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Innovation Technology for Detection of Tangible & Intangible Failure Modes Through Condition Base Monitoring System

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***Abstract*-Primary signals are generally those signals or parameters which are required to assess the performance of the equipments and which are designed to be emanated, such as oscillations in vibratory chutes/ Screens etc. Monitoring of primary signals are termed as "Performance monitoring" or "Performance Trend Monitoring". All other signals, which appear as loss output, like vibration, sound thermal, chemical or physical changes etc, are termed as secondary signals. Secondary signals are, normally, not designed for. Monitoring primary signals alone does not help in efficient assessment of health and condition of equipments/ machines. As secondary signals are generally result or form of loss output, monitoring of these signals becomes inevitable and, often more necessary, for equipment health monitoring and technical diagnostics. It is again emphasized that selection of condition monitoring parameters. Monitoring points and sampling points, monitoring frequencies and techniques and analysis of monitored parameters/ signals are to be done timely and Efficiently to enable maintenance personnel take timely actions.**

***Keywords*-CM, EHM, CBM and TBM etc.**

I.INTRODUCTION

Condition monitory (CM) is determining the health and condition of equipment, machines and systems etc by observing, checking , measuring and monitoring certain parameters and signals etc. In broader sense, it is said as Equipment Health Monitoring (EHM). The concept of EHM is a simple one – Monitor the steady state characteristics of the equipment and learn those characteristics. If these conditions change in a negative way then generate an alarm, investigate the problem and make a correction before the fault becomes so serious that a plant is shut down, production is lost and cost spiral. Condition monitoring (CM) is not a life –extending activity. Life extending activities are things such as lubrication, alignment, balancing and operating procedures. CM only provides information on failures before there is a breakdown.

Condition base Maintenance mainly depends on efficient condition monitoring. It is again emphasized that selection of condition monitoring parameters. Monitoring points and sampling points, monitoring frequencies and techniques and analysis of monitored parameters/ signals are to be done timely and efficiently to enable maintenance personnel take timely actions.

Aluminium metal matrix composites (AMMC) are the composites in which aluminium is used as the matrix and several reinforced materials are embedded into the matrix. Some of the reinforced materials are silicon carbide, graphite, fly ash, particulate alumina, red mud, cow dung

II. LITERATURE REVIEW

The spin momentum locking of the TSS is due to the large spin orbit coupling. Spin orbit coupling (SOC) is the phenomena wherein the spin of a particle interacts with its motion, which can affect the band structure. SOC affects the band structure of all materials. In some materials, when the SOC is large, it can cause the p-band (valence band) to bend upwards and the s-band (conduction) to bend downwards, which can eventually lead to 'band inversion', when they cross each other.

The vacuum tube voltmeters, also known as the valve voltmeters, were next in line of invention. Industries everywhere accepted these, as they were to be used with circuits that had high impendence. However, it specifically worked with 1 megohm circuit impendence, and hence, sometimes had problems with the lower ones. With minor changes in the voltmeter, the field effect transistor was introduced, which was followed by the analog transistor. They came enabled with varied features

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like capacitance, frequency, duty cycles etc. and became a must-have tool for every technician.

The moving coil (and its cousin the moving iron) multimeter makes use of a principal discovered by Hans Christian Oersted (1777-1851) in 1820; an electric current in a wire produces a magnetic field. The magnetic field exerts a force on a coil (or iron magnet), making it turn. This moves the attached pointer, allowing a measurement to be read off the graduated scale. Its greatest limitation is the need to use the very current being measured when it's operating as a voltmeter.

III. EXPERIMENTAL SETUP

The first Avometer had a sensitivity of 60 ohms per volt, three direct current ranges (12 mA, 1.2 A, and 12 A), three direct voltage ranges (12, 120, and 600 V or optionally 1200 V), and a 10,000 ohm resistance range. An improved version of 1927 increased this to 13-ranges and 166.6 ohms per volt (6 mA) movement. A "Universal" version having additional alternating current and alternating voltage ranges was offered from 1933 and in 1936 the dual sensitivity Avometer Model 7 offered 500/100 ohms per volt.[6] Between the mid 1930s until the 1950s, 1000 ohms per volt became a de facto standard of sensitivity for radio work and this figure was often quoted on service sheets. However, some manufacturers such as Simpson, Triplett and Weston, all in the USA, produced 20,000 ohm per volt VOMs before the Second World War and some of these were exported. After 1945/6, 20,000 ohms per volt became the expected standard for electronics but some maker offered even more sensitive instruments. For industrial and other "heavy-current" use low sensitivity multimeters continued to be produced and these were considered more robust than the more sensitive types.

