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From President's Desk...



Training in CBM can be highly rewarding!

Quite often, industry neglects the importance of training, particularly so in maintenance. This could lead to hit and trial approach by maintenance engineers consequently wasting precious time and effort. It is therefore essential to ensure that employee is well trained before he is employed in plant maintenance works.

Training leads to proper understanding of both the machine and condition monitoring equipment. It will also lead to getting the job done faster and better. The employee also feels better because he is being cared for by the company by investing for his training. He also starts appreciating the utility of CBM tools that he is given in his maintenance job. Thus relatively small investment in training results in a win-win situation for both the plant and the employee.

Of course, many industries have their own training departments. However, what is sometimes lacking is the focus on long term benefits use to training in aspects such as CBM. This is partly due to lack of suitable specialist instructors in this specialized domain. Plants therefore should not hesitate to hire services of outside experts in such a scenario to ensure successful adaptation of CBM to the plant. It is also important to ensure that trained employee is allowed to apply his newly acquired knowledge in his work or else he would feel that training imparted is a waste. Further he may not take training in future seriously.

It is high time that now in India with its abundant manpower has to understand the need for training in CBM to realize full benefits of our plants productivity. Are we ready for this!

- Dr. V. Bhujanga Rao

Main Features of this Issue...

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Five Keys to Maintain Equipment Reliability [Jeff Shiver](#)

There is so much similarity in all that many people do within the maintenance planning and scheduling world that compares to other separate and distinct functions. Jeff Shiver explained that borrowing from root cause analysis process methods, Ishikawa diagrams (also called fishbone diagrams or cause-and-effect diagrams) are one method that are used for product design, quality defect avoidance or variation, or to identify factors that lead to some event, hence they can be used in root cause analysis.

The categories typically include:

- Man (people)
- Methods: How the process is performed and the specific requirements to perform the tasks, including time estimates
- Machines: Any equipment, tools, etc., needed to do the job
- Materials: Consumables, parts required
- Measurements: Data generated from the process

All of these items combine together to create some output or event. In the case of maintenance planning and scheduling, hopefully they combine to maintain or restore the reliability of equipment, as an example. See, in all we do, it's important to remember that every product (i.e., maintaining equipment) is the result of a process. Let's break them down individually for maintenance planning and scheduling:

Man: People or staffing (which crafts?), skill requirements, number of people, contractors

Methods: The job-plan task steps and sequence; items such as permits, manuals and so forth

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Machines: What special tools (man lift, ladder, etc.) are
Materials: What consumables or parts are needed to restore the equipment?
Measurements: What do we need to know to improve the job plan? In the case of a condition-based monitoring task, we can take measurements to find something in the act of failing to allow planned restoration.

Interestingly, all of these items roll up to complete the job plan and job package that should be created by the maintenance planner. If one didn't have time to complete all of these items, which three should he focus on first to ensure that he could drive craft effectiveness? From a maintenance scheduling perspective, I need the manpower requirements, estimated hours and the materials, but it can't stop there. The only way that it's effective is if I have a continuous improvement loop that relies on the feedback of the technicians to improve the job plan.

Web Resource:

First AGM OF CMSI, JAMSHEDPUR CHAPTER

First Annual General Meeting of "Condition Monitoring Society of India, Jamshedpur Chapter" was held on 27th January, 2012 7:30 PM at Hotel J.K. Residency, Sakchi, Jamshedpur.

Welcome address was given by CMSI, Jamshedpur Chapter Chairman, Mr. B.K. Das. In his welcome address, he re-emphasized the need of propagating the concept of condition monitoring of equipment to small scale industries.

Today CMSI Jamshedpur Chapter has four institutional members and 25 individual members from across the industries like Tata Steel, Tata Motors, Lafarge India Ltd, Tinplate, Tata Power, Usha Martin, SKF, TIMKEN etc. Chairman requested all to increase the no. of members to at least 100.

In his secretary's report, Mr. G.R.P. Singh talked about the various activities taken-up the society during the year.

One day Workshop on "Condition Monitoring Practices in Steel & Allied Industries" was organized on 28th January 2011 in Institution of Engineers Building at Jamshedpur. Workshop was inaugurated by Dr. Vijay Sharma, Executive Director & Chief Executive (Steel Business), Usha Martin. Around 70 engineers participated from various steel & allied industries.

One day Seminar on "MAINTENANCE EXCELENCE THROUGH MACHINERY DIAGNOSTICS" was organized along with Institution of Engineers- Jamshedpur Chapter on 14th September 2011 in Institution of Engineers Building at Jamshedpur. Workshop was inaugurated by Mr. Subrata Mitra, Director, M.N Dastur & Co Pvt Limited. Around 75 engineers participated from various steel & allied industries.

