

**DETECTION OF BROKEN ROTOR BARS USING
MOTOR VIBRATION ANALYSIS**

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ABSTRACT

This paper described the detection of broken rotor bars using motor vibration analysis. The main objective is to study and diagnose the problem in AC induction motor by using motor vibration analysis to monitor its condition. Motor vibration analysis is performed with the motor on-line using CSI Machinery Analyzer. This provides the information of vibration spectrum to determine broken or cracked rotor bars and it is also useful for detecting various rotor faults. The scope of analysis information spectrum covers on the broken rotor bars of AC induction motor. Information from analyzer will be diagnoses using Artificial Intelligence software to show whether the condition of motor is in good health or not. The development utilizing of this Fuzzy Logic software allows a faster analysis and more accurate result.

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CHAPTER 1

1.1 Introduction

In 1897 Nikola Tesla exhibited the first elementary form of polyphase induction motor. Two years later Dobrowolsky described a machine with a cage rotor and distributed stator winding. Ever since then induction motors have enjoyed an increasing popularity and are being used in far greater numbers than any other type of machine, due to being a relatively simple device [3].

The simplicity of the induction machine principle is obvious in that their construction is robust, reliable and relatively inexpensive making it a natural choice for the majority of motor application ranging from fractional watt power of induction machine indicates a predominant ratio of 85% in comparison with other types of machine and are being used extensively in industrial process.

The stator of an induction motor is similar to that of the synchronous motor but the rotor structure is different. These are two forms of rotor (i.e cage rotor and the wound rotor). In the cage rotor machine, the rotor winding consists of conductors in the passes through slots in the lamination iron core of the rotor. The bars are connected to low resistance rings (known as end-ring) at each end of the core, so that any pair of conductors forms a short-circuited turn.

Although it has mentioned that induction machine are designed to be relatively robust and reliable, failure are inevitable. Amongst the many type of failure in induction machine, there appears to be a significant and steady number of cases of rotor bar failures. Defect developed in the rotor circuits may subsequently cause the motor to fail. One of the most common defect is the open-circuited rotor bars. The problem as witnessed in recent year, seems to relate to machine of large from size of the order of above 200hp, particularly the two pole machine running at 3000rpm. In large machine it