

Three-day State level Workshop on **Online Real-Time Environmental Monitoring Technology**

04-06 July 2017

Venue - Auditorium, Lake Conservation Authority, Bhopal

Preamble :

The Environment Surveillance Centre, M.P. Pollution Control Board (MPPCB) organised a three-day Workshop on 'Real-time Environmental Monitoring Technology' at Bhopal from 04-06 July 2017. The workshop was aimed to educate officials of all the Regional offices and HQ of MPPCB by providing exposure to the current technology. The workshop helped in capacity building and skill enhancement by understanding fundamentals, principles and intricacies of this new monitoring technology. The ultimate outcome of this workshop would help in better implementation of real-time monitoring programme in the State in its true spirit.

Proceedings :

The workshop started with the floral welcome of Chief Guest Dr. Tejinder Singh, APCCF & Head Western Region, Ministry of Environment Forests & Climate Change, GoI and other dignitaries on the occasion. This was followed by welcome address by **Shri R.S. Kori, Director Environment**, M.P. Pollution Control Board who gave an overview of the real-time monitoring scenario in Madhya Pradesh State and highlighted the efforts of MPPCB in implementation of 'self monitoring of compliance by industries' programme in the State.



Floral welcome of Chief Guest and dignitaries on the occasion

Shri A.A. Mishra, Member Secretary, MPPCB praised the idea of organising workshop on real-time monitoring technology and quoted it as prime demand in the present time. He asserted the need to take up the task of implementation of real-time monitoring programme in the State on priority basis. He appreciated the spirit shown by the industries in quick adoption of this new technology. He urged the participants to take benefit of knowledge of eminent resource persons who kindly agreed to be a part of this workshop for the cause of environment.



The **Chief guest of the function Dr. Tejinder Singh, Head Western region, MoEF & CC, Govt. of India** in his influential speech attracted attention of dignitaries and participants towards environmental issues of local as well as global interest. He shared his experience and expressed how this modern technology can help in quick decision support and in managing the health of the environment. He wished this workshop would provide not only content, but intent too, and would prove to be a milestone in implementation of Government's Self Monitoring of Compliance programme. He urged the participants to extract most out of this workshop and make it practical at work field to sound this programme a grand success.



The Chief guest addressing during Inaugural function

A total of 74 participants from all the Regional offices of MPPCB across the State attended the workshop. Among the resource persons Shri Abhijit Pathak and Shri Aditya Sharma from Central Pollution Control Board Delhi, Shri Sanjeev Kumar Kanchan from Centre for Science & Environment, New Delhi, Shri Tejbir Singh from M/s ABB India Limited, Faridabad, Haryana, Shri Sankar Kannan from M/s SICK India Pvt. Ltd. Mumbai, Shri Sudheesh Narayanan from M/s Knowledge Lens Bangalore, Shri Sathish Mogupally from M/s EOEPL, Hyderabad participated in the workshop.



Address by Shri R.S. Kori, Director, Environment, MPPCB

The vote of thanks was extended by Shri Sandeep Sarwan. He thanked the dignitaries, all the expert resource persons and distinguished guests present in the workshop. He also assured the authorities to follow the path shown by them in their addresses in achieving the objectives.

Live Streaming of Workshop :

In order to expand the reach of this important workshop to all other target participants who could not attend the workshop, a live webcasting of workshop was done throughout the technical sessions. The remarkable live streaming technology helped effectively reach wider audiences to make the workshop more purposeful and beneficial. The audiences watching the workshop live through webcast received the same training and information at the same time. All the presentations were webcasted in real time using streaming media technology. The live webcasting was an in-house effort without support of any external agency. This was the first ever programme MPPCB put on live streaming.

Proceedings of Technical Sessions :

The workshop was scheduled for three days and was divided into six technical sessions covering all the aspects related to real-time monitoring technology. The first technical session was opened with the deliberation by Shri Sanjeev Kanchan, Programme Manager, CSE, New Delhi who spoke on 'Fundamentals of Real-time Monitoring Systems'. He stated the advantages of this new technology over manual monitoring and made elaboration on various types of technologies and how they actually work. He also mentioned about the types of equipment and procedures for their installation. An overview about CAAQMS, CEQMS and CEMS was also given to the participants and the roadmap required to be followed to achieve the success was also briefed by him during the deliberation. The challenges being faced by industries and other missing links in proper implementation of real-time monitoring technology in the country were also highlighted by him during the talk.