Financial Report was presented by Treasurer, Dr. Anand Prabhakaran.



Release of News Letter 'WAVELET' by Mr BK DAS

First issue of quarterly publication of CMSI, Jamshedpur Chapter, WAVELET was released by Chairman, Mr. B.K. Das. Facebook Site of CMSI, Jamshedpur Chapter was also launched by Chairman, Mr. B.K. Das.

CMSI-Jamshedpur Local Chapter was re-constituted its New Executive Committee as follows:

Chairman:

Mr. B. K. Das, Tata Steel

Vice Chairmen:

Mr. D.S. Kudalkar, Tata Power

Mr. B. K. Gupta, Usha Martin

Mr. Gautam Halder, TIMKEN

Mr. Arvind Kr. Sinha, Tata Steel

Mr. Sanjay Kedia, Tata Steel

Secretary:

Mr. G R P Singh, Tata Steel

Jt. Secretary:

Mr. A K Paul, Tata Steel

Mr. M.K.K. Sharma, Tata Motors

Mr. Sunil Bagrodia, Technomec Solutions

Treasurer:

Dr. Anand Prabhakaran, Tata Steel

Jt. Treasurer:

Mr. Sudip Kr. Mukherjee, Tata Steel

Executive Members:

Mr. P.S. Mitra, Tata Motors

Mr. K K Mahajan, Tinplate

Mr. Navin Verma, Lafarz

Mr. P.K. Tibdewal, TRF

Mr. J.K. Singh, ISWP

Mr. V.K. Nirala, Tata Steel

Mr. Sandip Dhir, Tata Steel

Mr. Ajit Kar, Tata Steel

Mr. Falguni Mitra, Tata Steel

Mr. Pranay Sinha, Jusco

Mr. Manoj Kumar, Jyoti Cero

Convener:

Mr. Rohit Kumar

Finally, vote of thanks was proposed by convener, Mr. Rohit Kumar.

SPM Instrument India Pvt. Ltd.

7-1-27/1, Srinivasa Complex, 1 st Floor "B" Block,, Ameerpet, HYDERABAD-500 016, INDIA
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Solving Maintenance Problems with Mobile Collaboration!!

-- By Marieke Wijtkamp

Time is money. For companies with operations spread across the globe, delays in equipment maintenance issues or production line problems can kill the bottom line. If the most skilled engineer is located in New York or Detroit and the most important machinery is in Mexico or China, costs mount quickly when decisions are delayed. Typically, the expert (or a whole team of experts) would board a plane to go and try to solve the problem, causing further delays and incurring expensive travel costs. With mobile collaboration, no one leaves their desk, let alone the country.

Reducing Equipment Downtime on the Plant Floor



Production equipment downtime costs can be staggering, sometimes as much as \$3,500 per minute for an entire auto-factory line.

Equipment problem through for an offsite specialist to avoid costly hours that can be avoided with mobile collaboration technologies.

For one major consumer packaged goods (CPG) manufacturer, mobile collaboration now allows them to perform remote production-line equipment maintenance and repair. In the past, when a machine was down and the right engineer was not available onsite to troubleshoot the problem, downtime rapidly escalated. With mobile video collaboration, plant technicians can now show a remote expert the failed equipment, removing costly delays from the repair process.

Improving Repair Decisions in the Field

Heavy industrial equipment manufacturers face the challenge of servicing equipment around the globe. In some cases, these manufacturers are 100-percent liable for any downtime and repair costs associated with their equipment. Often, field technicians have significant decision-making power, and costs can escalate 10 times if the wrong choice is made in the field. With experienced field technicians approaching retirement, it is becoming more difficult and expensive to provide in-person coaching of junior technicians. Travel costs alone can range from \$2,500 to \$5,000 per trip.

Network Requirements

It is important to consider infrastructure requirements for the mobile collaboration system. Mobile devices require either an Ethernet or wireless network connection to access the Internet.

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Wireless connectivity is the most common method used in facilities such as a manufacturing plant. The bandwidth consumption typically ranges from 250 kbps to 1 Mbps, depending on the existing infrastructure.

For field-based applications, it is more common to see bandwidth consumption below 128 kbps due to narrow bandwidth backhaul connections. Even with only 128 kbps, mobile collaboration can include live video, voice, telestration and image sharing between the field technician and the remote expert.

