Abstract

In this paper, a reliability model of a system of two non-identical units in which one main unit (called original) is initially operative and other is a substandard unit which is kept as spare in cold standby is examined probabilistically in detail under two weather conditions – normal and abnormal. Each unit has direct complete failure from normal mode. There is a single server who visits the system immediately whenever needed. The operation and repair of the units are not allowed in abnormal weather. However, operation and repair of the units are as usual in normal weather subject to the condition that duplicate unit will not work if main unit is available for working in the system. The distributions of failure time of the units and change of weather conditions follow negative exponential while that of repair time of the units are assumed as arbitrary with different probability density functions. All the random variables are mutually independent and uncorrelated. The expressions for some important measures of system effectiveness are derived in steady state using semi-Markov process and regenerative point technique. The graphical study of MTSF, availability and profit has also been made on the basis of numerical results obtained for a particular case. The results of the present paper has also been compared with the model proposed by Malik and Deswal [6].
References


Index Terms

Computer Science Applied Sciences

Keywords

Repairable system Non-Identical units Weather conditions and Stochastic analysis