MONITOR

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From President's Desk...

Greetings! I take pleasure to inform you, that CMSI has established a Centre and first ever student chapter at Andhra University, Visakhapatnam recently. This CMSI Centre, I wish would become a Model Centre for students and practioners to develop their skills in condition Monitoring. I am also glad to intimate that Gas Turbine Research Establishment (GTRE), a premier DRDO laboratory has come forward to organize this year's National Conference on Condition Monitoring (NCCM-2013) at Bangalore. I urge all the members of CMSI to contribute actively to this Conference by sending Technical papers and by participating in big numbers.

I am pleased to see an increasing awareness and interest in this specialized technology whch is emerging more as a multi disciplined maintenance management. One of the notable developments in recent times is Open System Architecture for Condition Based Maintanance (OSACBM). OSACBM is a standard architecture for moving information in a condition based maintenance system. It is particularly useful in Integrated Vehicle Health Management (IVHM) that enables more reliability, efficiely and autonomy. Boing company and Smiths Aerospace have already employed this technique gainfully in their projects. Can we grab the opportunity to employ OSACBM in our R &D Projects?!. I feel, it is high time to move forward with pro-active approach for implementing CBM by adopting techniques such as Reliability Centred Maintenance, ANNs, SVMs, experts systems, wireless monitoring, online real time monitoring and so on. Let us all deliberate on such techniques with emphasis on our industrial needs in the forth coming conferences !!

- Dr. V. Bhujanga Rao

Main Features of this Issue...

National Conference on Condition Monitoring (NCCM-2013)

As a part of CMSI's endeavor to highlight growing importance of condition monitoring, a two day National Conference on Condition Monitoring (NCCM-2013) is being organized in association with **Gas Turbine Research Establishment (GTRE), Bangalore** during **October 4 – 5, 2013**. A number of Condition Monitoring experts/ practicing specialists from various organizations, institutes and industries are expected to participate in the conference. The conference provides a platform for interaction on state of the art Condition Monitoring strategies being followed worldwide. It also provides an opportunity to deliberate on latest trends in the field of Condition Monitoring. The conference is intended to generate awareness and interest among students of engineering, the future torch bearers of the society. It would be highly beneficial for maintenance engineers of industries, R&D professionals and academicians.

Call for Papers : NCCM-2013 invites papers related to various disciplines on Condition Monitoring of Machines & Structural Health Monitoring.

Important dates/deadlines

Receipt of Abstract (150 to 200 words)	- 30th May 2013
Intimation of acceptance of Abstract	- 31st May 2013
Submission of full length paper	- 30th Jun 2013
Registration deadline	- 01st Sep 2013

For detailed Brochure visit our website: www.comsoi.org.

STRATEGIC MAINTENANCE OF SHELL AND TUBE HEAT EXCHANGER

A shell and tube heat exchanger is the most common type of heat exchanger in oil refineries and other large chemical processes, and is suited for higher-pressure applications.

At regular intervals and as frequently as experience indicated, an examination should be made of; the interior and exterior condition of the unit. Neglect in keeping all tubes clean may result in complete stoppage of flow through some tubes which could cause severe thermal strains, leaking tube joints, or structural damage to other components.

There are two types of preventive maintenance of cleaning strategy:
(i) Reliability based maintenance is based on the performance of the unit and this restores the performance at regular intervals.
(ii) Cost-based cleaning strategy includes the costs associated with chemical cleaning, additional fuel/power consumption due to fouling.

Fouling and its prevention:
Exchangers subject to fouling or sealing should be cleaned periodically. In a Heat Exchanger, a light sludge or scale coating on the tube greatly reduces its efficiency. The unit should first be checked for air or vapour binding to confirm that this is not the cause for the reduction in performance. Before disassembly, the unit must be depressurized, vented and drained, neutralized or plugged of hazardous material.

In the tube bundle, the chemical or mechanical cleaning method selected must be on the choice of the operator of the plant and will depend on the type of deposit and the facilities available in the plant.

