Review paper on Stator and Rotor Fault Diagnosis Of 3-Phase Induction Motors

Prabhu K., Department Of Electrical Engineering

Galgotias University, Yamuna Expressway Greater Noida, Uttar Pradesh

E-mail id - k.prabu@galgotiasuniversity.edu.in

ABSTRACT: I.M., I.M. In almost every other sector, they are commonly used. Electrical power control, such as industrial engineering, the mechanical and development fields. Motors with induction are simple, powerful, and therefore the most robust, with a very high around reliability.But they are vulnerable, like any other engine, to Faults that, if not taken into account, can lead to catastrophic Motor failure in the continuous operation phase. Condition, Condition Induction motor monitoring has been widely used in the identification of defects. The different faults and defects in this paper Review of traditional and novel induction methods engine faults.

KEYWORDS:ANN, Computer Simulation, Data Acquisition, Fast Fourier Transforms, Fault Diagnosis, Fuzzy Logic, Induction Motors, Parameter Estimation, Vibration Measurement, Wavelet Transforms.

INTRODUCTION

For each industry, induction engines are the most important. However, they will inevitably malfunction, as in every other computer, owing to heavy operational duties, bad working conditions, inappropriate installation and output factors, etc. With increasing reliability and efficiency requirements, the field of Diagnosis of faults in induction engines is gaining significance[1]. If the faults are not expected beforehand, it can lead to significant sales losses, as well as risks to security and reliability, Operating protection. Many techniques have, however, been Suggested for identification and diagnosis of fault, but most of the Methods need a good amount of information to implement them effectively.Simpler approaches are needed to enable even amateurish operators with nominal knowledge of the system to scan the fault condition and make reliable decisions[2].

Rotor Faults:

