



# CSIR News

NEWSLETTER OF THE COUNCIL OF SCIENTIFIC &amp; INDUSTRIAL RESEARCH

Volume 65 No. 5 &amp; 6

website: <http://www.csir.res.in>

March 2015

## In This Issue

### 49 In The News

- CSIR-NBRI Releases New Variety of Gladiolus
- CSIR Wins International Competition to set up Wax Deoiling Technology at BPCL Refinery

### 50 R&D Highlights

- CSIR-CBRI working on Green Retrofit Strategies for Office Buildings
- CSIR-CBRI working on Solar Thermal Air Conditioner

### 53 Conference

- CSIR-CMERI organizes AdMet 2015

### 55 Workshops

### 57 Science Awareness Programmes

- CSIR-IICB Scientists Popularize Science among School Children

### 58 National Science Day

- CSIR-NEIST
- CSIR-CSIO
- CSIR-NCL

### 62 Exhibition

### 64 Kisan Mela

### 66 Honours & Awards

### 70 CSIR-Serving the Nation

- CSIR-Central Building Research Institute

### 72 Announcements

## In The News

### CSIR-NBRI Releases New Variety of Gladiolus



Release of the Gladiolus variety "NBRI-Lalima" by (L-R) Dr. C.S. Nautiyal, Dr. Harsharan Das and Dr. R.K. Roy

**D**ISPLAYING its commitment to plant research and welfare of floriculturists, the Lucknow-based CSIR-National Botanical Research Institute (NBRI) has come up with its latest offering – a new variety of Gladiolus flower named 'NBRI-Lalima'.

The new variety was released on 9 February 2015 by Dr. C.S.

Nautiyal, Director, CSIR-NBRI and Dr. Harsharan Das, IAS, Principal Secretary, Department of Science and Technology, Govt. of Uttar Pradesh.

The floret colour of 'NBRI-Lalima' is unique with pinkish-red combination and purplish splashes on its tip. The floret is highly frilled and is a late blooming variety. It is ideal for vase decoration and for cut-flower purpose.

## CSIR Wins International Competition to set up Wax Deoiling Technology at BPCL Refinery

The Wax Deoiling Technology developed jointly by the CSIR-Indian Institute of Petroleum (IIP), Dehradun and the Engineers India Ltd (EIL) has won an international competition. A Wax Deoiling Plant based on this indigenously developed technology has been set up with an investment of 750 crore rupees at the Numaligarh Refinery Ltd (NRI) – a subsidiary of Bharat Petroleum Corporation Limited (BPCL).

This wax deoiling plant will help to develop small-scale ancillaries and cottage industries in the nearby areas and will promote industrial development in the north-east region of India. The plant will also generate direct and indirect employment opportunities for local people.

The Wax Deoiling Technology is used to produce waxes from petroleum streams. The first batch of Paraffin Wax has been produced and regular production of Paraffin Wax is expected to start by the end of first quarter 2015.

The newly set up plant will produce 50,000 MMTPA of high value Paraffin Wax and 4,500 MTPA of Microcrystalline Wax that will help cut down the wax import by 50% and will save foreign exchange of the order of about 500 crore rupees/annum. Paraffin wax is used for making candles, polishes, medicines, food packaging, paints, leather etc, while Microcrystalline Wax is mainly used in the cosmetic industry.

The development opens up avenues for setting up new units in the country and even export of the technology.

### R&D Highlights

## CSIR-CBRI working on Green Retrofit Strategies for Office Buildings

Scientists at the CSIR-Central Building Research Institute (CBRI), Roorkee are working on green retrofit strategies for office buildings.

A comprehensive study of the existing green rating systems was carried out and the attributes for assessing and retrofitting existing buildings were identified. A Questionnaire was developed for the proposed rating system with an acronym, GRASS – Green Retrofit Assessment System for Sustainability, for making and rating existing buildings as green. It was sent to 500 professionals, engineers, material scientists, architects, and students from different disciplines. The 85 responses received were analyzed.

GRASS will rate a building on the

basis of its measured operational impacts on the environment, and will provide a simple indication of how well the environmental impacts are being managed, compared with other similar buildings. This rating is based on actual building performance, along with design, modelling and simulation results.

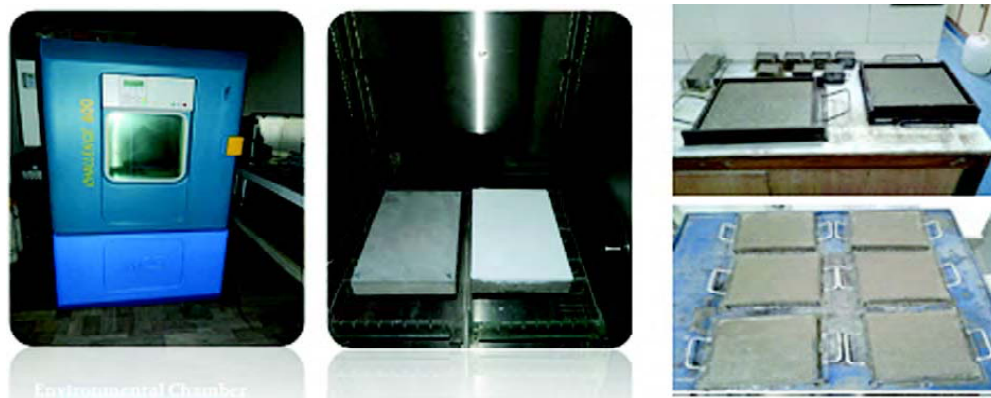
Analytical Hierarchy Process (AHP) has been used to analyze the questionnaire results. AHP is a mathematical technique which provides an effective means to deal with complex decision-making and to give weightage for each attribute, criterion & sub-criterion based upon the surveys. MS Excel spread-sheet & Expert Choice Software is also used to compute the weightages. The results obtained in each assessment item level can be calculated by using the equations:



i) Sub-criterion score ( $S_s$ ) = 0, 0.5 or 1 (on the basis of fulfillment), ii) Sub-criterion result ( $R_s$ ) = Sub-criterion weightage ( $W_s$ ) x Sub-criterion score ( $S_s$ ); iii) Criterion score ( $S_c$ ) =  $\sum R_s$ , iv) Criterion result ( $R_c$ ) = Criterion weightage ( $W_c$ ) x Criterion Score ( $S_c$ ); and v) Total assessment result =  $\sum R_c$

Similarly, a MATLAB program has been developed to predict the insulation

thickness to achieve the desired U-value for ECBC and NBC compliance for more than 120 combinations of different walling assemblies (materials) used in existing buildings built during 1950-2000. Different retrofit insulation thicknesses with and without air gap have been analyzed and PUF ( $k = 0.023$ ) insulation is found to be most economical fulfilling the desired properties.



