

Computer Based Method to Detect Defects of Rotor Mechanisms

A Dissertation by

NILANTHA VAJIRAPANI KULARATHNE

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Supervised By

Dr. N.D. KODIKARA

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ABSTRACT

The need for improved performance from expensive industrial plant has in recent years necessitated the application of 'Condition-Monitoring' methodologies. These can provide early warning of potential failure with the opportunity of organizing avoidance strategies to minimize lost time and unexpected costs, thus greatly improving manufacturing efficiency.

The present day requirement for, ever increasing reliability in the field of rotor dynamics is now more important than ever before and continues to grow constantly. Advances are continually being made in this area, due largely to the consistent demand from the power-generation and transportation industries including marine transportation. Because of progress made in engineering and materials science, rotating machinery is becoming both, faster and lighter, as well as being required to run for longer periods of time. All of these factors mean that the detection, location and analysis of faults play a vital role in the field of rotor dynamics.

All rotor mechanisms consist of shafts, bearings, couplings, gears etc. These machineries operate under various load conditions from light to heavy. All these rotor mechanisms, which are made of steel, transmit vibration. By the reasons, vibration of machines are very big by nature, reduction of vibration is important subject.

Objective of the Project:

The aim of the project was to design a computer based method to detect the defects of the Rotor Mechanisms. Since the rotor mechanisms consist of shafts, couplings and bearings etc., it tends to cause severe vibrations due to various running and incipient defects. These defects can be diagnosed by measuring the level of vibration to the extent they excited.

Methodology:

A model of the transmission system of the ship "M/V Lanka Mahapola" was used as the test rig. Accelerometers were mounted on the bearings to trace the exciting frequencies and amplitudes of the bearings.

Final Outcome:

A software program based on the AUTO Lisp has developed to diagnose the defects of bearings of rotor mechanism.