Another alternative to consider is the use of 3G or 4G cellular networks through mobile Wi-Fi hotspot devices such as the MiFi or Cradlepoint. By using a hotspot device, a wireless network can be created anywhere that offers adequate cellular coverage.

Mobile Collaboration Benefits



With the advent of mobile technologies, securely extending the power of video collaboration across an enterprise is now a reality.

Enterprises are already experiencing the benefits of mobile video within manufacturing, including product quality improvements, production-line downtime reductions, accelerated product development and more effective supplier communication. Now, engaging in a full video collaboration session has become as simple as making a phone call.

For more information, visit www.librestream.com.

Extract from Dr. BKN RAO's Lecture:

The philosophy of Condition Monitoring and Diagnostic Engineering Management (COMADEM) is: Sustained Prosperity through Proactive Monitoring, Diagnosis, Prognosis and Management of all our Assets. Its mission is continuous knowledge discovery, generation and dissemination. It embraces the eternal Vedic Doctrine: *Sathyam vadha* (Speak the Truth); *Dharmam Chara* (Do Your Duty Selflessly).

The Full paper of Prof. BKN Rao is available at our website <http://www.comsoi.org>

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For MEMS Accelerometers, Thermovision Cameras, Piezo Electric Transducers, Electro Dynamic Shakers, etc
Email: sales@stsol.com, URL: www.stsols.com, Phone: 040-27636433

Glimpses of Dr. V. Bhujanga Rao Endowment Lecture



Some Highlights of NCCM-2012



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For MEMS Accelerometers, Thermovision Cameras, Piezo Electric Transducers, Electro Dynamic Shakers, etc
Email: sales@stsol.com, URL: www.stsols.com, Phone: 040-27636433

Some Highlights of NCCM-2012

The Third National Conference on Condition Monitoring of Engineering Systems and Structures (NCCM-2012) was jointly organized by Research & Development Establishment (Engineers) [R&DE(E)] and Condition Monitoring Society of India (CMSI) under the aegis of Defence Research & Development Organisation (DRDO) during 15- 16 June 2012 at Pune.

Shri S.A. Katti, Joint Director, R&DE(E), Pune was the Chairman for this Conference and Dr. Edwin Vijay Kumar, AGM (Maintenance) was the co-chairman with Shri. A. Prasad Goud, Scientist 'F', R&DE(E), Pune, as the Convener and Shri. PVS Ganesh Kumar, Scientist 'G', NSTL, Visakhapatnam as the General Secretary.

The Chief Guest of the Conference Padmasri Dr. Vijay Kumar Saraswat, Scientific Advisor to Raksha Mantri and DG R&D, DRDO, New Delhi said that India's fifth-generation aircraft being developed by DRDO will have integrated condition monitoring systems covering important systems such as avionics, structural health, air-conditioning and pressure-regulating systems during his inaugural address at the two-day National Conference NCCM-2012.

Dr Saraswat also stated that technologies drive doctrines and with advancing technologies, maintenance strategies have changed over the years from 'break-down' to 'preventive' to 'predictive' to 'proactive' and systems have evolved to 'self-diagnosis' and 'self-healing', by integrating nano, micro and biotechnology. He emphasized that the development of sensors, signal processing techniques, decision support systems and software are the main challenges in Condition-monitoring and Structural-health-monitoring. Dr Saraswat also released the conference souvenir and proceedings.

Dr V Bhujanga Rao, Chief Controller R&D (HR), DRDO, and founder-president of Condition Monitoring Society of India delivered the keynote address. He elaborated on the importance of condition monitoring, failure mechanisms and causes and maintenance management strategies. He also spoke about the future involving cloud-based condition monitoring, and stressed that educational institutes should include condition-monitoring in higher education.

Earlier, Dr S Guruprasad, Director R&DE(E) welcomed the dignitaries and conference participants from industry, academia and various organisations. He mentioned about the pioneering work done by R&DE(E) even in the 1980s, where electric gen sets working in Antarctica were remotely maintained from Pune. He also mentioned about the recent achievement of developing a 'smart' composite bridge with structural health-monitoring.

Shri KVVSS Murthy, Vice-president of Condition Monitoring Society of India briefed the august gathering about the Society and its activities. More than thirty five papers were presented in the Conference which focused on topics related to Condition-Monitoring and Structural-Health-Monitoring.

Dr. V.Bhujanga Rao Endowment Lecture

First ever CMSI-GITAM Endowment Lecture was instituted by GITAM University (GU), Visakhapatnam and is named after the eminent Scientist Dr. V. Bhujanga Rao, Distinguished Scientist and Chief Controller R&D, DRD, as a mark of honour towards his outstanding contributions and pioneering efforts in condition monitoring.