Fig 1Digital Multimeter.

IV. EXPERIMENTAL INVESTIGATIO

Avoid this common and serious mistake: inserting test leads into incorrect input jacks. Doing so can lead to a dangerous arc flash. If measuring ac voltage, be certain to insert the red lead into the input jack marked V, not A. The display should show the ṽ symbol. Placing test leads in A or MA inputs and then measuring voltage will create a short in the measurement circuit.

Most multimeters power up in Autorange mode. This automatically selects a measurement range based on voltage present.

First insert the black lead into the COM jack. Next insert the red lead into the VΩ jack. When finished, remove the leads in reverse order: red first, then black. Connect the test leads to the circuit: black lead first,red second. Troubleshooting single-phase motors is one of the most practical uses of a digital multimeter's Capacitance Function.

A capacitor-start, single-phase motor that fails to start is a symptom of a faulty capacitor. Such motors will continue to run once operating, making troubleshooting tricky. Failure of the hard-start capacitor for HVAC compressors is a good example of this problem. The compressor motor may start, but soon overheat resulting in a breaker trip.
Single-phase motors with such problems and noisy single-phase motors with capacitors require a multimeter to verify properly functioning capacitors. Almost all motor capacitors will have the microfarad value marked on the capacitor.

Three-phase power factor correction capacitors are typically fuse protected. Should one or more of these capacitors fail, system inefficiencies will result, utility bills will most likely increase and inadvertent equipment trips of may occur. Should a capacitor fuse blow, the suspected faulty capacitor microfarad value must be measured and verified it falls within the range marked on the capacitor.If required, press the continuity button.

Knowing the current consumption in a system, component or circuit is very helpful during troubleshooting.
Electrical components such as motors often carry a nameplate that displays the component's circuit rating. A current measurement can be compared to that rating to determine the health of the component's operating condition.

Take current measurements: to determine how much a load (a component, such as a motor) is drawing from the system. You can also measure the total load on a circuit. A motor, for example, is overloaded if it draws more than the rated current, underloaded if it draws less.

When troubleshooting, a technician can take a baseline measurement and be on the lookout for overload, overcurrent or a current imbalance between phases.
Generally, higher-than-rated currents usually indicate a problem which can cause additional problems. Higher current produces higher temperature, and that may cause insulation breakdown and component failure.

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Most digital multimeters can only measure dc or ac current up to 10 A. Higher current must be scaled down with a current clamp accessory, which can measure current in a circuit from .01 A to 1000 A by measuring the strength of the electric field around a conductor.

For maximum efficiency, it is recommended that a current measurement be taken when equipment is first installed and during normal operation. These measurements can be used to provide a baseline comparison when troubleshooting a future problem.

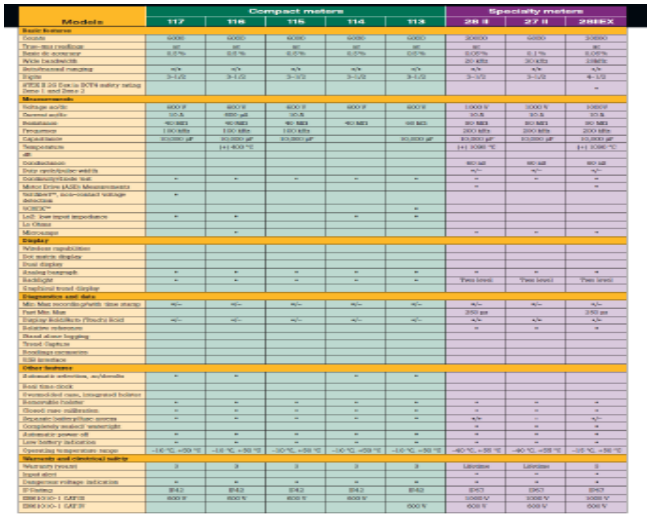

Fig 2 Meter Deign.

