



# MONITOR

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## From President's Desk..



### **Wish all CMSI fraternity a very happy and prosperous New Year 2018 !!!**

We are now in 2018. We are really passing through sweeping changes in technology domain. The way we live is going on changing very fast. We are talking about smart cities, smart factories, smart machinery.... We are talking about big data, IOT... We are talking about Industry 4.0 in which strong customization of products under conditions of highly flexible production is done. We are talking of automation, AI, Distributed manufacture, digital manufacture and so on.

But, let me tell you, this is exciting time for Condition Monitoring field. Maintenance always plays a significant role in ensuring that production goes smooth. The technical demands on production plants are rising enormously for want of flexibility, quality, and reliability. This makes us think that Condition Monitoring belongs to Industry 4.0. days have gone to think Condition Monitoring just only protects man and machine, gives more profit, protects environment etc. In Industry 4.0 vision, Condition Monitoring will go smart with innumerable intelligent sensors and do much more. We will see machines that predict failures and initiate maintenance processes autonomously. The result is that companies will be able to increase productivity and profitability many fold. It means continuous condition monitoring provided with a sense of factory intelligence is to be seen as a component of the Industry 4.0 vision. At this year's Singapore Air show, Rolls-Royce launched Intelligent Engine, a thinking to develop aircraft engines which are safer and efficient with ability to communicate with each other and their support networks Smart days ahead for Condition Monitoring !!

-- Dr. V. Bhujanga Rao

### **Main Features of this Issue...**

- Dr. V. Bhujanga Rao Endowment Lecture at GITAM University
- New High-Tech Rail-Accident Prevention System Is Yet to See Light of Day
- Condition Monitoring for Optimized Decision Making in Management of Buildings
- New online vibration card
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- Handy Mobile App on CM
- Informative Websites on CM
- Up coming Conferences/ training/ courses on CM
- CMSI Member in News
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### **Dr. V. Bhujanga Rao Endowment Lecture Instituted by at GITAM (Deemed to be University), Visakhapatnam**

Dr. V. Bhujanga Rao Endowment Lecture Instituted by CMSI & GITAM at GITAM (Deemed to be University) will be delivered by Dr. Amaresh Chakrabarti, Chairman, CPDM, IISc on 19 Mar 2018 at 1100 Hrs. All interested members can attend the lecture.



#### **Title: Industry 4.0: Smart Monitoring of Manufacturing and Beyond**

**Abstract:** Industry 4.0 is touted as the fourth industrial revolution. While the three earlier industrial revolutions are characterised by mechanisation of motive power, Mass organisation of industrial activity, and automation of individual machines, the fourth revolution is characterised by

connected enterprise, where all elements of an enterprise are connected together to provide intelligence at all levels - from machines through factory to enterprise. This promises to expand the concept of condition monitoring from individual machines to an entire factory or even beyond, where various subsets of the elements of an enterprise (people, part, tools, process and environment) could be monitored, decided and controlled. The talk elucidates the concept of Industry 4.0, the on-going work at the Smart Factory Lab Platform at IISc, and outlines as to how condition monitoring and control would take place within such factories.

For Brief Profile of the Speaker please see: <http://cpdm.iisc.ac.in/cpdm/facultyprofile>

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## As Rail Accidents Mount, New High-Tech Accident Prevention System Is Yet to See Light of Day By Arun Kumar Das

The 'on-board condition monitoring system', which would detect track and rolling defects, hasn't taken off from the initial 'expression of interest' stage.



*Track problems are one of the key causes of train derailment  
Source: PTI*

**New Delhi:** Despite repeated rail mishaps, the Indian railways is yet to operationalise the much-awaited 'on-board condition monitoring system (OBCMS)', an initiative that is meant to detect defects related to rolling stock and tracks.

**OBCMS** – consisting of state-of-the-art technology, which comes equipped with sensors on wheel bearings, gear boxes and other parts of the train – is expected to notify the control room when specific machine parts start developing problems. It will also alert authorities to the condition of the track well in advance before these vital components have a chance to break down, thus preventing derailment.

The national transporter, expected to float a global tender to acquire the sensor-based system, could not move beyond the pre-bid stage and has remain undecided about its final shape for more than three years. It floated its first expression of interest (Eoi) in August 2015 but as of April 2017, has said that the project is still in a "nascent stage."

The system, railway officials say, also has not been taken up as a pilot project.

