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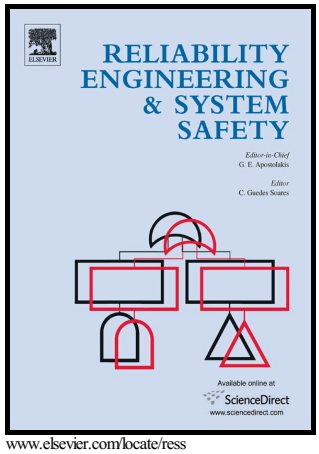

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Abstract

Maintenance is essential to prevent catastrophic failures in rotating machinery. A crack can cause a failure with costly processes of reparation, especially in a rotating shaft.

In this study, the Wavelet Packets transform energy combined with Artificial Neural Networks with Radial Basis Function architecture (RBF-ANN) are applied to vibration signals to detect cracks in a rotating shaft. Data were obtained from a rig where the shaft rotates under its own weight, at steady state at different crack conditions. Nine defect conditions were induced in the shaft (with depths from 4% to 50% of the shaft diameter). The parameters for Wavelet Packets transform and RBF-ANN are selected to optimize its success rates results. Moreover, 'Probability of Detection' curves were calculated showing probabilities of detection close to 100% of the cases tested from the smallest crack size with a 1,77% of false alarms.

Key words:
Cracked shaft detection, Wavelet transform, Intelligent Classification Systems, Condition monitoring, Artificial Neural Networks

1 Introduction

The main objective of condition monitoring of rotating machinery is to detect faults before a catastrophic failure occurs. Besides, detection must arrive early enough to have time for programming a stop at the most convenient moment. This kind of maintenance has a lot of advantages, such as the avoidance of stopping and dismount the elements of the machine to check its status, and

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