Casting of Vermiculite tiles and samples in Environmental Chamber

Vermiculite tiles of size 25x25x3.5cm have been developed as part of the project activity and applied on the roof top of the experimental model at the Institute to see their effectiveness in improving the thermal comfort indoors. The physical properties of the tiles are:

- i) Density: 0.870 gm/cc;
- ii) Compressive strength: 4.66MPa;
- iii) Flexural strength: 1.36MPa;
- iv) Water absorption: 30% and

- v) Thermal conductivity: 0.228 W/m-k.

The thermal performance indoors is being monitored using a 64-channel data-logging system. The preliminary analyses show that Vermiculite tiles with white reflective paint provide good thermal insulation.

**Ashok Kumar, Rajesh Deoliya,  
Rajni Lakhani, B.M. Suman & Team  
at CSIR-CBRI**

## CSIR-CBRI working on Solar Thermal Air Conditioner

Scientists at the CSIR-Central Building Research Institute (CBRI), Roorkee are working on the design and development of an air conditioner energized by solar energy for residential buildings.

The aim is to develop a novel solar power generation system with 30% conversion efficiency and a Solar

Adsorption Cooling System.

A novel thermodynamic cycle has been employed to achieve higher efficiency which is a combination of Stirling and Rankine cycle. This novel engine has high power-to-weight ratio and higher achievable theoretical efficiency also. The PV and TS diagram of the

thermodynamic cycle are shown in Figure 1.

The engine was drawn in SolidWorks software as shown in Figure 2 and is in the stage of fabrication. The preliminary

design stage of Stirling Engine is based on Ross-Yoke drive Mechanism. This crank mechanism is chosen to eliminate the lateral forces on displacer and power piston thus increasing the efficiency of the engine.

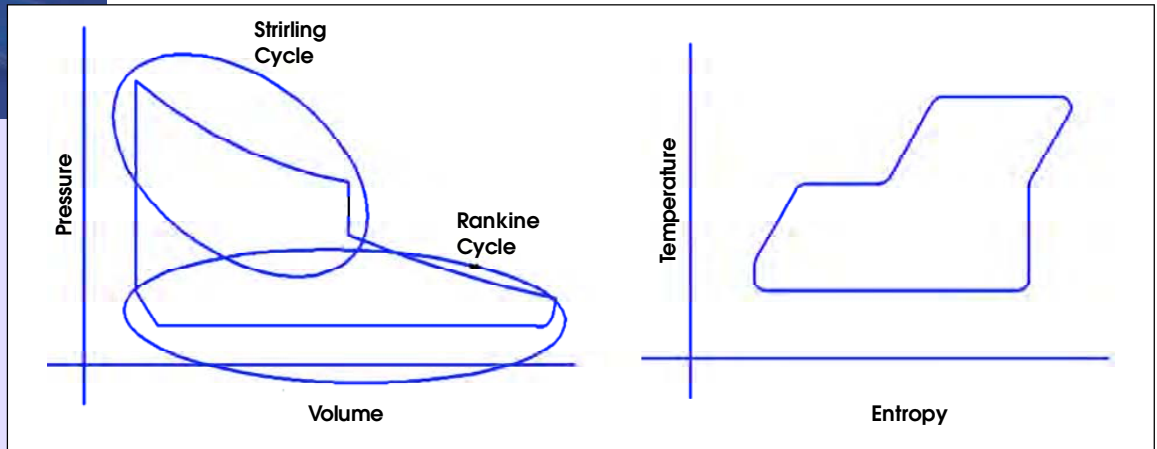


Fig.1: PV and TS diagram of Novel Thermodynamic Engine

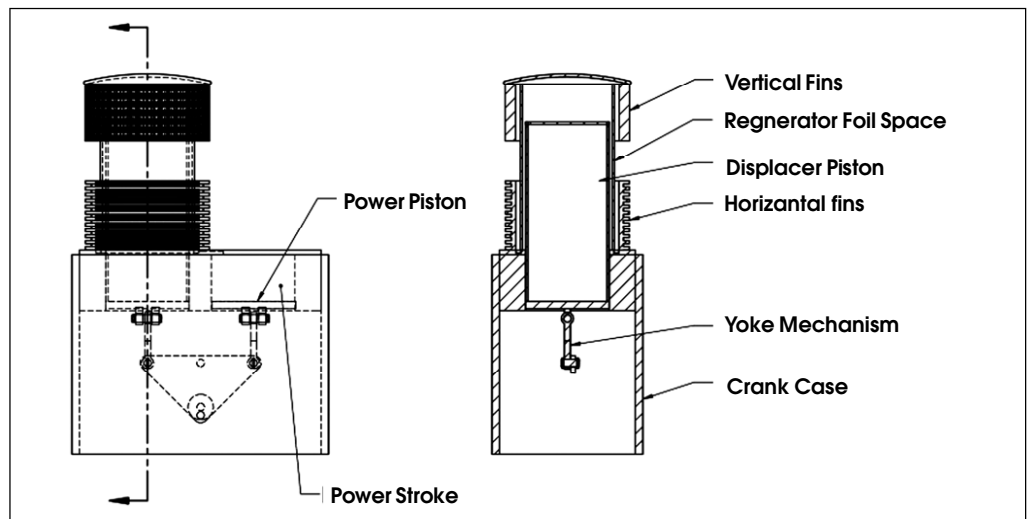


Fig. 2: Design of Stirling Cycle based Solar Power Generation System



Fig. 3: Rapid Prototyping model Engine

A rapid prototyping model engine has been fabricated as shown in Figure 3 to verify the working of the Crank (Ross-Yoke) Mechanism, which is working as per design. The fabrication of the second version of the engine, which shall work both mechanically and thermodynamically, is in progress.

**Nagesh Babu Balam at  
CSIR-CBRI**

## Conferences

# CSIR-CMERI organizes AdMet 2015



The 4<sup>th</sup> National Conference on Advances in Metrology (AdMet2015) and CSIR-CMERI's 58<sup>th</sup> foundation day were successfully organized by CSIR-CMERI, Durgapur from 25<sup>th</sup> to 27<sup>th</sup> February, 2015. AdMet2015 was co-organized by the Metrology Society of India (HQ&ER).

The Welcome Address was delivered by Dr. P. Pal Roy, Acting Director, CSIR-CMERI, Durgapur.

The National Science Day was also celebrated on 27<sup>th</sup> February 2015 in continuation with AdMet2015 with an eminent lecture by Prof. T. Kumar, Director, IIT, Durgapur.

The main theme of AdMet 2015, that is, usefulness and application of metrology in all spheres of human activity was reflected in all the lectures by eminent speakers from National Physical Laboratory, UK, IIT-Kanpur, IIT-Kharagpur, IISc-Bangalore, CSIR-NPL, and CSIR-CMERI.