With track problems emerging as a major cause for derailments, the use of technology has become an important policy initiative for the railways. Amongst many causes for derailment, the three biggest known causes for any derailment are track wear-and-tear, bearing wear-and-tear and wheel wear-and-tear.

Contd.,

The OBCMS system would essentially monitor the health of the bearing, wheel and track on a real-time basis as the trains ferry cargo and passengers across the vast Indian railways network.

In 2015, the-then railway minister Suresh Prabhu had said in the Lok Sabha that the on-board rolling stock condition monitoring system is being planned to "monitor the health and safety of key components of coaches, freight cars and locomotives," which would result in increased safety, improved reliability and higher utilisation while reducing operational costs.

Though the railways has earmarked Rs 113 crore in the last budget, the OBCMS, considered to be a paradigm shift in train maintenance, is still caught up in red tape.

The OBCMS system is operational in countries such as the UK, Sweden and Ireland, where it is effectively monitoring maintenance needs of coaches, tracks and locos in advance for ensuring safer travels.

While the railways maintain that specifications are being finalised with due diligence, the fact of the matter is that prolonged delay has raised serious questions about the functioning and pace of implementation by the concerned directorate.

"The sensor-based monitoring system is the most effective enabler for the railways to monitor critical components that have been identified as the major causes for derailment, delay and causes for infrastructure deterioration," said a senior railway ministry official. According to the system, the on-board sensors record vibrations and temperatures constantly. Vibration anomalies are the earliest indicator that something maybe wrong with the bearing. This allows for operators to mark those bearings out for careful observation, thus preventing any further damage.

Even after the derailment, the vibration analysis can be used to ascertain the cause of the accident; whether it happened due to bearing failures, or defect in wheel or tracks.

Detection of bearing fault at the early stage will help prevent occurrences of incidents and maintenance schedules can be planned for bearings that show anomaly. Track condition monitoring would also be a part of the system as the sensors pick up unusual impacts over one location where the trains operate.

**Web Resource:** <http://www.financialexpress.com/india-news/indian-railways-aims-to-reduce-possibilities-of-signal-failures-introduces-remote-condition-monitoring-of-signalling/941707/>



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## Condition Monitoring & Condition Aggregation for Optimized Decision Making in Management of Buildings

Buildings are one of the major infrastructure investments in cities. Sustainable preservation of building assets in order to deliver an appropriate level of service throughout their life cycle requires a comprehensive and optimized decision making methodology. This decision making method needs to be supported not only by accurate data, but also by proper manipulation and aggregation techniques to target the highest potential longevity of construction materials. Condition monitoring methods help asset managers collect required information about their buildings to make justifiable judgments for maintenance and rehabilitation strategies. This data is collected in the condition monitoring stage within a defined scope of a condition monitoring manual. The level of detail in data collection may depend on the asset management system, element hierarchy adopted by the organization and criticality of assets. While detailed condition data is collected during building condition assessments, for higher-level optimized strategic asset management overall conditions of element groups are desirable to project the capital investments and expenditures. The paper reviews condition monitoring techniques for buildings and also presents a risk-based methodology for aggregating the inspected conditions to a higher group level of inspected elements which leads to a greater accuracy of decisions to be made for strategic management of buildings.

Extract from: **Applied Mechanics and Materials** (Volumes 438-439), Pages 1719-1725.

DOI: 10.4028/www.scientific.net/AMM.438-439.1719, October 2013 HessamMohseni, SujeevaSetunge, Guo Min Zhang, Ron Wakefield.



## Handy Mobile App on CM

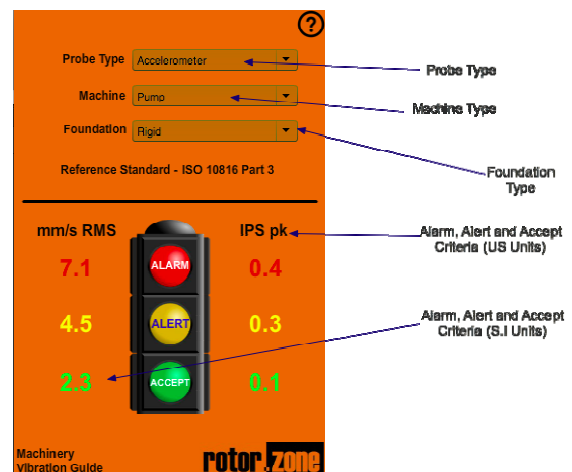
A useful reference covering vibration measurements taken using Proximity Probes (Bently Nevada, Vibrometer etc) and Accelerometers.