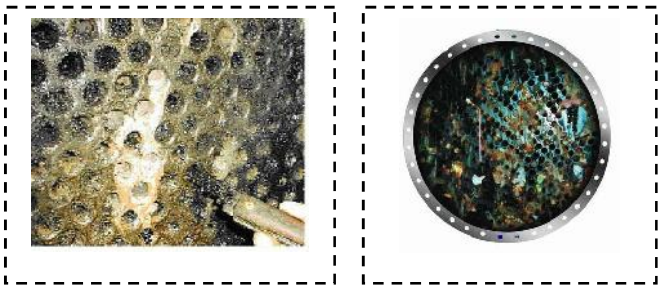


Figure. Chemical and macro fouling

Cleaning procedure:
Heat exchangers may be cleaned by either chemical or mechanical methods. Circulation of hot wash oil or light distillate can remove sludge. Some salt deposits can be washed out by hot fresh water. Commercial cleaning compounds can also be used but they have to be compatible with the metallurgy of the exchanger. High pressure water jet cleaning can also be effective. Scrapers, rotating wire brushes, and other mechanical means are used for removing hard scale, coke or other deposits. Some qualified organization also provides cleaning services.

Cleaning precautions:
1) Tubes should not be cleaned by blowing steam through individual tubes since this heats the tube and may result in serve expansion strain, deformation of the tube or loosening of the tube to tube sheet joint.
2) When mechanically cleaning a tube bundle, care should be exercised to avoid damaging the tubes.

Leaks in Heat Exchanger:
Leaks can also be costly and damaging to the product. Hence, it is essential to prevent the leaks in Heat Exchanger. Under hydraulic pressure, the point where water leaks indicates a defective tube or tube to tube sheet joint. Hydraulic test should be performed so that the temperature of the metal is over 60 ^{o}F (16 ^{o}C) unless the materials of construction have a lower nil ductility transition temperature.

Tube bundle removal and handling:
To avoid possible damage during removal of a tube bundle from a shell, a pulling device should be attached to eyebolts screwed into the tube sheet. If the tube sheet does not have screw threads, tapped holes attached to bearing plates may be used. The bundle should be supported on the baffles, supports or tube sheets to prevent damage to the tubes.

Plugging of Tubes:
Defective tubes may be plugged using commercially available tapered plugs. Excessive tube plugging may result in reduced performance

Tube expanding:
A tube expander should be used to tighten a leaking tube joint, they should not be over expanded.

Gasket replacement:
Gasket and gasket surfaces should be thoroughly cleaned and should be free of scratches or defects. When a heat exchanger is dismantled it may be re-assembled with new gaskets. Any leakage at a gasketed joint should be rectified and not permitted to persist as it may result in damage to the gasket surfaces. When these are used with a tongue and groove joint without a nubbin, the gasket should be installed so that the tongue bears on the seamless side of the gasket jacket. When a nubbin is used, the nubbin should become on the seamless side.

Reduce tube vibration:
The floating tube sheet can introduce axial stresses from pressure differentials raised due to forced flow of fluid. As the flow velocity increases, tubes rattle against each other at mid span and chafe against tube support. Hence the average cross flow velocity may be limited to a safe value below the critical velocity. Alternatives are to increase the natural frequency of tubes or reducing unsupported tube length.

Source: ***http://www.hcheattransfer.com/fouling1.html***
Contributed by: *Dr. Rajesh Ghosh and Andukuri Ravindra*
GITAM Institute of Technology, GITAM University, Visakhaptnam.

Dr. V. Bhujanga Rao Endowment Lecture by Prof. Dr. V. Ramamurti, IIT(M) [Retd.]

'Second Dr. V. Bhujanga Rao Endowment Lecture' was delivered by revered **Dr. V. Ramamurti, Retired Professor of IIT, Madras** at GITAM University on **29 Jan 2013**. Speaking on this occasion, Dr. V. Bhujanga Rao described Dr. V. Ramamurti quite aptly as **'Guru of Gurus'** (i.e. Teacher of Teachers). He informed the audience that the condition monitoring is used in a wide variety of industries to improve the machine efficiency and the subject is transforming into a multi-disciplinary subject. He mentioned that condition monitoring is gaining importance because of its benefits particularly in the areas of defence vehicle maintenance, heritage buildings monitoring, railways and in industrial sector. He appreciated the GITAM University for organizing programs to promote condition monitoring.

Dr. V. Bhujanga Rao added that the maintenance is 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.

