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Performance Evaluation and Cost Analysis of Standby Systems

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Abstract : Pumping systems are an integral part of water desalination plants, their effective functioning is vital for the operation of a plant. In this research work, the reliability and availability of pressurized pumps in a reverse osmosis desalination plant are studied with the objective of finding configurations that provides optimal performance. Six configurations of a series system with different number of warm and cold standby components were examined. Closed form expressions for the mean time to failure (MTTF) and the long run availability are derived and compared under the assumption that the time between failures and repair times of the primary and standby components are exponentially distributed. Moreover, a cost/ benefit analysis is conducted in order to identify a configuration with the best performance and least cost. It is concluded that configurations with cold standby components are preferable especially when the pumps are of the size.

Keywords : availability, cost/benefit, mean time to failure, pumps
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