The guide references the major standards in use for machinery condition monitoring, ISO 10861, ISO 7919 and API617.

The guide also gives specific cover most major machine classes ... Gas Turbines, Pumps, Centrifugal Compressors and Reciprocating Machines.

Results are displayed with Acceptance, Alert and Alarm criteria in both International/European and North American units.

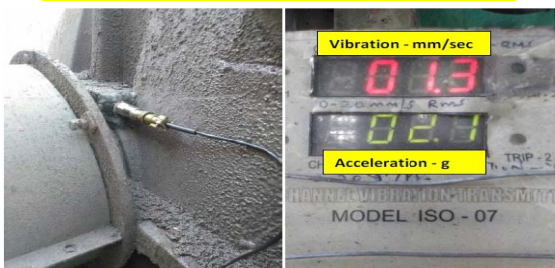
A "must have" app for condition monitoring specialists and rotating equipment engineers.



<http://rotor.zone/vibrationanalysis/styled/index.html>



## New online vibration card generating Acceleration & Velocity values via. Single sensor.



(OEM for this card - M/S Isotronica, Mumbai,  
Mr. Shrikant Saraf – 9821595280)



## Informative websites on CM

<http://www.mobiusinstitute.com/site2/detail.asp?LinkID=31>

<http://www.reliableplant.com/Read/26843/phase-analysis-vibration>

<http://www.denysschen.com/denysschen/default.aspx>

M/s. FLIR Systems India Pvt. Ltd

1111, D Mall, Netaji Subhash Place, Pitampura, New Delhi-110034  
Tel: 0091-11-45603555, Email: [flirindia@flir.com.hk](mailto:flirindia@flir.com.hk), Website: [www.flir.com](http://www.flir.com)



## Some highlights of National Conference on Condition Monitoring (NCCM-2017)



As a part of CMSI's endeavor to bring out the growing importance and recent trends in condition monitoring, a two day **National Conference on Condition Monitoring (NCCM-2017)** was organized by **Indira Gandhi Centre for Atomic Research (IGCAR)**, Kalpakkam, Chennai during **October 26-27, 2017** in association with **Condition Monitoring Society of India (CMSI)** with an emphasis on Case Studies relevant to diagnosis and rectification of machinery faults.

Dr. Arun Kumar Bhaduri, Director, IGCAR graced the occasion as Chief Guest. Nearly 120 delegates attended the conference to reap the benefits of interaction with condition monitoring experts. **CMSI** places on record its appreciation for befitting conduct of conference by the Convener Dr. BPC Rao and his team. All the delegates unequivocally felt the congregation was worth meeting. Some highlights of the conference are:

The keynote Speakers are Dr. Amiya Ranjan Mohanty, IIT, Kharagpur, on topic "Recent developments in machinery and condition monitoring", Dr. B Venkataraman, IGCAR, Kalpakkam, on "Condition monitoring through NDE: and Dr. A. Rama Rao, BARC, Mumbai (Retd.) on "Vibration Analysis as an Effective Diagnostic Tool for Condition Monitoring in Power Plants".

Invited Talks were delivered by Capt. Sitaram Nadimpalli, Indian Navy (Retd), Reveille Allied Engineers Pvt Ltd, Visakhapatnam, Dr. Sanjay G. Barad, GTRE, Bangalore, Shri Probal Ghosh, Tata Steel Limited, Jamshedpur and Dr. D. Dinakaran, Hindustan Institute of Technology & Science, Chennai.

### GBM 2017 of CMSI

GBM of CMSI was held on 26 Oct 2017 at IGCAR, Kalpakkam. The meeting was attended by about 50 members. Following resolutions were made during the meeting.

- i) It was unanously agreed to institute best student paper award from next Conference.
- ii) Experiences of expert members be brought out as book on similar lines of Dr. V. Ramamurti' s book.
- iii) Six months online course be explored by CMSI.