Following this Professor Dr.V.Ramamurti delivered Dr.V.Bhujanga Rao endowment lecture on **"Condition Monitoring-Indian Scenario"**. He said that around 2000 people are involved in annual maintenance of machines in Indian industry. He mentioned that poor design of basic equipment, improper reporting of the problems, using of imported designs are mainly affecting the industry. He advised to first understand the problem and machine design and then plan for solutions. He observed that there are plenty of opportunities for mechanical engineers in the field of condition monitoring in coming years. He briefed about his experiences in various industries.

Vice-Chancellor of GITAM University **Prof. G. Subrahmanyam** requested experts to give academic inputs to the university. NSTL Director **Shri. SV Rangarajan** shared his experiences in developing an online Condition Monitoring systems for IN ships. Prof. V. Lakshmi Prasad, Principal, GITAM Institute of Technology, Prof. MRS Satyanarayana, Joint Secretary, Shri. KVVSS Murty, Vice President, CMSI, Shri. PVS Ganesh Kumar, General Secretary, CMSI and others participated in the meeting.

Brief Biodata of Dr. V. Ramamurti


Prof. V.Ramamurti

Dr. V. Ramamurti is a retired Professor of Applied Mechanics Department from IIT Madras. An academician with immerse erudition, Prof. Ramamurti was associated with NASA Lewis Research Centre, Cleveland, USA. He was a visiting professor at department of Mechanical Engineering, University of Texas, Austin, US, Department of Mechanical and Production Engineering, Nanyang Technological University, Singapore and various universities at Canada and Kuwait. He worked as INSA Senior Scientist with AUFRG CADCAM Centre, Anna University, Chennai.

For nearly 40 years he has been a retainer consultant to process, Heavy Engineering, Automobile and Power sectors. An academician par excellence, Prof. Ramamurti involved in design problems of industries like KCP Group, Chennai, TVS Group, Chennai, Nuclear Power Corporation, Mumbai, Tata Research and Development Centre, Pune, GE (India) Bangalore and L&T Engineering Solutions, Chennai and Bangalore.

Prof. Ramamurti has produced 25 doctoral students and published extensively in journals of national and international repute. He has immaculate knowledge in the area of stress analysis, Vibrations and Condition Monitoring which secured him a place in the prestigious academies in India, INSA, INAE and Indian Academy of Science. Prof. Ramamurti has been elected Hononary life member of the Association of Mechanisms and Machines. He also works as an Editor for the INSA Biographical Memoirs Journal.

A committed researcher, Prof. Ramamurti has been awarded with the NRDC award for Import Substitution in 1973, Vasvik Indutrial Research Award in Mechanical Engineering in 1983, INSA Hussain Zaheer Medal in Engineering in 1995 and INSA Biren Roy Medal in Engineering and Physics in 2007. He has been chosen for the Distinguished Alumnus Award of IIT, Kharagpur during its Diamond Jubilee Celebrations in 2012.

Abstract of the lecture

Condition monitoring is being practiced by many Engineers in this country covering process industries. In most cases scientific approach to solve the problem is missing. In this lecture three specific cases of problems faced by power, cement and sugar plants handled by the author during the last two years are discussed. These cover stator and rotor dynamic problems involving site measurements followed by sound scientific analysis. Two illustrations are on steady state vibration problems and one on transient. It is pointed out that basic concepts are needed to pin point the defect. In one case study, design guidance for the product is also presented.

The manuscript of full paper is available on cmsi website: **http://www.comsoi.org**

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

- Editors

Dr. V. Bhujanga Rao Endowment Lecture


















Inauguration of CMSI Centre and First Student Chapter of CMSI !!

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

- Editors

Inauguration of CMSI Centre and First Student Chapter of CMSI

CMSI centre was inaugurated by Dr. V. Bhujanga Rao, President, CMSI at Department of Mechanical Engineering., College of Engineering (Autonomous), Andhra University (AU) on 14 Mar 2013. The Centre is set up with an objective of providing a common platform for students and practioners to develop their skills and share their knowledge in Condition Monitoring. On this occasion, First ever Student Chapter of CMSI was also launched by Dr. V. Bhujanga Rao. Inauguration was graced by Shri SV Ranga Rajan, Outstanding Scientist & Director, NSTL; Prof. Ramachandra Murthy, Principal, College of Engg (A), AU; Prof. MMM Sarkar, HOD (Mechanical Engg.), College of Engg (A), AU on the dias. Many dignitaries including Dr. Radha Krishna, Principal, College of Engg. for Women, AU; Prof. M Ananda Rao and Sri. KVVSS Murty, Vice Precidents of CMSI; Prof A. Rama Krishna, Chairman (BoS), Dept. of Mech Engg, College of Engg (A), AU attended the inauguration.