Prof. R.C. Budhani, former director CSIR-NPL (presently, Professor, IIT Kanpur), Prof E.S.R. Gopal (IISc Bangalore) and Dr. Y.P. Singh (CSIR-NPL) briefly talked about the historical background of metrology. Today, measurement activity concerns extremely precise measurements.

Dr. A. Sengupta (Acting Director, CSIR-NPL) enlightened the audience about atomic clocks, which get delayed only by 1 second in 130 million years and help to maintain our radar systems, satellite communications, radio telescopes and power grids.

At the end of the inaugural session, a vote of thanks was proposed by Dr. Ranjan Sen, Chief Scientist CSIR-CMERI and Convener AdMet 2015. He said that the central theme of the conference takes its cue from the emerging trends and market outlook for the Indian manufacturing industries where compliance to increasing stringent quality control with sustainable

development and more small products and systems that conform to a more informed and discerning customer, who is continuously raising the bar for manufacturing industries.



Left to Right: Prof. R.C. Budhani, former Director, CSIR-NPL lighting the lamp; Dr. P. Pal Roy, Acting Director, CSIR-CMERI, Durgapur, Dr. R. Sen, Chief Scientist, CSIR-CMERI & Convener AdMet2015; Dr. A. Sengupta, Acting Director, CSIR-NPL

Dr. S. Yadav (CSIR-NPL) spoke about the extremely precise pressure measurement devices which are very useful for power generation, oil and natural gas exploration, exploitation, civil aviation and military purposes.

Dr. Y.P. Singh (CSIR-NPL) talked about the highly sophisticated temperature measurement devices that enhance the control over nano-level activities.

Dr. Kamal Hossain (National Physical Laboratory, UK) and Dr. Rajat Mukherjee (SRL Laboratory) showed how metrology is pertinent for devising societal rules and international trade. Almost 80% of the international trade is dependent on measurement techniques. Not only trade or

society, metrology has possibly touched all the human activities right from the conception of human life to its demise. They also highlighted the importance of standards in medical metrology. It is a sector that requires a lot of work in the future.

Dr. V.N. Ojha (CSIR-NPL) and Dr. K.P. Chaudhary (CSIR-NPL) talked about about nano-metrology. The challenges in nano-dimension metrology are the formation, maintenance, calibration, and traceability of standards and many more. The effort by different countries to take a positive step towards this direction is the call of the hour.

measurement of uncertainty, role of calibration and measurement traceability in quality management and possible reasons of violation of NABL rules.

In all, 13 keynote lectures were presented.

Besides these, 70 papers were presented in eight technical sessions: Health Care, Time and Frequency, Electro Technical, Metrology for Advanced Manufacturing, Quality Assurance, Uncertainties in Measurements and Standards, Dimensional Metrology and Machine Vision, and Pressure, Temperature, Humidity and Density.

About 150 registered participants from various industries, organizations, academia and Government labs actively participated in AdMet2015.

One young researcher award was also presented to Dr. Subhadeep De (Scientist, CSIR-NPL) during the conference. To motivate other researchers, best paper awards were also presented to eight researchers (from each of the eight sessions) for their contribution towards the science of measurement. Ten papers were also selected from the conference for publication in a SCI journal, *MAPAN*, Journal of Metrology Society of India (published by Springer with impact factor 0.477) after extension and peer review.

Several government bodies such as CSIR, Science and Engineering Research Board and NABL sponsored the conference. Various industries viz. M/s Mitutoyo South Asia Pvt. Ltd., M/s Ametek Instruments India Pvt. Ltd., M/s Icon Analytical Equipment Pvt. Ltd., M/s FARO Business Technologies Pvt. Ltd., M/s WIKA Instruments India Pvt. Ltd., and M/s Nanovea also supported the conference. Other industries viz. M/s Octagon Precision (India) Pvt. Ltd., M/s Indian Calibration Services, M/s Shankar Wire Products Industries Pvt. Ltd., M/s Electrometer Corporation, M/s Alcalab Pvt. Ltd., The Mission Hospital Durgapur, M/s Dynotech Instruments Pvt. Ltd. also extended their hands to make this conference successful.



Left to right: Dr. P. Pal Roy, Acting Director, CSIR-CMERI; Prof. R.C. Budhani, Ex-Director, CSIR-NPL; Dr. R. Sen, Chief Scientist, CSIR-CMERI & Convenor AdMet 2015; and Dr. A. Sengupta, Acting Director, CSIR-NPL, releasing the abstract book of the conference

Prof. S.K. Pal (IIT Kharagpur) enlightened the audience about the advantages of friction stir welding for precise welding activity. Today, automobile manufacturers are trying to apply the FSW process for welding of dissimilar materials with dissimilar geometric dimensions.

Mr. A. Das Gupta (Ex-CMTI), Mr. R. Srikanth and Mr. N. Jhangra (both NABL Accreditation Officers) elaborated upon NABL norms for getting accreditation,

## Workshop

# CSIR-CECRI organizes Workshop on “Recent Advances in Electroplating and Allied Technologies”



Dr. S. Sivaram delivering the inaugural address

The CSIR-Central Electrochemical Research Institute (CSIR-CECRI), Karaikudi and Micro, Small and Medium Enterprises (MSME), Government of India jointly organized a one-day Workshop on “Recent Advances in Electroplating and Allied Technologies” for the benefit of electroplating and allied industries, especially micro, small and medium scale enterprises, on 28 January 2015 at Hotel Radisson Blu, Chennai. The goal of the workshop was to disseminate the latest trends including technological advancements in process and equipment relating to electroplating and surface coatings.

Inaugurating the workshop, Dr. Swaminathan Sivaram, ex-director of CSIR-National Chemical Laboratory, Pune urged small-scale industries to adopt a cluster approach to solve problems on marketing tactics, quality, etc. He underlined the importance of talent and being alert to innovations in order to sustain and grow in the face of global competition.

Dr. Vijayamohan K. Pillai, Director, CSIR-CECRI, in his presidential address announced CSIR-CECRI's intention to set up an exclusive desk for micro, small and medium enterprises. He added that anyone from the MSME sector could approach the desk for technical consultancy. He averred that the need

of the hour for MSMEs was to adopt cost-effective and eco-friendly technologies to tide over stiff challenges.

Earlier, Dr. S. Mohan, Senior Principal Scientist, CSIR-CECRI welcomed the gathering. Dr. Jun Hyung Jin (Managing Director, Semyung India Enterprises Pvt. Ltd., Chennai), Shri. Raji Khoshi (Managing Director, Alent India Ltd.), Shri S. Rathinakumar (Senior Area Manager, Atotech, Chennai), Shri G.A. Ganesan (Managing Director, Dynamic Engineers and Electroplaters, Chennai), and Shri B. Vijayakumar (President, Electroplaters Association, Chennai) offered their felicitations.