### Compilation of Case Studies:

A book entitled '**Vibration Condition Monitoring of Industrial Machinery - Practical Case Studies**' authored by Late **Dr. V. Ramamurti**, Retd. Professor, IIT, Chennai was released at NCCM-2017. First Copy of the same was received befittingly by Mrs. Rajyalakshmi Ramamurti W/o. Prof. V. Ramamurti. On this occasion Dr. V. Ramamurti was conferred with Honorary Fellow of CMSI Posthumously and the Certificate was presented to Mrs. Rajyalakshmi Ramamurti by President CMSI.



**Hindustan University**

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## HOMAGE

Great Leader, Visionary and Former Director,  
NSTL, Visakhapatnam



**RAdm. S. MOHAPATRA, VSM, IN (Retd.)**

DOB: 01-07-1945

DOD: 10-02-2018

CMSI pays homage to this Great Leader  
and Former Director of NSTL who inaugurated  
CMSI and its Emblem in 2003 at NSTL,  
Visakhapatnam.

**May his soul Rest in Peace !!**

## HOMAGE

Great Teacher, Visionary and Founder Secretary,  
CMSI, Visakhapatnam



**Dr. M. ANANDA RAO, Professor of AU (Retd.)**

DOB: 01-07-1946

DOD: 14-05-2017

CMSI pays homage to this Great Teacher  
and Founder General Secretary of CMSI who is  
one of the pioneers in establishing the  
Society in 2003

**May his soul Rest in Peace !!**

## UP Coming training programs/courses/ Conferences

### **NPTEL - Online Course on Machinery Fault Diagnosis & Signal Processing at IIT Kharagpur**

IIT Kharagpur will provide course completion certificate to all who attend the course and appear in the online exam at the end of the 12 week course. Participants can learn on their free time as well in this course, an initiative of MHRD, Government of India. This is open to all students, faculty members, and professionals from industries and scientific establishments.

[https://onlinecourses.nptel.ac.in/noc18\\_me12/preview](https://onlinecourses.nptel.ac.in/noc18_me12/preview)

**31<sup>st</sup> International Congress and Exhibition on  
Condition Monitoring and Diagnostic Engineering  
Management (COMADEM 2018)** to be hosted by the  
North-West University, South Africa during 2 - 5 Jul  
2018

**13<sup>th</sup> Western Pacific Conference on Acoustics  
(WESPAC-2018)** to be held at CSIR-NPL, New Delhi,  
India from 11 – 15 Nov 2018

<http://www.wespac2018.org/in/>

**57<sup>th</sup> Annual British Conference on Non-Destructive  
Testing**, taking place from 10 - 12 Sep 2018 at the  
East Midlands Conference Centre and Orchard Hotel,  
Nottingham, UK.

<http://www.bindt.org/events/NDT-2018/>

**7<sup>th</sup> International Conference on Through-life  
Engineering Services**, 6 – 7 Nov 2018, Cranfield  
University, UK

[http://www.through-life-engineering-services.org/  
index.php/home](http://www.through-life-engineering-services.org/index.php/home)



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## Honorary & Life Fellows

CMSI Congratulates members conferred with Honorary Fellows and upgraded to Life Fellows:

### HONORARY FELLOWS

Dr. Ing. BKN RAO  
Prof. V. RAMA MURTI (Posthumous)  
Dr. KOTA HARINARAYANA  
Dr. BALDEV RAJ

### LIFE FELLOWS

Dr. V BHUJANGA RAO  
Prof. M ANANDA RAO  
Mr. KVVS MURTHY  
Mr. PVS GANESH KUMAR  
Dr. EDWIN VIJAY KUMAR  
Prof. MRS SATYANARAYANA  
Prof. KOONA RAMJI  
Prof. BELLA SATYANARAYA  
Prof. K V RAMANA  
Mr. KNS PRAKASA RAO  
Mr. BK DAS  
Mr. AVS CHARI  
Prof. AMIYA RANJAN MOHANTY  
Mr. T. VENKATA RATNAM  
Dr. KV BHASKARA SHARMA  
Mr. GU NARASIMHULU  
VAdm. SAMEER SARAN LAL (Retd)  
Dr. BVA RAO  
Dr. TVK BHANUPRAKASH  
Dr. VVS BHASKARA RAJU

## DRDO Scientist of the Year !!!



Er. PVS Ganesh Kumar, Senior Vice President of CMSI is awarded with **DRDO Scientist of the Year** award in recognition of his significant contributions in the domain of **Naval Stealth Technologies**.

