

Analysis of magnetic flux density for airgap eccentricity and bearing faults

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Abstract—This paper involves current signal frequency analysis for airgap eccentricity and bearing damage in induction motors. Magnetic flux density in the airgap is calculated to get effect of faults on current signal. Equation of characteristic frequencies for eccentricity is revised. In addition, a sudden eccentricity is simulated in short intervals to get effect of bearing damages. Therefore, new frequencies are detected for bearing faults that is related with eccentricity. This knowledge impresses most of the experimental condition monitoring systems and diagnosis systems.

Keywords—Airgap Eccentricity, Bearing Damage, Fault Detection, Induction Motor.

I. INTRODUCTION

Induction motors take important place in factories. Failure of electrical machines causes loss of money so increment of

motor reliability has been studied. The main reason of failures in induction motors are faults such as,

1. Unbalanced rotor
2. Eccentricity
3. Bearing damage
4. Broken bar
5. Winding faults
6. Looseness
7. Oil effect.

These faults can be detected by online monitoring of vibration and current signals to increase the reliability of machines. A review of fault detection is given in [1]-[3]. The main reasons of faults can be arranged as follow,

1. Over temperature
2. Unbalanced temperature

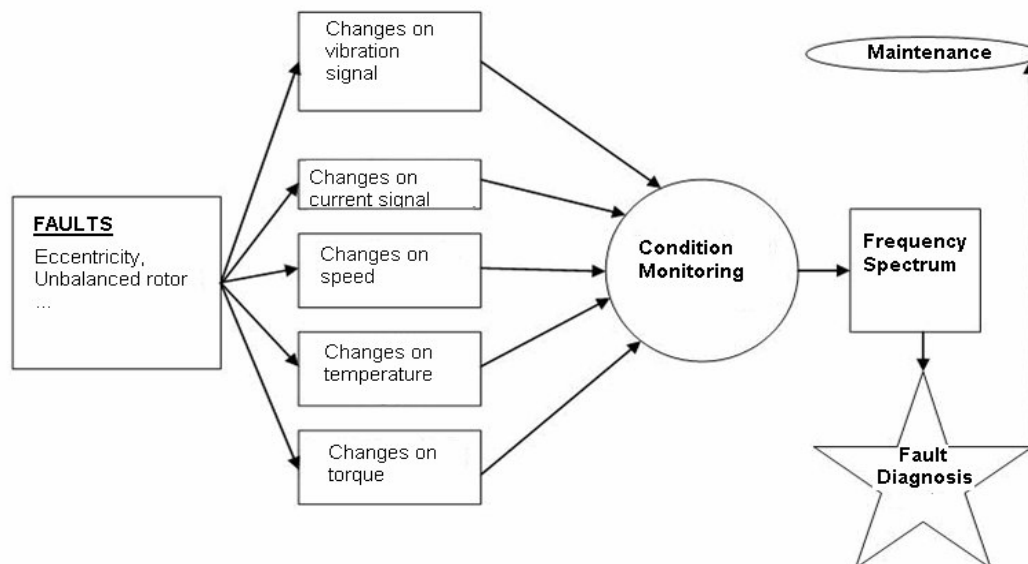


Fig. 1 fault detection

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3. Unbalanced pull-force
4. Electromagnetic force
5. Improper lubrication of bearings