A section of the audience at the workshop

Shri R.V. Alagesan, Head, Business Development, CSIR-CECRI proposed a vote of thanks.

More than a hundred electroplating industries from Madurai, Coimbatore and Chennai participated in the workshop, which was ably supported by the Electroplaters Associations of Chennai, Madurai and Coimbatore as well as their member industries. Enthone India and Semyung India Enterprises exhibited their products for the benefit of the participants.

The technical sessions saw presentations on pre-treatment, hard chromium plating, electrode-less plating, alloy plating, passivates for zinc and zinc alloys, precious metal plating, and emerging techniques and methodologies. The deliberations helped synergize R&D

activities with industrial expectations and opened the floodgates to issues of quality maintenance, eco-friendly and cost-effective processes, and pollution control and effluent treatment.

A number of queries were raised, a majority of which related to day-to-day technical problems such as recovery of chromium in iron-contaminated solutions, water reuse, graphite as electrode and quality control methods. CSIR-CECRI scientists not only provided answers to the queries but also expressed their readiness to address technical problems of the industry, as and when required. In turn, the industries requested the organizers to conduct similar programmes every year.

## CSIR-CIMAP organizes Workshop on *Aloe vera* Processing Technologies



Participants having hands-on exposure on processing of *Aloe vera* leaves

CSIR-Central Institute of Medicinal and Aromatic Plants (CSIR-CIMAP), Lucknow successfully organized a four-day hands-on training workshop on “Entrepreneurial Training on *Aloe vera* Processing Technologies” (AVPT-2014) from 24<sup>th</sup> to 27<sup>th</sup> November 2014. Twenty-five participants from different states of India (Kerala,

Karnataka, Andhra Pradesh, Maharashtra, Madhya Pradesh, Punjab, Uttarakhand and Uttar Pradesh) took part in the training.

*Aloe barbadensis* Miller, more commonly called *Aloe vera* or Ghritkumari or Gwar Patha in Hindi, is one of the oldest known medicinal plants gifted by nature, and is also known as the wonder or miracle plant. The

*Aloe vera* training course provided a platform to new entrepreneurs to learn the technical aspects of the production of *Aloe vera* based products and formulations such as juice, sap, aloe gel and cream.

The training workshop coordinated by Er. Sudeep Tandon, Principal Scientist & Head, Process Chemistry & Technology Department of the Institute familiarized the

participants with the theoretical and practical aspects of the technologies with real-time hands-on experiments. Details of different types of plant and machineries, economics of production, details of preservatives, stabilizers, etc. were provided to the trainees. Particular emphasis was laid on the quality analysis procedures for the aloe-based products.



Participants of the training programme with scientists and Director, CSIR-CIMAP, Prof. Anil Kumar Tripathi (seated sixth from left)

### Science Awareness Programme

## CSIR-IICB Scientists Popularize Science among School Children

Dr. Samir Kumar Dutta, Senior Principal Scientist, CSIR-IICB was invited on 11 January 2015 to address a workshop for school students arranged at the St. Thomas School, Budge Budge. The workshop was attended by more than 200 students from different schools. Dr. Dutta with his two Senior Research Fellows demonstrated how basic science is exploited by fake magicians simply using scientific principles. Students were asked to perform the tricks themselves.

The demonstration made use of various principles of physics, chemistry and biology. From the demonstrations students learnt that DNA cannot be viewed by naked eyes, it



Balloon magic

requires UV light. Demonstration on enzyme activity with body tissues/enzymes made them believe that enzymes are present in our body. They learnt about solubility, indicator, polar and non-polar solvents, solvents heavier and lighter than water, etc. They also learnt how pressure helps to lift water above a certain level, attraction of opposite poles due to magnetism and drawing of 'lines of force' keeping eyes closed on a board hiding the presence of a magnet, boiling of water

under reduced pressure, transformation of materials from solid to gaseous states directly, etc.

The students observed the experiments carefully and enjoyed the demonstrations. The programme concluded with a few words to the students about why they should opt for science, how science has helped in the progress of India, what is being attempted now and how much we can do for our society.



Soap bubble



Students watching a demonstration

### National Science Day

## CSIR-North East Institute of Science & Technology

Celebrating the National Science Day 2015, the CSIR-North East Institute of Science & Technology, Jorhat organised a special programme on 25 February 2015 in the Dr. J.N. Baruah Auditorium.

On the occasion, Prof. Harsh K. Gupta, Member, Atomic Regulatory Board; President, Geological Society of India; President, International Union of Geodesy & Geophysics and Chairman, Research Council, CSIR-NEIST delivered a very illuminating lecture on the topic, "*Living with Earthquakes in the North-East India*", while gracing the event as Chief Guest.



Prof. Harsh K. Gupta delivering the National Science Day lecture

Prof. Gupta in his lecture covered various aspects about earthquakes and associated hazards, earthquake data analysis, seismic moment rate release, magnitude distribution of earthquakes, earthquake forecast, early earthquake warning system, etc. He focused particularly on North East India and the Himalayan region. He said that

the first 14 years of the 21<sup>st</sup> century witnessed much more loss of human lives and property than the entire 20<sup>th</sup> century.

Prof. Gupta further elaborated on medium term earthquake forecast based on precursory swarms and quiescence periods for predicting the probability of earthquakes. He spoke about earthquake early warning system where an early warning of even 20 seconds prior to the occurrence of an earthquake can save millions of lives and property. Prof Gupta also gave some highlights of the activities under NDMA funded project on M 8.7 1897 Shillong Earthquake for creating a repeat scenario of the earthquake in the North East which is being implemented by CSIR-NEIST with the association of NDRF, SDRF and SDMA's of all NE states.

Prof. Kankan Bhattacharyya, Department of Physical Chemistry, Indian Association for Cultivation of Science, Kolkata & Member-Research Council, CSIR-NEIST graced the event as Guest of Honour. In his address, Prof. Bhattacharyya spoke about the work of Prof. C.V. Raman from his early life and his extraordinary passion leading to the discovery of Raman Effect, for which he received the Nobel Prize in 1930. Prof. Bhattacharyya encouraged all to cultivate such passion, confidence and the spirit of victory to reach one's destiny.

Earlier, Dr. R.C. Boruah, Outstanding Scientist, CSIR-NEIST delivered the welcome address and introduced the Chief Guest to the gathering. Dr. D. Ramaiah, Director, CSIR-NEIST in his Presidential Remarks said that the National Science Day

is celebrated every year in the country not only to celebrate the discovery of Raman Effect but also to popularize the benefits of scientific knowledge. He urged everyone to contribute their best for the growth and development of science of the nation. He also recapitulated the vision of the Prime Minister, 'Make in India', and appealed to all to take on 'Make in CSIR-NEIST' spirit to translate research into useful products and technologies.

