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خلاصه مقاله:

This paper aims to introduce a joint optimization approach for maintenance, quality, and buffer stock policies in single machine production systems based on a P control chart. The main idea is to find the optimal values of the preventive maintenance period, the buffer stock size, the sample size, the sampling interval, and the control limits simultaneously, such that the expected total cost per time unit is minimized. In the considered system, we have a fixed rate of production and stochastic machine breakdowns which directly affect the quality of the product. Periodic preventive maintenance (PM) is performed to reduce out-of-control states. In addition, corrective maintenance is required after finding each out-of-control state. A buffer is used to reduce production disturbances caused by machine stops. To ensure that demand is met during a preventive and corrective maintenance operation. All features of three sub-optimization problems including maintenance, quality control, and buffer stock policies are formulated and the proposed integrated approach is defined and modeled mathematically. In addition, an iterative numerical optimization procedure is developed to provide the optimal values for the decision variables. The proposed procedure provides the optimal values of the preventive maintenance period, the buffer stock size, the sample size, the sampling interval, and the control chart limits simultaneously, in a way that the total cost per time unit is minimized. Moreover, some sensitivity analyses are carried out to identify the key effective parameters.

کلمات کلیدی:

joint optimization, periodic preventive maintenance (PM), corrective maintenance, P control chart, buffer stock

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