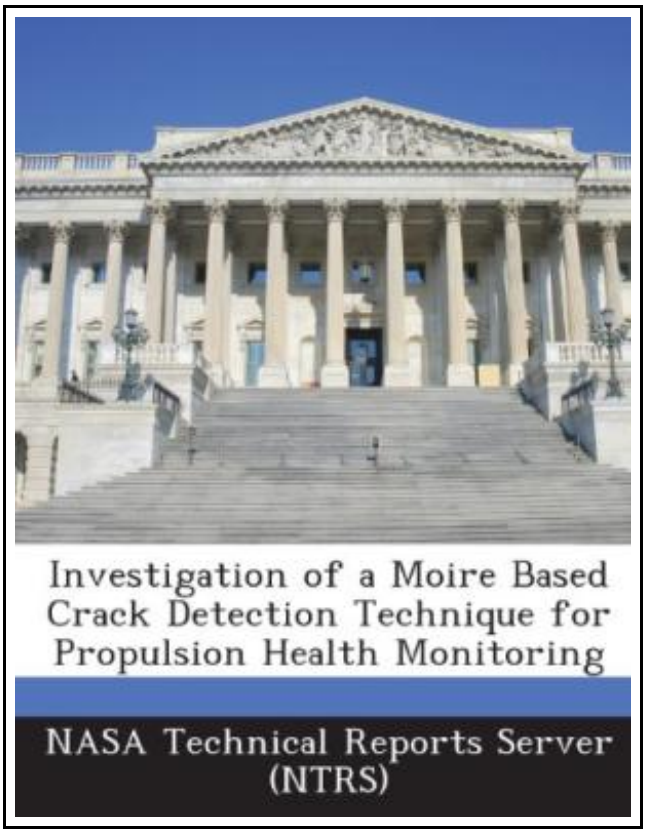
Investigation of a Moire Based Crack Detection Technique for Propulsion Health Monitoring



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(Robyn Nolan)

INVESTIGATION OF A MOIRE BASED CRACK DETECTION TECHNIQUE FOR PROPULSION HEALTH MONITORING

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BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 22 pages. Dimensions: 9.7in. x 7.4in. x 0.1in.The development of techniques for the health monitoring of the rotating components in gas turbine engines is of major interest to NASA s Aviation Safety Program. As part of this on-going effort several experiments utilizing a novel optical Moir based concept along with external blade tip clearance and shaft displacement instrumentation were conducted on a simulated turbine engine disk as a means of demonstrating a potential optical crack detection technique. A Moir pattern results from the overlap of two repetitive patterns with slightly different periods. With this technique, it is possible to detect very small differences in spacing and hence radial growth in a rotating disk due to a flaw such as a crack. The experiment involved etching a circular reference pattern on a subscale engine disk that had a 50. 8 mm (2 in.) long notch machined into it to simulate a crack. The disk was operated at speeds up to 12 000 rpm and the Moir pattern due to the shift with respect to the reference pattern was monitored as a means of detecting the radial growth of the disk due to the defect. In addition, blade displacement data were acquired using external blade tip clearance and shaft displacement sensors as a means of confirming the data obtained from the optical technique. The results of the crack detection experiments and its associated analysis are presented in this paper. This item ships from La Vergne,TN. Paperback.

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