Prof. Dr. B.K. Nagaraja Rao, International Director, Condition Monitoring and Diagnostic Engineering Management (COMADEM) from UK delivered a lecture on **"Condition Monitoring and Diagnostic Engineering Management: The Key to Sustained Prosperity"** on 31 January 2012 at 1500hrs at GU.

According to Dr. BKN Rao, Industrial assets in Europe and the rest of the world are ageing due to low level of investments and poor maintenance. But, proactive monitoring, diagnosing, and intelligently managing all assets will ensure sustained overall system efficiency. He said maintenance was an important decision-making function for any business processes with significant investment in physical and human assets.

Poor maintenance could lead to increased pollution and environmental costs and, sometimes, fatal accidents. The cost of maintenance and downtime was too high for many industries, he noted and, citing the example of Europe, said that the annual spending on maintenance there was around 1500 billion Euros. Proactive Maintenance Engineering and Management was treated by many industrial leaders and policy makers as a central business and economic strategy, he observed.

Prof. Nagaraja Rao said modern day systems were large, complex, and automated and the high demands on the performance of such systems had created a need for new and innovative multidisciplinary-based proactive solution in the area of the maintenance of the complex systems.

All these had motivated the stakeholders, senior managers, and maintenance engineers to continuously monitor intelligently the contribution of maintenance towards overall business goals or in terms of sustained prosperity. Sustained proactive maintenance and critical asset management were continuously evolving, bringing new challenges and opportunities for individuals and business communities worldwide, he stated.

GITAM University Vice-Chancellor G. Subrahmanyam, Principal D. Prasada Rao and Head of Mechanical Engineering Department Kamaluddin participated in the programme and felicitated the guests Dr. Bhujanga Rao and Dr. BKN Rao.

The Full paper of Prof. BKN Rao is available at our website <http://www.comsoi.org>

All feedback, comments and contributions to the news letter are most Welcome.

- Editors

Why acoustic emission represents the next generation of vibration?

History, experience and familiarity count for a lot where conditioning monitoring is concerned. But that doesn't negate the need for change, innovation and the advancement of tried, tested and trusted techniques. The late Steve Jobs commented: "Innovation is the ability to see change as an opportunity – not a threat". Condition monitoring (CM) is transforming rapidly and so too must the mindset of CM practitioners and users. It's not good enough to simply disregard a disruptive technology in an effort to protect the 'old guard'. When combating downtime, there's no place for historical sentiment.

Steadily disrupting traditional vibration techniques is acoustic emission (AE). As the mechanical condition of machinery deteriorates, energy loss processes such as impacts, friction and crushing generate sound wave activity that spans a broad range of frequencies. AE technique is based on frequencies much higher than are monitored in the repetitive synchronous movement of vibration. By detecting only the high frequency part of this signal, it is possible to detect miniscule amounts of activity, for example a slight rub, a brief impact or the crushing of a single particle in the lubricant. By this means it is possible to detect impending failure before damage occurs, as well as monitoring its progress thereafter.

With well-defined ISO standards, traditional vibration techniques including vibration monitoring and vibration analysis have provided a trusted approach to condition monitoring for the past thirty years. Yet, it remains a complex science and requires sophisticated knowledge and understanding from a seasoned expert. In contrast, AE technology extends and simplifies the science, placing the power of vibration techniques directly into the hands of every engineer. Signals can be processed at the AE sensor in to an easily understandable form.

Let's be clear, vibration analysis (VA) as a technique will have a place for many for years to come for many end users, however there is no escaping from the fact that there is often a requirement for a costly and unsustainable level of knowledge required to affect a good diagnosis. There is no doubt that VA is valuable, but it is too often overly complicated.

In fact the areas in which vibration and AE both apply can be illustrated as overlapping circles. However, AE provides an earlier warning detecting wear and small defects, whereas with vibration, damage must have occurred to detect a signal. AE will pick up a lack of lubrication, friction, and cracking, which vibration will not. Although it must be acknowledged that the totality of information obtained from AE will be more limited than that derived from vibration.

Suitable for continuously running machinery as well as machinery operating intermittently, slowly or for short durations, AE allows the user to diagnose problems with machinery at an early stage, carry out maintenance procedures and then monitor the improvement. It provides real time information with early sensitivity to faults and applicability to a wide range of rotational speeds.

AE is specifically designed to allow users with little knowledge of the subject to check bearings and major slideways for condition in a way that would be near impossible using traditional vibration techniques.

