

National Seminar on “Power Quality Management”

At the all heavens Banquet Hall, Flower Valley, Eastern Express Highway, thane (W), Mumbai on Thursday, 20th December 2007, 9:30 am – 5:30 pm.

Keynote Address: Power quality management and the Indian scene by Mr. K. R. Kini, Director, **Society for Applied Microwave Electronics Engineering & Research**, Vithal Uyognagar

Session – II : Testing & Measuring

Chairman: Dr. R. Venkatesh, Unit Head, Power Quality Management, Crompton Greaves Ltd. Aurangabad.

□ **Test equipment for power quality check** by Mr. Haren Shah, **Meco Instruments Pvt. Ltd.**, Navi Mumbai.

Haren Shah

Haren Shah – Marketing Executive - M/s. Meco Instruments Pvt. Ltd. is Commerce Graduated from Mumbai University. He is associated with MECO INSTRUMENTS PVT. LTD since last 18 years

MECO one of the largest manufacturers of Electrical / Electronic Testing and Measuring Instruments in India with a large range of products since last 44 years

Test Equipments for Power Quality check By Haren Shah

- *Is our Installed machinery is running at efficiently 100% as specified by manufacturer?*
- *Are our equipments and personal operating are safe from Hazardous happening?*
- *Are our electrical System are balanced or unbalanced?*
- *Is there any presence of Harmonics in our Power Systems in our own premises?*
- *Are our Distribution Systems are planned accordingly as per design?*
- *Are we getting Quality- Cleaner Power from Utilities?*
- *Why measuring and monitoring date and acquisition is important for Energy?*
- *Why Testing and maintenance is so Important for our Plant and machinery time to time?*

Today I will just brief out about Various Test Instruments for Power measurements and quality check.

DIGITAL MULTIMETERS

- *Why Testing and maintenance is so Important for our Plant and machinery time to time?*

In old days we have seen TV Mechanic carry in their beg small pocket type Multimeter to check Radio, TV sets while going for repairing of the same. Its easy tool to found fault in PCB Card or Electrical wiring of Radio / TV sets or Electrical appliance. Now we have Digital Multimeters with LCD Display with lot of different features like 3-1/2 Digits, 3-3/4 Digits, 5 Digits with 1999 counts, 3999 counts or 80000 counts and bargraph, etc.

The first tool one can think of for any Electrical Measurement is either Multimeter. When it comes to taking basic Voltage and Current measurements from any electrical or electronic equipments, Multimeters plays an important roll. Its long a Staple in the toolbox they still are called up to get the job done. There isn't a plant maintenance professional that would be caught on the job without them. A Great multi purpose tools they can also be used to check Resistance, Capacitance, Frequency and Continuity with beeper. Manufacturer of Multimeters have also added features such as HFE, Diode Test, Temperature measurement, duty Cycle, data logging to further expand their capabilities. Digital Multimeters operates on DC Batteries installed inside the meters and supplied with Voltage Probes, Holster, and Carrying Case for Field measurements.

DIGITAL CLAMP ON METER (TONGTESTER).

- *Is our Installed machinery is running at efficiently 100% as specified by manufacturer?*

Without disconnecting load, on live cable / wire to measure Current flow or Usage of Load, Clamp On meter (Tong Tester) plays a crucial roll. Just clamping on the live wire/ cable Clamp meter measure AC or DC Current flowing from the same. Where it is difficult to read or see reading or measured values Clamp meter can also hold screen. Other features of Clamp meters are like Multimeters to measure voltage, Resistance, Capacitance, Frequency and Continuity with beeper.

CLAMP ON GROUND RESISTANCE AND LEAKAGE CURRENT TESTERS

- *Are our equipments and personal operating are safe from Hazardous happening?*
- *How to Check Earthling of Electrical Installation where it is next to impossible to punch auxiliary electrodes as required by the conventional methods for measurement?*

Whether called "Earth" or "Ground" a critical element of any power system is grounding. A failed ground becomes a safety hazard and since it no longer provides a reference, testing becomes all but impossible. Any preventive maintenance schedule should include periodic ground check. Clamp-On Ground Resistance and Leakage Current Tester is a non-contact type innovative solution for measuring ground resistance and leakage current of Electrical installations like Transmission poles, Transformers, Lightning arrestors, Motors, High voltage appliances and Cables. It can be used in Multi grounded systems without disconnecting the ground connection of the circuits.