Deliberation by Shri Sanjeev Kumar Kanchan, CSE, New Delhi



The 2nd speaker of the day **Shri Abhijit Pathak, Scientist ‘C’, Central Pollution Control Board, Delhi** spoke on Principles & Technologies involved in RTAMS. After giving an introductory information and chronological background about real-time monitoring system (RTMS) he shared views regarding need of RTMS in Indian scenario, components of RTMS, areas covered under RTMS, benefits of real-time monitoring etc. He also talked on policy perspective for implementation of CEMS, various issues involved in implementation of this technology, concerned statutory provisions etc.



Presentation by Shri Abhijit Pathak, CPCB., Delhi

In his another technical deliberation on 'Protocol for Installation and Performance check of CEMS' Shri Pathak narrated about technical issues which need immediate attention for the implementation of CEMS and gave a glimpse about where India stands as far as compliance of international norms is concerned. He also explained about installation of CEMS, performance check and calibration of CEMS for reliability of data, certification and approval of real-time monitoring systems etc lucidly which was well received by the participants.

Shri Tejbir Singh, M/s ABB India Ltd., Faridabad, Haryana deliberated on 'Understanding on CEMS selection for Process and Sector specific Industries'. He explained CEMS measurement techniques, industrial specific CEMS analysis, role of CEMS in energy management, process checks and control etc. Elaboration on various In-situ and Extractive CEMS methodologies was quite absorbing and informative to the participants.



A talk by Shri Tejbir Singh, M/s ABB India Ltd during the workshop

On day-2 of workshop Shri Tejbir Singh made presentation on calibration of gaseous CEMS and informed the participants about international protocols which are already in-place for this purpose. The European norms EN15267, EN14181, which talk about CEMS calibration and checks, were also discussed by him in his presentation. The basic requirement for calibration, i.e. proper mounting of CEMS, need of accredited laboratories, suitable reference standards, cylinder test gases, zero and span check etc were also very well elaborated and explained in his presentation.



Deliberation by Shri Sankar Kannan, M/s SICK India Pvt. Ltd.

Shri Sankar Kannan, M/s SICK India Pvt. Ltd., Mumbai made his presentation on Technology Options & Device Calibration for PM-CEMS. He illustrated the history of CEMS which was followed by various technologies, viz. Tribo flo, electrodynamic, scatter light, Beta radiation, wet-extractive, gravimetric measurement etc used for particulate matter measurement, were all discussed. Need of calibration and how it is done was also explained by him very nicely.

This was followed by technical presentation on Continuous Effluent Quality Monitoring System by Shri Abhijit Pathak, Scientist, Central Pollution Control Board, Delhi. He talked about need of CEQMS, application of this technology for monitoring of fresh waters and industrial effluent as well. He discussed both in-situ and extractive systems for continuous monitoring of effluent. The parameters that can be monitored through CEQMS, limitations of CEQMS, Site selection procedure, data reliability, data management, basic specifications of CEQMS etc all were very well explained by him to the participants.



Dignitaries and Participants engrossed in workshop presentations

In his next presentation on Legal Framework and Prescribed Standards for RTM Shri Abhijit Pathak addressed the national policy on real-time monitoring in India, parameters and standard limits defined for each one, what should be the flow of CEMS implementation, how data should be transferred and managed etc. The check-list for CEMS implementation was quite informative and was explained very well to the participants. He asserted the need for development of CEMS protocol, training to the laboratories, accreditation of laboratories for CEMS calibration, revision in standards for CEMS compliance purpose and shared his views on this with the participants.

In the 5th technical session on last day of workshop **Shri Sathish Mogulapally and Shri Manoj Kumar, M/s EOEPL, Hyderabad** spoke on Continuous Ambient Air Quality Monitoring technology and calibration procedures. After explaining about fundamentals of CAAQMS the participants were briefed about site selection criteria and location for CAAQMS installation. CAAQMS data transfer from the site to the Server, management of data, calibration techniques of CAAQMS etc were also discussed during the presentation.