Nearly 200 Students joined as CMSI **Annual Student Members** from the Dept. of Mechanical Engg, AU. As part of the programme, one day workshop was organised. The Workshop discussed techniques and practices such as Vibration Monitoring, Thermography, Wear debris analysis being employed in the industry for predictive maintenance. The workshop is aimed at acquiring nuances of Machinery Condition Monitoring and also to impart basics of condition monitoring techniques to the budding engineering students.

Workshop was convened by Prof. K. Ramji, Dept. of Mechanical Engg, College of Engg (M), AU. Experts from industry delivered talks during the Workshop. In addition, Condition Monitoring equipment was Practically demonstrated by a leading solution provider.

Resource persons:

1) Dr. K V Bhaskara Sharma, SRDC, Bangalore
2) Dr. Edwin Vijaya kumar, AGM, Visakhapatnam Steel Plant
3) Mr. Rana Dutta, DGM, Electro Steel castings, Kolkata
4) Mr. Srinivas Goud and Mr. Kotya Naik, M/s. SPM India, Hyderabad

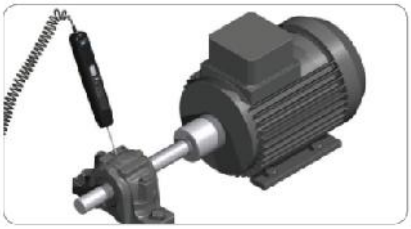
Dr. K V Bhaskara Sharma delivered a talk on **"Rotor dynamics & Condition Monitoring".** Dr. Edwin Vijaya kumar delived an informative talk on **"Health Monitoring of Industrial Equipment - Is it Relevant?".** Mr. Rana Dutta presented some practical case studies in his talk **"Condition Monitoring - Some Case Studies".** Mr. Srinivas Goud and Mr. Kotya Naik representing M/s. SPM India, Hyderabad showcased the bearing & vibration analysis simulation and identification of faults using latest instrumentation.

The participants from industry, faculty of local Engineering colleges expressed that the workshop is highly beneficial in acquiring knowledge in Condition Monitoring. The student members participated actively and were highly benfitted in acquiring basics of Condition Monitoring.

Dr. M. Ananda Rao and Prof. Ramamohana Rao, Registrar, AU distributed participation certificates to the participants of Workshop in the valedictory. Prof. A. Ramakrishna Rao, Prof, MMM. Sarcar, Prof. K. Ramji participated.

Product News: Electronic Stethoscope TMST 3

Easily pinpoints bearing and machine noise



The SKF TMST 3 is a high quality, sensitive instrument enabling the determination of troublesome machine parts by the detection of machine noises or vibrations. TMST 3 includes a headset, two different length probes (70 and 220 mm) and a pre recorded audio CD demonstrating the most common encountered troublesome machine noise.

- Excellent sound quality helps to reliably identify the possible cause of the noise.
- User friendly and easy to operate, no special training required.
- Lightweight ergonomic design makes it easy to operate with one hand.
- Excellent quality headset for optimum sound quality even in very high-noise environments.
- Pre-recorded demonstration CD and output for analouge recording help facilitate analysis and comparison.
- supplied with two probes, 70 and 220mm (2.8 and 8.7 in) enabling reach almost anywhere
- Adjustable digital volume control up to 32 levels to reach desired volume.

Further Details: **http//:www.skf.com**

Technical Talk on “Engine & Compressor Condition Monitoring Techniques”

Condition Monitoring Society of India (CMSI), Visakhapatnam in association with Predict Technologies India Pvt. Ltd, Hyderabad organized a technical talk on **"Introduction to Engine & Compressor Condition Monitoring Techniques"** by Mr. EDWARD P. KELLEHER on 11 Jan 2013 at FOUR POINTS SHERATON HOTEL, Visakhapatnam.