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Product News: TRIO™ CX-7



TRIO™ CX-7 is the first of a new generation **vibration data collectors** and machine condition **analyzers**.

TRIO's **new ergonomic design** and Bluetooth® wireless data acquisition provide **more comfort and efficiency** when performing repetitive data collection to support your **Predictive Maintenance (PDM)** program. TRIO CX-7's embedded, award winning **automated diagnostics** and Windows® 7 operating system provide the **most capable** unit available on market.

TRIO BENEFITS

TRIO utilizes the newest generation industrial tablet PC having as much computing power as many PC workstations. Safer to use with hands free and wireless data acquisition. Voice activated acquisition allows you to use your hands for other things. Wireless connection to the data processing unit allows you to move away from dangerous machines while collecting data. Its modular configuration is robust and will lower the overall cost of ownership; when your user interface becomes obsolete, purchase an inexpensive replacement. As new capabilities become available, download and install them.

TRIO FEATURES

- 4 CH simultaneous acquisition
- Triaxial accelerometer
- 104 dB dynamic range
- Windows® 7 Ultimate controller
- 64 GB solid state hard drive
- Embedded ExpertALERT™
- Sybase SQL database onboard
- Bluetooth® wireless data acquisition
- 2 MP camera (video and still photography)

Contd., Why acoustic emission....

Ultimately, maintenance personnel are responsible for keeping machinery running. If they are empowered to monitor condition themselves, identify where action is needed and then check that the action taken has solved the problem, then AE has significant advantages of cost, speed, flexibility and ease of field application in comparison to traditional vibration analysis techniques. It is the efficient and effective approach to CM; an easy way to implement a 'no surprises' maintenance policy.

Web Resource: <http://www.kittiwakeholroyd.com>

All feedback, comments and contributions to the news letter are most Welcome.

- Editors

CMSI MEMBERS IN NEWS



Mr. Hemanth Bari, Manager, MTP Dept, Condition Monitoring Cell, Reliance Energy, Dahanu Thermal Power Station, Mumbai presented a contributed paper to the proceedings of the 25th International Congress on Condition Monitoring and Diagnostic Engineering (COMADEM 2012).

CMSI Congratulate him for presenting the paper at COMADEM 2012!!

The URL of your paper is <http://dx.doi.org/10.1088/1742-6596/364/1/012022>

CONDITION MONITORING AROUND THE GLOBE...

Courses, Conferences, workshops

National Symposium on Acoustics (NSA 2012) Organised by KSR Institute for Engineering and Technology, Tiruchangode, Tamil Nadu and ASI invites original contributed papers related to different disciplines of Acoustics for presentation (oral and poster) in the conference during 5 – 7 Dec 2012. The special theme of the conference is "**Condition Monitoring**".

Dates to remember

Submission of extended Abstracts : **July 16, 2012**

Acceptance of abstract intimation : **Aug 06, 2012**

Camera ready manuscript with registration fee : **Oct 25, 2012**

National conference on Recent Developments In Condition Monitoring, Diagnostic Engineering & Maintenance Management (RDCMDEMM-2013) Organised by **NMAM Institute of Technology, Nitte-574 110, Karnataka** during 24-25 Jan 2013.

Important Deadlines

Last date for full paper submission: **November 20th, 2012**

Notification of paper acceptance: **December 10th 2012**

Camera Ready Manuscript: **December 26th, 2012**

Authors' Registration Deadline: **January 10th, 2013**

CMSI Welcomes New Members!!

Life Members:

Mr. Dhulipala Satya Sudhir
Mr. Vijay Kumar Nirala
Mr. Mirthyunjay Kumar
Dr. Popuri Bangaru Babu
Mr. Randhir Singh Birdi
Mr. Shivanath Ram
Mr. G.V. Krishna Kumar
Mr. S. Sathiya Kumar

Editorial Board :

Dr. V. Bhujanga Rao
Dr. M. Ananda Rao
Sri. P.V.S. Ganesh Kumar
Sri. T. Venkata Ratnam

Reference Books

Practical Balancing, Alignment and Condition Monitoring of Rotating Equipment



The focus of this book is on the most up-to-date information and best practice. After an introduction to the application of maintenance and costs of breakdowns, the important issue of vibration and vibration measurement is detailed. The important topic of balancing is then discussed drawing on practical examples. Alignment and other machinery faults are then covered. Other often neglected areas of particle and chemical analysis, temperature monitoring and failure analysis are covered in detail.

Publisher : Kulwer academic publishers
ISBN : 0 412 46500 0

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All feedback, comments and contributions to the news letter are most Welcome.

- Editors