A large number of invited guests, eminent personalities from Jorhat district and CSIR-NEIST fraternity attended the programme.



Dignitaries on the dais (from left), Dr. R.C. Boruah, Outstanding Scientist, CSIR-NEIST; Prof. Harsh K. Gupta, Member, Atomic Regulatory Board and Chairman, Research Council, CSIR-NEIST; Dr. D. Ramaiah, Director, CSIR-NEIST and Prof. Kankan Bhattacharyya, Department of Physical Chemistry, Indian Association for the Cultivation of Science, Kolkata

## CSIR-Central Scientific Instruments Organisation

CSIR-Central Scientific Instruments Organisation, Chandigarh celebrated the National Science Day on 2 March 2015 by holding an Open Day and organizing a National Science Day Lecture. All the labs of CSIO were kept open in the forenoon.

Around 750 visitors including students from various schools, colleges, universities

and the general public went around the laboratories of the institute. They interacted with the scientists and were given exposure to the technologies available and being pursued at CSIO.

Later in the afternoon Dr. Atul Sachdev, Director Principal, Government Medical College & Hospital (GMCH), Chandigarh

delivered the National Science Day Lecture on the topic “Easy ways to good health”. He said that health is defined as a state of complete physical, mental (psychological) and social (economic) well being and not merely the absence of disease or infirmity. To complete the definition it also includes health as the capacity of adapting and self managing and as a state of personal satisfaction not only related to the integrity of the body but the level of satisfaction a person gets from his body.



From Left to Right: Dr. Amod Kumar, Acting Director, CSIR-CSIO, Dr. Atul Sachdev, Chief Guest and Director Principal, GMCH, Chandigarh, Dr. C. Ghanshyam, Chief Scientist, CSIO

Dr. Sachdev highlighted that with the technology boom, the quality of life improved but it led to physical inactivity making people couch potatoes while the eating habits remained unchanged. Discontent with life, profession-related stresses and economic and social pressures are leading to an epidemic of lifestyle diseases like obesity, diabetes, hypertension, etc. While quoting, “A positive attitude makes life enjoyable”, he also encouraged the scientists to think about the fact that contentment is not in achieving what you desire but in knowing that what you have is more than what you deserve.

Earlier, Dr. Amod Kumar, Acting Director, CSIO welcomed the Chief Guest and said that the National Science Day is celebrated in India on February 28 every year to mark the discovery of Raman Effect by Sir C.V. Raman, for which he was awarded the Nobel Prize. He emphasized that scientific research should be for the benefit of the society. He underlined that although high science like Nuclear Science and Atomic Energy are very important but equally important is the science of small innovations which have large societal impact.

The function concluded with a formal vote of thanks by Dr. C. Ghanshyam, Chief Scientist, CSIR-CSIO, Chandigarh.

## CSIR-National Chemical Laboratory

CSIR-National Chemical Laboratory, Pune celebrated the National Science Day from February 24 to February 27, 2015. The four-day celebrations included Poster Sessions and lectures by students and scientist awardees. The special attraction of the event was the National Science Day Lecture on 27 February 2015 by Dr. K. Radhakrishnan, former Chairman, Indian Space Research Organization (ISRO) on ‘Recent strides in Indian Space Mission’.

Dr. Sourav Pal, Director, CSIR-NCL addressing the audience said that the National Science Day is a special day and remembered Sir C.V. Raman and his contributions. Dr. Pal also mentioned how the performance of the laboratory has been significantly improving over the last few years in terms of

publications, patents as well as external earnings. He formally introduced the chief guest, Dr. K. Radhakrishnan, who gave the fabulous National Science Day Lecture.

Dr. Radhakrishnan said that science is for building of the nation. He talked about the Indian Space Programme led by legendary personalities like Vikram Sarabhai and Satish Dhawan and the conditions they faced in those times. He asked the youngsters present on the occasion to “Play as a team to win the game”.

Dr. Radhakrishnan mentioned that currently there are twenty-five Indian satellites in service around the earth that are working for facilitation in different areas like communication, weather, navigation, remote sensing, etc. He talked about various space

applications supported by the satellites revolving in space. He claimed that India's entry into space has made a big difference. The numbers of deaths due to earthquakes, cyclones, heavy rains and floods have reduced because of the timely predictions by satellites revolving around the earth. It has also helped to reduce oil consumption by boats in fishery and other businesses where predictions by satellites have played an important role. He said that nearly 65 government departments are using applications driven by the satellites improving their working for better governance, development and in environment and disaster management.

Dr. Radhakrishnan mentioned that ISRO had spent much resource to deploy mechanisms like solar panels for the production of energy and antennae for communication from remote places on the earth. He talked about the indigenous production of launcher technologies in PSLV and GSLV. Complex parts of the satellite systems related to thermal conditions in space are examined carefully. The vehicle going into space is kept track of since a small deviation in the assessment can make the mission a failure. He admitted that failures may come, but one should improve. He also discussed the possibilities of human space flight in the future that involves the next level of challenges like thermo-resistant interior of the spaceship and safety of travelers.

Dr. Radhakrishnan also talked about the Mars Orbiter Mission (MOM), India's first interplanetary mission that was successfully accomplished recently. He said that Mars was chosen because it was closer to earth, in the neighbourhood, to understand the Sun and also to find the answers to the origin of life on the earth and evolution of humans. He elaborated how the cost of the mission was kept so less. Dr. Radhakrishnan entertained many questions from the audience.

The Poster Presentation programme got a good response from research students and project assistants. More than 300 posters were presented. Dr. Radhakrishnan gave away the National Science Day awards to deserving students. The awards included the NCL RF-Keerthi Sangoram Memorial Endowment

Award for Best Research Scholar in the areas of Physical Chemistry/Materials Science, Biological Sciences, Chemical Sciences and Catalysis and Engineering Sciences. Each award carried a cash prize of Rs. 5000 and a certificate. Various Best Research Paper Awards were given which carried cash prizes and certificates. Nearly 40 posters were



Dr. K. Radhakrishnan delivering the National Science Day lecture



Dr. Sourav Pal offering a memento to Dr. K. Radhakrishnan

appreciated for better efforts.

In the afternoon, talks were given by the recipients of the awards as a part of the celebration. The Maneckji and Shirinbai Neterwala Foundation NCL RF Award Lectures were rendered separately by Dr. Prakash Wadgaonkar and Dr. Ulhas Kharul and Dr. R.A. Mashelkar Endowment Fund NCL RF Award Lecture was given by Dr. Akkattu Biju. Lectures by the recipients of the Best Research Scholar Award 2014 and Best Research Papers with Highest Impact Factors were also organized to enrich the event.

## Exhibitions

## CSIR-NAL participates in AEROINDIA 2015

The 10<sup>th</sup> International AEROINDIA 2015 show opened on 18 February 2015 at the Yelahanka Air Force Base. Mr Narendra Modi, the Prime Minister of India, inaugurated the mega event.