This method of measurement completely eliminates the use of ground and *auxiliary electrodes* thus saving lot of time and avoiding shutdown of the installations. This is an extremely handy device especially at places where it is next to impossible to punch *auxiliary* electrodes something that is difficult to do inside buildings. as required by the conventional methods for measurement. Substantial time and manpower savings justify the investment in this instrument.

The instrument is based on an unique principle in which a pre-defined current is injected in the ground circuit under test and then the induced magnetic current thereby generated in the circuit is measured at a high frequency by use of special clamp – on current transformer in the instrument.

CLAMP ON POWER METER

- *How to check Power quality and troubleshoot problems in Power Distribution Systems?*
- *Are our Electrical System are balanced or unbalanced?*
- *Are our Distribution Systems are planned accordingly as per design?*
- *Why measuring and monitoring date and acquisition is important for Energy?*

Clamp on Power Meter are next generation of Clamp on Meter (Tong Tester), which can give instant values and measure Power Parameters like KW, HP, Power Factor as well as Current, Voltage, Resistance. Clamp on Power Meters are useful for 3Phase 4 wire systems to measure Energy, Harmonic, AC/ DC True Power, and TRMS Values of Power Systems.

Clamp on Power Meter is a state of the art versatile instrument using micro controller technology and having various functions that would be ideal for an Inspector for carrying out vigilance checks, surveys, raids, audits and periodic visits for checking at industrial and consumers end. The measurements can be done without disconnecting the loads and in a very short interval of time.

Clamp on Power Meter *also assists in load studies and verifies system capacity prior to the addition of the new loads. Of equal importance the power meter facilitates energy assessments. If your company is investing in energy saving devices, the three phase power analyzer is the tool that will give you the before and after picture you will need to support or disapprove the investment.*

POWER AND HARMONICS ANALYZER

- *Is there any presence of Harmonics in our Power Systems in our own premises?*
- *Are we getting Quality- Cleaner Power from Utilities?*

Power and Harmonics Analyzer help prevent and troubleshoot problems in power distribution systems. A powerful predictive maintenance tool and will help detect and prevent power quality issues before they can cause downtime and lost production time. Power and Harmonics Analyzer Can Analysis, Measure, Monitor with Recording of History, Graphs, and Wave form of Complete Power Quality and Power Consumption (Energy) with Software for Easy Download on PC for Solution It is a state of the art versatile instrument using micro controller technology and having various functions that would be ideal for an any Engineer / Inspector for carrying out Periodic Visits, Vigilance checks, Surveys, Raids, and Energy Audits for checking at Industrial and Consumers end.

Power and Harmonics Analyzer can Analysis 3P4W, 3P3W, 1P2W, 1P3W, with Programmable CT/PT Ratios and Capture 28 Transient Events measures TRMS value, Active, Apparent & Reactive Power Factor, Phase Angle (Φ) & Energy. Analyzer has built in timer & Calendar for data logging. Facility to retrieve Power data & Harmonics on hardcopy screen Memory with Programmable Interval Optical Isolated cable RS-232C~USB Interface along with Software for easy download of Recorded Data & Transient events

CONCLUSION :

- In the fight against downtime and non-compliance Plant maintenance professionals face an ever-increasing array of responsibilities.
- First and foremost they need to keep many varying types of equipment running and running at peak performance rate. If a system is running at less than 100% optimum performance, then people are wasting time and the saying goes "*TIME IS MONEY*".
- If a piece of machinery is running at less than 100% of manufacturer specifications then it will probably wear down prematurely. That too wastes money and drains resources.
- The equipments have to be running safely so as to minimize the risk of injury on the job. Injuries result in lost productivity and cost a lot of money.
- The equipments need to be running efficiently so as to not waste Energy "*Wasted Energy is Wasted Money*" and harming the environment.
- Repairing devices as they break down is no longer an acceptable business practice. Maintenance has become preventive and scheduled maintenance.
- Plant maintenance professional must rely on their test equipment to assist them in getting the job done quickly safely and with minimum disruption.

Thank you all for your kind and patient hearing.

Note: Some of the writ-up, example or case study taken from various articles in various General/Magazine for the awareness and knowledge of the Public issued herewith without any prejudice. E. & O.E.