

An optimum maintenance strategy for machine repair problem with spares and server vacations

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Abstract

This paper studies the machine repair problem consisting of M operating machines with S spare machines, and R servers (repairmen) who leave for a vacation of random length when there are no failed machines queuing up for repair in the repair facility. At the end of the vacation the servers return to the repair facility. Two vacation policies of servers are considered. First, the servers take vacations repeatedly until they find the repair facility has at least one waiting failed machine in the queue. Second, the servers don't take a vacation again and remain idle until the first arriving failed machine arrives, which starts a busy period in the repair facility. For both policies, birth and death process is used to developed the steady-state probabilities of the number of failed machines in the system as well as the performance measures. Some special cases are given. A Cost model is developed to obtain the optimal values of the number of spares and the number of servers while maintaining a minimum specified level of system availability.

Keywords : *Machine repair problem, multiple vacations, single vacation, steady-state probability.*

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