The highlight of the inaugural ceremony was the stress on the theme 'Make in India' in the aerospace, defence, civil aviation, airport infrastructure and defence engineering. Prime Minister Narendra Modi made a strong pitch to end India's dependence on defence imports, promised a conducive environment for manufacturers, including a discrimination-free tax system, and asked foreign firms not to be just

“sellers” but “strategic partners”.

The event spread across 2,50,000 sq m attracted a large number of visitors from India and abroad. AEROINDIA 2015 has surpassed all previous records with participation of 49 countries through 328 exhibitors and 295 Indian exhibitors. The show held from February 18 to 22 was an air extravaganza for lakhs of Bengalureans and outsiders. It attracted 5 lakh visitors.

The air show had static and air display by various aircraft including fighter, transport, helicopter and aerobatic display teams. HAL's Light Combat Helicopter (LCH) and the Light Combat Aircraft (LCA)-Tejas were on display at the event. The aircraft participating in static and air displays were the Indian Air Force Sarang Team. Air display teams from Sweden, UK, Czech Republic and open sky jump by USA Special Forces were among the major attractions.

A breathtaking display of air power and brilliant aerobatics by fighter jets and helicopters enthralled the audience where famed international aerobatic teams left the crowd awestruck with their death-defying stunts. In the skies a tiny Tiger Moth, the vintage aircraft that was once used as primary trainer aircraft for the Royal Air Force during World War II and was also the basic trainer aircraft in the IAF initially, followed by India's Light Combat Aircraft Tejas pulled off some stunts.

Another Indian product that amazed all was the Light Combat Helicopter made by the state-run HAL. Its reverse flying, a feature uncommon for conventional helicopters, was much appreciated along with its maneuvering skills. The wing walkers from Sweden left everyone stunned as two girls did aerobatic feats on board a flying plane.

CSIR-National Aerospace Laboratories also participated in the AEROINDIA 2015 Exhibition. The items showcased at the AEROINDIA 2015 included autoclave, radomes, wind tunnel model, DHVANI, DRISHTI, simulators, wankel engine, carbon



fibres, MAVs, scaled down models of SARAS, HANSA and CNM5, etc.

The stall design was unique this time, as NAL had opted for the Maxima Setups. NAL's preparation for the air show involved systematic planning that started months in advance and the result was sufficiently gratifying. The illuminated backlit posters displaying NAL technologies added to the aesthetics of the layout.

The important visitors to the stall included Director General CSIR, Joint Secretary CSIR, Dr. V.K. Atre, former DRDO Chief, Former Directors of NAL and other foreign dignitaries. Dr. M.O. Garg, DG-CSIR appreciated the stall design and product display and congratulated the NAL team for putting up a good show at the AEROINDIA 2015.

The NAL stall attracted a large number of serious visitors. NAL received quite a few business enquiries particularly on MAVs, Autoclave, Wankel engine, DHVANI & Surface Coatings.



Kisan Mela**CSIR-CIMAP Organizes Farmers' Fair  
(Kisan Mela)**

CSIR-Central Institute of Medicinal and Aromatic Plants (CSIR-CIMAP), Lucknow organized a one-day Kisan Mela in its campus on 31 January 2015. About 4000 farmers and entrepreneurs from different states participated in the Kisan Mela. Hon'ble Governor of Uttar Pradesh Shri Ram Naik was the chief Guest.

In his inaugural address, the Governor said that medicinal and aromatic plant cultivation is helping the farmers to enhance their income. Lauding the efforts of CSIR-CIMAP in the development and dissemination of technologies, the Governor said that people are now demanding drugs and cosmetics based on natural products as the prolonged use of synthetic items is producing side effects. The Governor called upon the farmers present in the Kisan Mela to interact with scientists and to acquire recent knowledge on the medicinal and aromatic plants.

Later, the Governor visited Kisan Mela stalls and released the improved distillation unit for rose and other precious essential oils developed by CIMAP. He also planted a sapling of 'Sita Ashok' (*Saraca asoca*) in the institute's campus.

Mrs. Eva Sharma, Chief Conservator of Forest was also present on the occasion as a special guest.

Earlier in his welcome address, Prof. Anil Kumar Tripathi, Director, CSIR-CIMAP said that CSIR-CIMAP is organizing Kisan Mela on 31<sup>st</sup> January every year for the last about 11 years. Prof. Tripathi cited the contributions made by CSIR-CIMAP in the area of mint technology and anti-malarial drug plant *Artemisia annua* technology through which thousands of farmers and entrepreneurs and several industries have been benefitted over the past many years.

Interaction on production and marketing of medicinal and aromatic plants, sale of quality planting material and publications, demonstration of improved plant varieties and herbal products, live demonstration of distillation/processing, training for rose water and agarbatti making, and demonstration of 'Early Mint Technology' were the main attractions of the CSIR-CIMAP Kisan Mela. An improved distillation unit named "CSIR-CIMAP Unnat Asvika" (a multi-utility and portable mini distillation unit for all types of essential oils)



Hon'ble Governor of Uttar Pradesh, Shri Ram Naik and Director, CSIR-CIMAP, Prof. A.K. Tripathi lighting the lamp. Standing in the centre is Chief Conservator of Forests, Mrs. Eva Sharma.



Release of 'Aus-Gyanya', a souvenir-cum-extension bulletin

developed by CSIR-CIMAP, the souvenir 'Aus-Gyanya' and a booklet on the co-cultivation of menthol mint were also released by the Governor.

Representatives of IPCA Lab, Ratlam, SIDBI and buyers and sellers of medicinal and aromatic plants also participated in the Kisan Mela. Various scientific institutes such as CSIR-NBRI, Biotech Park and other companies and Mentha Growers Association and several beneficiaries of CSIR technologies put up their stalls in the Mela.

In the Technical Session, lectures on Mentha cultivation by Dr. V.K.S. Tomar, Co-cultivation of Mentha by Dr. Saudan Singh, Vetiver by Dr. H.S. Chauhan, Lemongrass and Citronella by Dr. Saudan Singh, Palmarosa by Dr. H.P. Singh, distillation and storage of essential oil by Er. Sudeep Tandon, Artemisia by Dr. A.K. Gupta, Ashwagandha by Dr. Saudan Singh, Satavar and Kalmegh by Dr. H.P. Singh, marketing of medicinal and aromatic plants by Dr. Sanjay Kumar, and vermi-

composting by Dr. Alok Kalra were delivered.

A Question & Answer session was also organised for the benefit of the farmers. Dr. V.K.S. Tomar, Chairman of the organising committee presented the details of various programmes of the Kisan Mela while Dr. Sanjay Kumar, Convenor conducted the proceedings and proposed the vote of thanks.