Rotor faults can be induced by electrical failures such as a bar defect or bar breakage or mechanical failures such as rotor eccentricity. The first fault occurs from thermal stresses, hotspots, or fatigue stresses during transient operations such as start-up, especially in large motors. A broken bar changes torque significantly and became dangerous to the safety and consistent operation of electric machines[3].
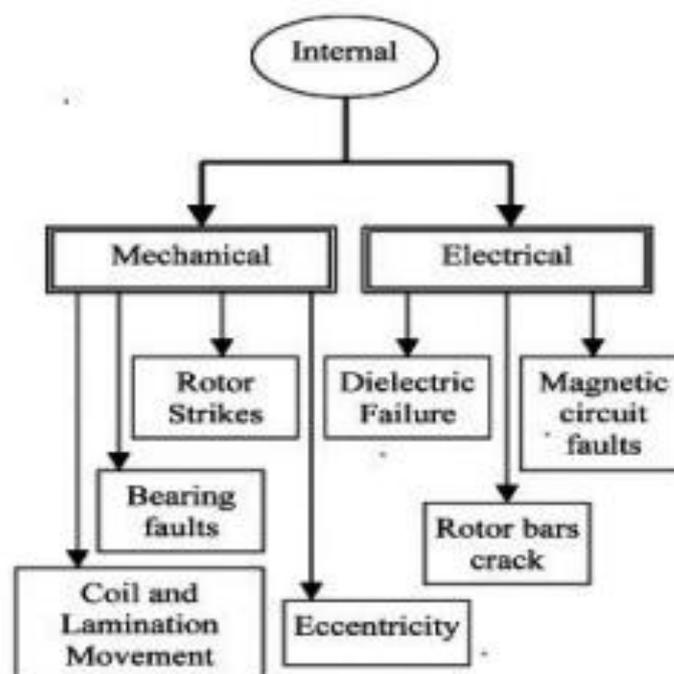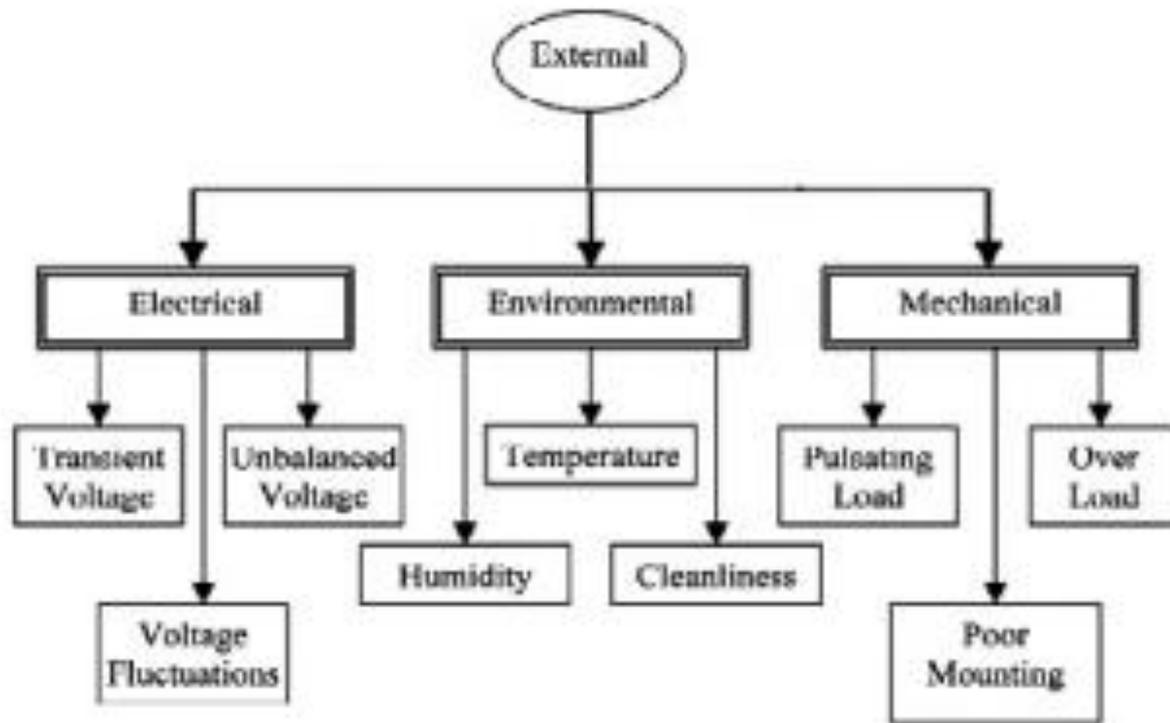

Fig. 1:Block Diagram Presentation of Internal Faults[4]**.**

Fig. 2: Block Diagram Representation of External Faults[5]**.**

The induction motor is subjected to primary types of fault and related secondary faults. Fig.1 classifies the sources of induction motor faults. In Fig. 1, the internal fault tree is depicted and Broadly, an induction motor can develop either internal fault or external fault. With reference to the origin, a fault may be mechanical or electrical[1] Fault can be classified as stator fault or rotor fault depending on the location of the fault. Faults associated with the moving parts like bearing and cooling faults are categorized as rotor faults. Specifically, induction motor faults can be broadly classified into bearing failures, stator faults, rotor faults, air gap eccentricity, mechanical vibrations, etc. Fig.2 illustrates the relative probability of occurrences of various faults in an induction machine

The standard method of diagnosis is composed of an assembly of the sensor that delivers the fault signal to a signal processing device that further sends the outcome for review Expert networks, where the related fault is detected, eventually[6].

Stator Faults:

An induction engine is exposed to different stresses, such as thermal, electrical, chemical, and mechanical. Most stator defects may be due to such stressful operating conditions. The situations. Stator winding faults, such as turn-to-turn, Coil-to-coil, phase-to-phase and coil-to-ground open circuit, some of the more common and potentially destructive are defects. If left undetected, eventually these can cause a cataclysmic motor failure. The three major divisions the following are described in the stator defects[7].