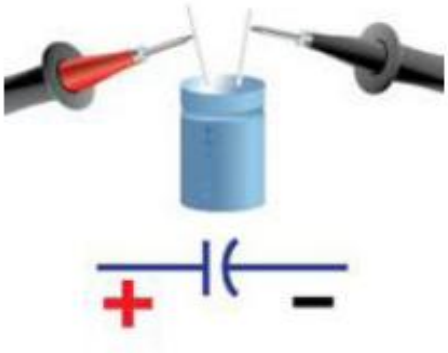

Fig 3Measure capacitance.

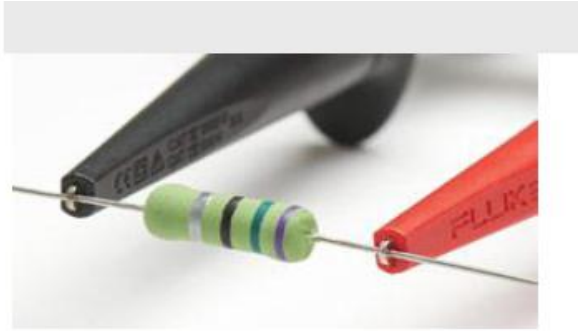

Fig 4Measure resistance.

V. RESULTS AND DISCUSSION

In multimeter checking –In forward Bias Shor circuit between W to Positive terminal and In Reverse Bias short circuit between W to Ground in the alternator Forward Bias.

It centers around the forecast of debasement procedure of the item, which depends on the supposition that most anomalies don't happen immediately, and generally there are a few sorts of corruption process from ordinary states to irregularities. Henceforth, in contrast to breakdown upkeep and preventive support, the CBM centers around shortcoming recognition and diagnostics of components as well as debasement observing and disappointment expectation. By and large, CBM can be treated as a technique used to lessen the vulnerability of support exercises and is done by the necessities demonstrated by the gear condition.

Fig 5 In multimeter checking – Open circuit between WL to Positive terminal and WL to Ground in the alternator.

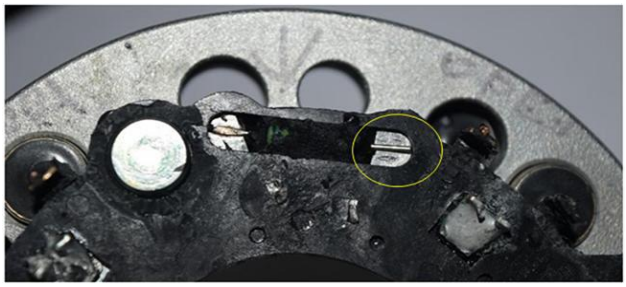

Fig 6 In WL NOT ON alternator rectifier – Open circuit noticed between WL to Field mold terminal joint – Pl refer attached photos – 5 Ohms resistor found in Open circuit.

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VI. CONCLUSIONS

A digital multimeter (DMM) is a device / test tool used to measure two or more electrical values—principally voltage (volts), current (amps) and resistance (ohms). It is a standard diagnostic tool for technicians in the electrical/electronic industries.

Digital multimeters combine the testing capabilities of single-task meters—the voltmeter (for measuring volts), ammeter (amps) and ohmmeter (ohms). Often they include a number of additional specialized features or advanced options. Technicians with specific needs, therefore, can seek out a model targeted for particular tasks.In this machine, child parts comprises of rotor, rectifier, regulator, stator winding, slip ring, Drive end bracket, Slip ring bracket, Pulley and fasteners When positive terminal of a voltage source is connected to the n-type region and the negative terminal of the source is connected to the p-type region then the p n junction is said to be in reverse biased condition. Multimeter is sufficient to analysis the defects in the field and to find out the potential failures modes.

REFERENCES

[1] C. L. Kane, and E. J. Mele, Tangible Defects, Phys. Rev. Lett. 95, 146802 (2005).
[2] G. Gupta, M. B. A. Jalil, and G. Liang, TIs as Attractive Candidates for Application's, Scientific Reports 4, 6838 (2014).
[3] J. E. Moore, Topology from the Geometry, Nature 464, 194, (2010).
[4] B. Srinivasulu,Experimental Investigation Of Mechanical Properties Of Friction Stir Spot Welding Using Circular Profile En 31 Tool On T6061 And T6082 Aluminum Alloys, IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE), e-ISSN: 2278-1684,p-ISSN: 2320-334X, 78-1684,p-ISSN: 2320-334X PP. 26-30.
[5] K. V. Klitzing, G. Dorda, and M. Pepper, Multimeter, Phys. Rev. Lett. 45, 494 (1980).

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