A view of the guests and participants in the Kisan Mela



CSIR-CIMAP Unnat Asvika, a multi-utility portable distillation unit released on the occasion

**Honours & Awards**

**CSIR-IICB Scientist Elected WAST Fellow**



Dr. Subhas Chandra Biswas, Senior Scientist, CSIR-IICB, Kolkata has recently been elected as Fellow of the West Bengal Academy of Science and Technology (WAST). Dr. Biswas has made very important contributions towards the understanding of molecular mechanism of neurodegeneration in

Alzheimer's disease. He has established an excellent neurodegenerative disease research laboratory at CSIR-IICB. He has identified several endogenous molecules and signalling pathways that can serve as potential therapeutic targets for amelioration of neurodegeneration in Alzheimer's disease.

**CSIR-IICB Scientist Awarded FNA**



Professor Nahid Ali, Chief Scientist, CSIR-IICB, Kolkata has recently been elected Fellow of the prestigious Indian National Science Academy (2015) as a recognition of her outstanding contributions to the field of parasitology with focus on the potentially fatal disease visceral leishmaniasis or kala-azar.

She has successfully integrated various scientific disciplines towards development of vaccines, immunotherapy, drugs and diagnosis of this disease. Her pioneering doctoral work resulted in a paradigm shift from anionic to cationic liposomes as vaccine adjuvant. Prof. Ali and her group were the first to demonstrate the use of liposomal protein-based vaccines, and heterologous (DNA/protein) prime-boosting for sustained protection against visceral leishmaniasis.

Prof. Ali's noteworthy observation on the cytotoxic activity of drug-free stearylamine-bearing liposomes, through abundant parasite-specific phosphatidylserine, led to the development of efficient liposomal

drugs for sterile cure with single-shot therapy. The formulations show synergism with the drugs and render them more specific and effective for treating the disease. Her associates have recently extended this strategy for the targeted therapy of cancer.

Unravelling the enigma of immune suppression, Prof. Ali's group demonstrated for the first time leishmanial antigen specific secretion of suppressive cytokines, IL-10 and TGF- $\beta$ , in kala-azar. Further, they provided vital clues for relapse and reactivation of disease in the form of PKDL. Moreover, her observations on the cross-reactivity of leprosy sera with leishmanial antigens recently challenged the authenticity of phenolic glycolipid-1 as specific antigen for leprosy.

Prof. Ali is an elected Fellow of the West Bengal Academy of Science and Technology (2008), Fellow of the National Academy of Sciences India (2011), and Fellow of the Indian Academy of Sciences (2013).

**CSIR-IICB Scientist Awarded FNASc**



Dr. Keya Chaudhuri, Emeritus Scientist, CSIR-Indian Institute of Chemical Biology (CSIR-IICB), Kolkata, has been selected for the award of Fellowship of the National Academy of Sciences, Allahabad, India, which was announced in October 2014 in Medical Sciences.

Dr. Chaudhuri was honoured for her fundamental contributions in understanding

of the pathogenesis of the disease cholera, with insight on how to design a better vaccine. Her group devised an original strategy that identified a number of in vivo induced gene products in *Vibrio cholerae*. Her group developed a new algorithm for identification of genomic islands in prokaryotes with which a new virulence determinant was discovered in *V. cholerae* and was

experimentally shown to encode a new RTX like toxin.

Her laboratory for the first time had developed human epithelial cell-dendritic cell (EC-DC) co-culture model for studying host-*V. cholerae* interaction. Her group has

recently discovered a novel mechanism of transportation of cholera toxin via outer membrane vesicles and delineated its immune response. Her research has long-lasting impact on better invention strategies for the disease cholera.



## CSIR-IICB Scientist Awarded FNASc

Dr. Sharmila Chattopadhyay, Principal Scientist of CSIR-Indian Institute of Chemical Biology (CSIR-IICB), Kolkata, has been elected as a 'Fellow of The National Academy of Sciences, India, 2014' for her significant contributions to the area of 'Plant Defence Signalling Mechanism'.

Dr. Chattopadhyay is in CSIR-IICB for the last 14 years after obtaining her postdoctoral training abroad in ATO-DLO, Wageningen, The Netherlands. She has revealed how under environmental stress conditions plants sense the stress, and act to survive in the hostile environment. She has successfully demonstrated that glutathione in its reduced form i.e. GSH has an intricate position in plant defence. In her recent studies, she has identified that few stress responsive proteins viz. HSPs, NBS-LRR, serine/threonine protein kinase, annexin etc.

are the key conciliators of GSH-mediate defence especially under biotic stress conditions *in planta*.

Besides, pathway engineering on therapeutically important plant secondary metabolites is another current research area of her laboratory. Next-generation sequencing of *Podophyllum hexandrum*, an endangered medicinal plant, followed by the identification and characterization of pathway gene/s of podophyllotoxin, a second generation anti-cancer agent, has been performed efficiently in her laboratory.

Dr. Chattopadhyay is a reviewer and a member of the Editorial Board of prestigious international and national journals in the area of Plant Science. She has published several research articles in international peer-reviewed journals and book chapters as well.



## Dr. C.S. Nautiyal Honoured with J. C. Bose National Fellowship

Dr. Chandra Shekhar Nautiyal, Director of CSIR-National Botanical Research Institute, Lucknow has been awarded the prestigious 'J.C. Bose National Fellowship' by the Department of Science and Technology (DST), Ministry of Science and Technology, Government of India.

The award is conferred to Dr. Nautiyal, for his eminence and contributions in the field of exploring ecosystem-friendly approaches utilizing science behind plant-microbe interactions that he has constantly pursued for the last three decades. Dr. Nautiyal has developed novel technologies that have enabled rapid screening and

selection of useful plant growth promoting microbes that impart plant tolerance to salt, drought, and pathogenic microorganisms. The outstanding endeavours of Dr Nautiyal in the field of agricultural biotechnology contributed in increasing stress tolerance and enhancing the yield of plants, maximising the economic, environmental and societal benefits to the people of India. The major spin-offs of his contributions have been several patents, publications and utilization of these technologies by several biotechnology companies nationally and internationally.



## CSIR-CEERI Chief Scientist visits Egypt as Expert

Dr Jamil Akhtar, Chief Scientist, CSIR-CEERI, Pilani participated as an expert member in the 3<sup>rd</sup> Joint Committee Meeting on Science & Technology held in Cairo during 22-23 December 2014.



Dr. Jamil Akhtar of CSIR-CEERI in conversation with Egyptian former Minister of Agriculture Dr. Ayman Abu Hadid in presence of India Ambassador to Egypt H.E. Mr. Navdeep Suri

During the meeting, India and Egypt signed an ambitious new Executive Programme on Cooperation in the field of Science and Technology. The documents were signed in Cairo in the premises of the Ministry of Scientific Research and in the

presence of H.E. Dr. Sherif Hamad, Minister of Scientific Research of the Arab Republic of Egypt and H.E. Mr. Navdeep Suri, Ambassador of India to Egypt.