The 2nd presentation on the last day was on ‘Quality Assurance Levels and Certification of RTAMS’ by **Shri Sanjeev K. Kanchan, CSE, New Delhi**. He elaborated on the issue of quality assurance, how it should be done, present practice in India, the current practices observed in the western countries etc. He also talked about the criteria Quality Assurance Levels 1, 2 and 3 being followed in the Europe. The procedure followed in the US, i.e. CEMS performance check during the installation, was presented to the participants. The need of CEMS certification, comparison of India’s present CEMS protocol with US and other European countries etc was also discussed in his presentation.

He stressed the need for indigenous system for CEMS certification, indigenous agency for the certification, need for development of set of guidelines and protocols, skill enhancement, capability building and few other measures for proper implementation of CEMS in the country.

This was followed by deliberation by **Shri Aditya Sharma, Scientist ‘D’, Central Pollution Control Board, Delhi** who spoke on ‘Data communication protocols and procedures for data validation’.



As part of background information he informed the participants about the target industries/sectors which fall under purview of CEMS, various requirements of system for continuous monitoring, schematics of data management, current protocol followed by CPCB for the management of real-time data etc. Various types of systems and technology in-use at present were also discussed by him in his deliberation. The procedure for the registration of industries at CPCB for CEMS and mechanism for submission of data etc were also explained by him to the participants.

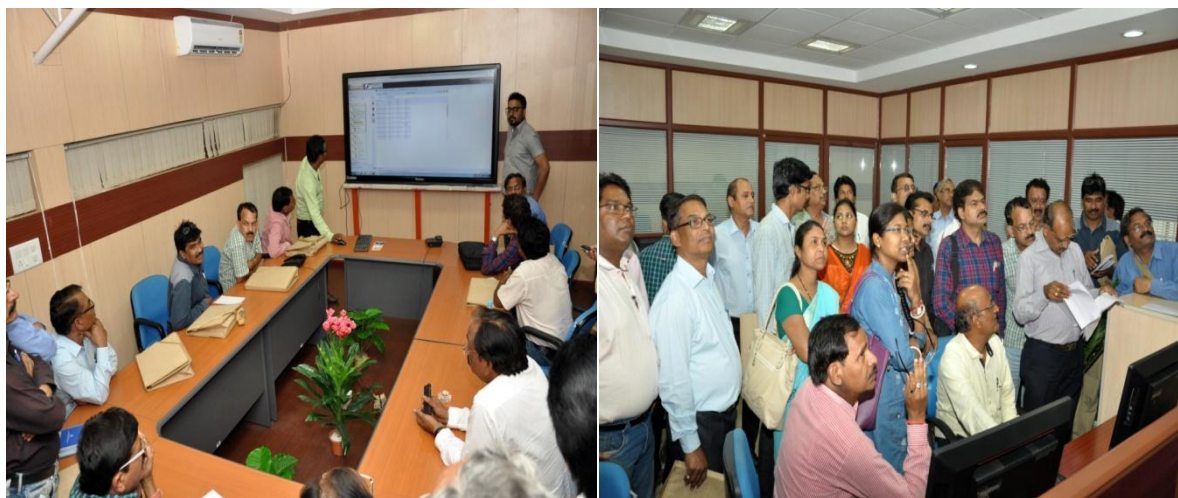
Shri Sudheesh Narayanan, M/s Knowledge Lens, Bangalore talked on Data tampering threats and counter measures. He detailed about data integrity issues and the techniques to be applied to verify the real-time monitoring data for its reliability. He made few graphical presentations giving examples of tampered and suspected data. He also focussed on data flow mechanism, sources where data tampering is possible , data interpretation, inspection areas for CEMS, CAAQMS and CEQMS etc.



