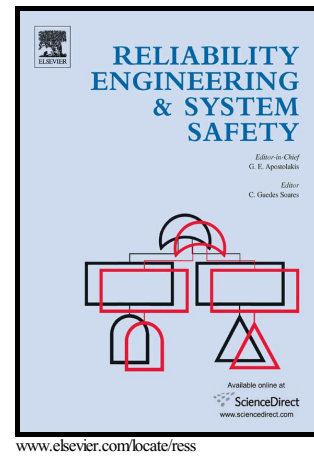


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**A two-phase inspection model for a single component system with three-stage
degradation**

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Abstract

This paper presents a two-phase inspection schedule and an age-based replacement policy for a single plant item contingent on a three-stage degradation process. The two phase inspection schedule can be observed in practice. The three stages are defined as the normal working stage, low-grade defective stage and critical defective stage. When an inspection detects that an item is in the low-grade defective stage, we may delay the preventive replacement action if the time to the age-based replacement is less than or equal to a threshold level. However, if it is above this threshold level, the item will be replaced immediately. If the item is found in the critical defective stage, it is replaced immediately. A hybrid bee colony algorithm is developed to find the optimal solution for the proposed model which has multiple decision variables. A numerical example is conducted to show the efficiency of this algorithm, and

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