CONCLUSION

For fault detection, expert systems can be used using laws derived from the weight of relation of a supervised neural networks and heuristic rules derived from about information. This Artificial Neural Networks combination the control system will boost and expert knowledge suitable for diagnosis.In addition, a vibration harmonics data base for different reasons, the use of experimental and theoretical investigations normal dimensions and specification of three-phase induction motors they can be produced. By means of this database, a new norm for Instead of the traditional one, vibration can be created, which depends on the vibration velocity of the RMS rather than the vibration velocity Harmonic amplitude. In addition, a data base for harmonics of vibration for different reasons, the use of experimental and theoretical investigations normal dimensions and specification of three-phase induction motors they can be produced. By means of this

database, a new norm for instead of the traditional one, vibration can be created, which depends on the vibration RMS velocity.

REFERENCES

[1]   *Vector Control of Three-Phase AC Machines*. 2008.

[2]   A. C. Induction, I. Field, and O. Control, "Application note Sensor field oriented control (IFOC) of three-phase AC induction motors using ST10F276," *ReVision*, 2006.

[3]   O. Janssens *et al.*, "Convolutional Neural Network Based Fault Detection for Rotating Machinery," *J. Sound Vib.*, 2016, doi: 10.1016/j.jsv.2016.05.027.

[4]   K. L. Shi, T. F. Chan, Y. K. Wong, and S. L. Ho, "Modelling and simulation of the three-phase induction motor using SIMULINK," *Int. J. Electr. Eng. Educ.*, 1999, doi: 10.7227/IJEEE.36.2.6.

[5]   V. N. Ghate and S. V. Dudul, "Cascade neural-network-based fault classifier for three-phase induction motor," *IEEE Trans. Ind. Electron.*, 2011, doi: 10.1109/TIE.2010.2053337.

[6]   A. Glowacz and Z. Glowacz, "Diagnosis of the three-phase induction motor using thermal imaging," *Infrared Phys. Technol.*, 2017, doi: 10.1016/j.infrared.2016.12.003.

[7]   J. Bird, "Three-phase induction motors," in *Electrical and Electronic Principles and Technology*, 2018.

 Prachi Dewal, Gagandeep Singh Narula and Vishal Jain, "Detection and Prevention of Black Hole Attacks in Cluster based Wireless Sensor Networks", 10th INDIACom; INDIACom-2016, 3rd 2016 International Conference on "Computing for Sustainable Global Development", 16th – 18th March, 2016 having ISBN No. 978-9-3805-4421-2, page no. 3399 to 3403.

•   Ishleen Kaur, Gagandeep Singh Narula, Vishal Jain, "Differential Analysis of Token Metric and Object Oriented Metrics for Fault Prediction", International Journal of Information Technology (BJIT), Vol. 9, No. 1, Issue 17, March, 2017, page no. 93-100 having ISSN No. 2511-2104.

•   Basant Ali Sayed Alia, Abeer Badr El Din Ahmedb, Alaa El Din Muhammad,El Ghazalic and Vishal Jain, "Incremental Learning Approach for Enhancing the Performance of Multi-Layer Perceptron for Determining the Stock Trend", International Journal of Sciences: Basic and Applied Research (IJSBAR), Jordan, page no. 15 to 23, having ISSN 2307-4531.•RS Venkatesh, PK Reejeesh, S Balamurugan, S Charanyaa, "Further More Investigations on Evolution of Approaches for Cloud Security", International Journal of Innovative Research in Computer and Communication Engineering , Vol. 3, Issue 1, January 2015

•   K Deepika, N Naveen Prasad, S Balamurugan, S Charanyaa, "Survey on Security on Cloud Computing by Trusted Computer Strategy", International Journal of Innovative Research in Computer and Communication Engineering, 2015

•   P Durga, S Jeevitha, A Poomalai, M Sowmiya, S Balamurugan, "Aspect Oriented Strategy to model the Examination Management Systems", International Journal of Innovative Research in Science, Engineering and Technology , Vol. 4, Issue 2, February 2015