Edward P. Kelleher is the Regional Sales Manager-Asia for Windrock Inc. (subsidiary of the Dover Company) which is a provider of comprehensive machinery monitoring systems for industrial reciprocating machines. Gist of his technical talk is given below:

- Continuous monitoring of critical rotating machinery is widely accepted by strictly rotating machinery users such as centrifugal and screw compressors. However, continuous monitoring of reciprocating machinery such as compressors and internal combustion engines has not yet achieved the same acceptance level. Recently, there has been good progress in this field.
- Reciprocating compressor dynamic analysis is based on the interpretation of deviation of its operation parameters from ideal conditions. Parameters to be analyzed include cylinder internal pressures, volumes, temperatures, phase, vibrations. The analysis also includes calculated parameters such as power, efficiency, and losses.

The talk was attended by about 75 participants from local Industries, Indian Navy and academia.

SPM Instrument India Pvt. Ltd.

7-1-27/1, Srinivasa Complex, 1 st Floor "B" Block,, Ameerpet, HYDERABAD-500 016, INDIA
Tel +91 40 23731264/+91 40 23730644, Fax +91 40 23731314, info@spm.co.in

CMSI MEMBERS IN NEWS

Prof. GSN Raju has been appointed as Vice Chancellor of prestigious Andhra University, Visakhapatnam, with effect from 05 February 2013. Prof. Raju is involved in a lot of research work, guided more than 24 Ph.Ds, authored several books and won many awards. He presented more than 350 research papers at national and international conferences.

CMSI congratulates him on his appointment and wishes him all the best in new assignment. CMSI is looking forward to more fruitful interaction with Andhra University during his stewardship.

CONDITION MONITORING AROUND THE GLOBE..... Courses, Conferences, workshops

The International Conference on Condition Monitoring, Diagnosis and Maintanance-CMDM 2013

CMDM 2013 is the second edition of the **International Conference on Condition Monitoring, Diagnosis and Maintanance,** organized every two years by CIGRE Romanian National Committee, as organizer and CNTEE Transelectrica (the Romainan Transmission and System Operator) and ALSTR (the Romanian Live Working Association), as co-organizers.

It is a major event in power systems which provides an exceptional venue to CIGRE members and interested parties for presenting fundamental and technological developments and for promoting key suppliers of products and services for electrical power systems. The conference will bring together power systems engineers, decision makers, economists, academicians and others with interest in the power field.

Important Dates:

Deadline to send the Paper Abstract	**: May 17th, 2013**
Deadline to send the Paper Manuscript	**: July 19th, 2013**
Deadline for submitting the Copyright Form	**: July 19th, 2013**
Deadline for Authors Registration	**: September 2nd, 2013**
Conference Dates	**: September 2nd - 5th, 2013**

Further Details: http//: www.cmdm2013.org

CMSI Welcomes its New Institutional Member !

Centurion University of Technology and Management (CUTAM),
Parlakhemundi, ODISHA

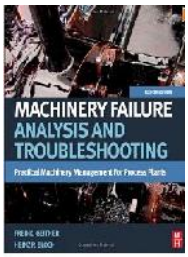
CMSI Welcomes New Members!!

Life Members:

Mr. ISR Murthy
Mr. Abhimanyu Sharma
Capt. Sitaram Nadimpalli
Prof. GSN Raju
Mr. RVS Subrahmanyam
Mr. Kutthumu Srinu
Mr. Srinivas Aluri
Mr. MS Sai Krishna
Mr. SAS Rajasekhar

🕮 Reference Book 🕮

Machinery Failure Analysis and Troubleshooting: Practical Machinery Management for Process Plants **by Heinz P. Bloch & Fred K. Geitner**



This book is a comprehensive guide to analysis and trouble-shooting. Solves the machinery failure problems costing time and money. Provides accurate information on anticipating risk of component failure and avoiding equipment downtime. Includes numerous photographs of failed parts to ensure you are familiar with the visual evidence need to recognize. Covers proven approaches to failure definition and offers failure identification and analysis methods that can be applied to virtually all problem situations.
Demonstrates with examples how the progress and results of failure analysis and troubleshooting efforts can be documented and monitored.

Publisher: **Butterworth-Heinemann; 4 edition, 2012**
ISBN-10: **0123860458**

BOOK POST

If undelivered please return to:

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Visakhapatnam – 530 027, INDIA, Phone: 0891-2586390