He is currently working as **Scientist 'G'** at **NSTL, Visakhapatnam**. His efforts led to realization of several indigenous capabilities in prediction, measurement and mitigation of broad spectrum emissions of ships and submarines thereby enhancing self reliance in Naval Stealth Technologies. He is also guiding some of the complex and technologically challenging futuristic developments under various projects of NSTL.

**CMSI congratulates him on his achievement and wishes him to get many more laurels in his future endeavours !!**

Contd..

Mr. B SASI  
Mr. SAJU T ABRAHAM  
Mr. PALAPARTHI RAVI  
Mr. RANGA RAMA KRISHNA  
Mr. ANUP KUMAR P  
Mr. V PRAKASH  
Mr. S BAGAVATHIAPPAN  
Dr. S MAHADEVAN  
Mr. S HIRUNAVUKKARASU  
Mr. GOVIND KUMAR SHARMA  
Ms. SHAHAB FATIMA  
Ms. REVATHI VENKATA RAMAN  
Mr. BARID BARAN LAHIRI  
Mr. CK MUKHOPADHYAY  
Mr. K ARUNMUTHU  
Ms. M MENAKA  
Mr. ANISH KUMAR  
Dr. T SARAVANAN  
Mr. KAMLESH KUMAR  
Dr. D.G. HARRIS SAMUEL  
Dr. G. RAVIKIRAN SASTRY  
Mr. MANTOSH BHATTACHARYA  
Mr. MOSES DAYAN GODI  
Mr. M. G. PODUVAL  
Mr. SHRIDHAR KURSE  
Mr. V. K. PRAMOD



## CMSI Welcomes New Members !!!

### LIFE MEMBERS

Mr. VENKATA KRISHNA KISHORE G  
Mr. A VISWANATH  
Mr. T K HANEEF  
Mr. K V RAJ KUMAR  
Mr. ARJUN V  
Mr. GMSK CHAITANYA  
Mr. MM NARAYANAN  
Mr. MANOJ KUMAR RAJA  
Mr. WAIKHOM SHARATCHANDRA SINGH  
Mr. PONSEENI VASAN  
Dr. R DHAYALAN

Contd..

**Any achievements of our life members, Institutional members and local chapters may please be informed through our email: [cmsi.hq@gmail.com](mailto:cmsi.hq@gmail.com) to publish in our news letter 'MONITOR'**



# Condition Monitoring Society of India (C M S I)

## *CMSI Member in News*



**Dr. K. Ramji**, General Secretary, CMSI and Professor of Mechanical Engineering Department, Andhra University, Visakhapatnam has been appointed as **Vice Chancellor** of **Dr. BR Ambedkar University, Srikakulam, Andhra Pradesh**.

CMSI Congratulates him for this achievement and wishes him many more laurels in his future endeavours.



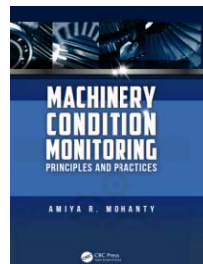
CMSI extends its heartiest felicitations to Prof. K. Ramji, Our General Secretary & Vice Chancellor, Dr. BR Ambedkar university, Srikakulam, Govt of AP

### Editorial Board :

**Dr. V. Bhujanga Rao**  
**Er. P.V.S. Ganesh Kumar**  
**Er. T. Venkata Ratnam**  
**Er. Hemanth M. Bari**

### **Reference Book**

### **MACHINERY CONDITION MONITORING - Principles And Practices** by **Dr. Amiya R. Mohanty**



Since vibration is one of the most widely used fault detection techniques, the book offers an assessment of vibration analysis and rotor-dynamics. It also covers the techniques of wear and debris analysis, and motor current signature analysis to detect faults in rotating mechanical systems as well as thermography, the nondestructive test NDT Techniques (ultrasonics and radiography), and additional methods.

The author includes relevant case studies from his own experience spanning the past 20 years, and detailing practical fault diagnosis exercises involving various industries ranging from steel and cement plants to gas turbine driven frigates. While mathematics is kept to a minimum, he also provides worked examples and MATLAB® codes. This book presents the latest techniques in fault diagnosis and prognosis, provides many real-life practical examples, and empowers you to diagnose the faults in machines all on your own.

**Publisher : CRC Press Taylor & Francis Group**  
**ISBN : 9781138748255 - CAT# K32636**



### **For Membership Enrollment please Contact:**

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

**- Editor**