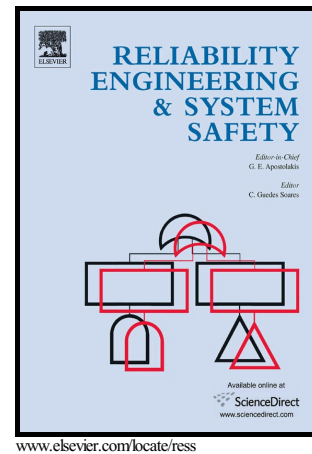


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A Trivariate Optimal Replacement Policy for a Deteriorating System Based on Cumulative Damage and Inspections

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Abstract

In this article, we study a trivariate replacement model for a deteriorating system consisting of two units. Failures of unit 1 can be classified into two types. Type I failure (minor failure) is fixed by a minimal repair and type II failure (catastrophic failure) is removed by a replacement. Both types of failures can only be detected through inspection. Each type I failure of unit 1 will result in a random amount of damage to unit 2 and the damages are cumulative. The probability of type I failure or type II failure is assumed to depend on the number of failures since the last replacement. We formulate a replacement policy based on the number of type I failure, the occurrence of the first type II failure, and the amount of accumulative damages. Hence the system is replaced either preventively or correctively at any of the following four conditions depend on whichever occurs first; preventively (a) at the N th type I failure; or (b) when the total damage of unit 2 exceeds a pre-specified level

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