Abstract

A repairable system of two non-identical units - one is an original (called main unit) and other is a substandard (called duplicate unit) is investigated stochastically under different weather conditions – normal and abnormal. The system starts its operation with original unit keeping duplicate unit in cold standby. There is a direct failure of each unit from normal mode. Both units are capable in performing the system functions well. A single server is called immediately to do repair of the unit whenever needed. The operation and repair of the units are stopped in abnormal weather. And, in normal weather, priority is given for operation and repair to the original unit over duplicate unit. After repair unit works as new. All random variables are statistically independent and uncorrelated. The failure time of the units and time to change of weather conditions follow negative exponential distributions while repair times of the units are arbitrarily distributed. Various reliability and performance measures are obtained in steady state using semi-Markov process and regenerative point technique. The graphical behavior of MTSF, availability and profit function with respect to normal weather rate has also been observed for a particular case.


Index Terms

Computer Science
Applied Sciences

Keywords
Repairable system  Non-identical units  Different weather conditions  Priority
Reliability measures and Stochastic analysis