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The present paper analyses the reliability and cost-benefit for a single unit system with scheduled maintenance and variation in demand. As Change in demand affects the production of system also, hence sometimes, the system needs to be shut down when the number of produces are in excess as compared to those demanded. Revenue in case of both types of up states i.e., when demand is greater than or equal to production and when demand is less than production have also been taken under consideration while carrying out the cost-benefit analysis. The loss incurred to the system when it is kept shut down due to less demand has also been taken into account. Optimized reliability indices of the system effectiveness are estimated numerically using semi-Markov processes and regenerative point technique. Expression for the expected profit is obtained after obtaining various measures of system effectiveness. We can conclude that cut off points for various rates/probabilities/revenue per unit up time/costs can be obtained which help in deciding the upper/lower acceptable values of rates/costs so that the system is profitable.

Keywords: Single Unit System, Scheduled Maintenance, Variation in Demand, Regenerative Point Technique, MTSF, Cost-Benefit Analysis

Literature of Reliability contains lot of studies on the reliability and cost-benefit analysis of various systems. These studies are contributed by various researchers including Rizwan *et al.* (2010); Manocha *et al.* (2011) and Kumar and Kumar (2012) where in the concepts of operating and rest periods, hot standby Programmable Logic Controller, random inspection, instructions, ash water pump systems with and without failed states, hardware based software interaction failures and different types of recovery have been taken up. These studies have considered the demand as fixed. However, there exist many practical situations where the demand of the units produced is not fixed. Such a situation may be seen in General Cable Energy System and hence there is need of studying reliability and availability analysis of a system

present paper investigates the reliability and cost-benefit analysis of a single unit system with scheduled maintenance and variation in demand. As variation in demand affects the production and hence the system is required to be put to down state when the units produced are already in excess. The system in the down state is made operative as soon as the produced units are less in number than those demanded.

In this study, the probabilistic analysis of the system is analyzed by making use of semi-Markov processes and regenerative point technique and have obtained various measures of system effectiveness such as Mean Time to System Failure, The Steady State Availability

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