Presentation by Shri Sudheesh Narayanan, M/s Knowledge Lens, Bangalore

The last presentation in the 6th Technical session was by Shri Sanjeev Kanchan, CSE, New Delhi. In his presentation he spoke on accredited and empanelled laboratories. He explained the need of lab accreditation and why it is essential and what role it plays in real-time data quality and reliability. He also talked about global system of accreditation headed by ILAC and IAF, process of accreditation in USA and UK. The requirement of infrastructure, manpower, field tests etc for CEMS etc. The existing gaps in CEMS in India and the steps to be taken to smoothen the process were all discussed in the presentation.

The participants had a **visit to the Environment Surveillance Centre (ESC)** to understand its functioning. Online connectivity of RTMS with servers, remote surveillance of industries through IP-PTZ camera, remote calibration of CEMS, data management, data interpretation at ESC etc were all explained to the participants.



Visit of participants to the Environment Surveillance Centre

On the last day the panel discussion and valedictory session was graced with the presence of **Shri Malay Shrivastava (IAS), Chairman, M.P. Pollution Control Board**. There was recap of topics discussed during the three-day workshop and the Chairman was briefed about the proceedings of technical sessions. The panellists included the resource persons, Member Secretary and Director Environment, MPPCB. Few queries came up during the session were responded by the panellists. The prevailing grey areas in CEMS implementation in the country were highlighted during the workshop and measures were also suggested to overcome them.



H'ble Chairman, MPPCB at Valedictory function of RTM workshop

The Chairman, MPPCB lauded the timely efforts by team of Environment Surveillance Centre in organising this workshop. He said the event reflects the growing realization to adapt to this new monitoring technology and take on challenges come next in the CEMS implementation programme and set an example by taking lead in the country. He expressed confidence in participants who attended three-day and wished everyone to make use of learning from workshop in their respective areas in the larger interest of environment.

Shri A.A. Mishra, Member Secretary, MPPCB praised the idea of organising this workshop. Pointing the workshop a grand success he expressed desire to organise such workshops at zone level in the State with the objective to train more people of organisation. He also appreciated the efforts made by Dr. Rajendra Chaturvedi, Scientist, ERC in shaping the entire workshop in planned and systematic way and bringing expert resource persons and regulatory officials on one platform for the better cause of environment. He praised the idea of evaluation of participants through questionnaire based on the presentations made during the workshop. He acknowledged the sincere contribution made by all the expert resource persons who kept the event lively and kept the participants energised throughout the sessions and developed an interest in this upcoming RTM technology.



Award of Certificates and Memento to the Participants

The programme was concluded with the award of Certificates to the participants and ended with thanks to the Chair, dignitaries and the participants.

Recommendations :

The following recommendations are put forth, based on the outcome of the workshop, following active engagement and two-way interaction among resource persons and participants during the programme.

1. A comprehensive guideline needs to be published covering all aspects, including suitable real-time monitoring technology selection for specific process and specific sector, installation protocol and post installation check to ease the task of inspection, monitoring and implementation of real-time monitoring programme under self monitoring of compliance by industries.
2. As the data communication protocol, data management, remote calibration check and other related issues in real time monitoring system are driven by Information and Communication Technology hence there is strong need to have people/professionals from IT background in Pollution Control Boards/Committees for necessary support and to strengthen and make the management of real-time monitoring system easy.
3. Reliability of data and credible reporting is possible only through a strong regulatory framework hence real time monitoring technology requires a legal backing and incorporation of same in the existing environmental legislations pertaining to control of air and water pollution. A set of Rules, specifically addressing all the issues related with real-time monitoring system, should be notified before further proceed.
4. There is genuine need to have an indigenous certification agency. The CPCB's Guidelines on CEMS require Certification of CEMS but as on date there is no agency in the country to certify the 'equipment type' to be used for CEMS and other purpose.
5. A well defined certification policy, not as a guideline but as a Rule, is also essentially needed. Accreditation of laboratories or empanelment system should be established for verification/performance check of RTM systems.

6. There is need to develop dedicated facilities for performance evaluation and calibration of real-time monitoring systems to make it reliable, foolproof and purposeful for improved environmental protection.

- 7 CEMS is a new technology and, therefore, capacity building and skill enhancement of the target groups, including regulators and the industries people, is primary requirement for effective implementation of real-time monitoring programme.