The Indian delegation was led by Dr. Arabinda Mitra, Advisor and Head, International Bilateral Cooperation, Department of Science & Technology, Govt of India, while the Egyptian side was led by Prof. Dr. Hazem Mansour, Assistant to the Minister of Scientific Research, Egypt.

The Executive Programme will be valid for the period 2015-2018 and will focus cooperation on vital sectors of Biotechnology (agriculture biotechnology and enzyme biotechnology); Nano-Technology (Material sciences and Sensors); and Information & Communication Technology (e-Health, e-Education and e-Governance). Both sides will arrange Joint Research and Development Projects, exchange of visits by Scientists and training programmes, and scientific workshops and conferences for which they will be organizing two workshops in Egypt and one in India. The two sides also agreed that the 4th Joint Committee Meeting will be held in India in early 2016.

## CSIR-IHBT Scientist Receives Prestigious VASVIK Award



Dr. Sanjay Kumar, Senior Principal Scientist at the CSIR-Institute of Himalayan Bioresource Technology (CSIR-IHBT), Palampur was presented the prestigious VASVIK (Vividhlaxi Audyogik Samshodhan Vikas Kendra) award for the year 2013 in the field of agricultural science and technology for his work on industrial enzymes, plants in cold desert at high altitude, improving the photosynthesis rate, stress tolerance and yield of plants in a function held at Bhaidas Auditorium, Mumbai.

The award was presented by Shri Piyush Goyal, Union Minister of State for New & Renewable Energy, Power & Coal in the presence of Dr. Mohan I. Patel, Chairman,

Board of Directors, VASVIK, Shri Nayan Patel, Director, VASVIK and Prof. M.M. Sharma, Chairman, Board of Advisors, VASVIK, apart from other dignitaries. The award carries a citation and cash prize of rupees one lakh.

While working at CSIR-IHBT, Dr. Kumar has significantly contributed in Himalayan high altitude biology and transfer of technology of a novel enzyme "Superoxide Dismutase" (SOD) which is associated with controlling oxygen toxicity arising out of oxidative stress in any living system. The technology has been licensed to a Kolkata-based company, M/s Phyto Biotech Pvt. Ltd.



*CSIR News is profiling all the CSIR laboratories throwing light on the significant areas they work in and their achievements.*

## CSIR-Central Building Research Institute (CSIR-CBRI)

Since its inception in 1947 as the Building Research Unit and its transformation into the CSIR-Central Building Research Institute, Roorkee in February 1951, CSIR-CBRI has been assisting the building construction and building material industries in finding timely, appropriate and economical solutions to the problems of advanced materials, health monitoring and rehabilitation of structures, disaster mitigation, fire safety, energy efficient buildings, etc.

**Building Materials:** The thrust is on development of building material from natural resources – inferior soil, mining, industrial, agricultural wastes. Work is on to develop wood substitutes, polymers, plastics, protective coatings, adhesives, fibre-reinforced building materials and components, cement, lime and lime-based products, super-plasticiser and high-strength concrete and pollution controlling and monitoring devices for lime kilns. Technology for termite prevention and prevention of fungi attack in buildings has been developed.

**Clay Flyash Bricks:** Plants for the manufacture of clay-flyash bricks have been set up at Dabhol, Vadodara (Gujarat), Ropar & Bhatinda (Punjab) and Delhi, based on the technology developed at the Institute. The plants utilize 40-50% locally available flyash for the production of bricks.

**Flyash Sand Lime Bricks:** A commercial plant for the manufacture of flyash-lime brick has been established at Durgapur by Damodar Valley Corporation, Kolkata. The plant has been designed to produce 40,000 bricks per day.

**Wood Substitute:** The Institute has developed EPS Composite Door Shutters, Coir-CNSL Board, Fibre Reinforced Gypsum Binder as an alternative to wood. Natural fibre door shutter filled with foam has also been developed.

**Block Making Machine for Remote Hilly Areas:** Egg-laying type concrete block making machine capable of producing concrete blocks

with stone aggregates as large as 75 mm suitable for hilly regions has been designed and developed.

### Building Construction

**Mini Climbing Crane:** Mini climbing crane designed at the Institute was awarded Republic Day Award by NRDC, New Delhi. It can lift loads up to 1000 kg. The crane is in use in building construction projects for the construction of multi-storeyed residential and other buildings.

**Navodya Vidyalaya:** More than 500 Navodya Vidyalaya complexes completed based on design, specifications and construction technologies recommended by the Institute. NV complexes have been constructed at high altitude like Kargil and at sea level like Lakshadweep and Andaman Nicobar Islands.

**Expert System for Computer Aided Architecture Design:** Expert System Software to help architects and planners in designing and evaluation of housing programmes.

**Rural Housing:** Planning, design and construction of low-cost houses using local materials, low cost waste disposal system, socio-economic and physical surveys of villages in different geographical regions of the country.

### Disaster Mitigation

**Damage Assessment due to Earthquakes:** Earthquake damaged buildings surveyed in Uttarkashi region of Uttarakhand and remedial measures for rehabilitation submitted to the Government.

**Earthquake-resistant Design and Construction:** The Institute at the request of Govt. of Maharashtra provided technical guidance for selection of appropriate building materials and construction technologies suitable for earthquake-prone areas.

**Houses for Cyclone-prone Areas:** Alternative housing plans developed utilizing pyramidal roof for cyclone-prone coastal areas of Andhra Pradesh, Orissa and Kerala.

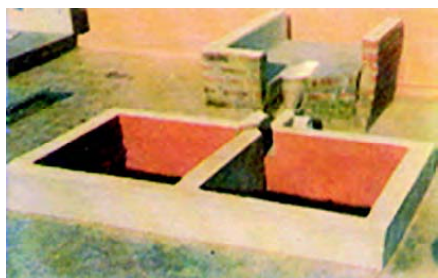


*Landslide Hazard Zonation Maps* of some regions of Garhwal and Sikkim prepared for development of housing complexes in safe zones and in the maintenance of roads.



### Building Efficiency

- Design of residential and industrial buildings for natural and artificial illumination, ventilation, acoustic and thermal comfort, utilizing solar energy for heating & passive cooling system.
- Development of guidelines for green and energy efficient buildings
- Development of low-cost technologies for economically weaker section
- Development of guidelines for physically challenged
- Guidelines, bye-laws code of practice for use of glass in buildings



- Development of climatic zone map of India included in BIS
- Distress diagnosis & strengthening of RC & heritage structures
- Health monitoring & rehabilitation of structures



### Fire Research

- Development of fire-retardant treatments and coatings, post-fire investigations, study of the burning behaviour of flammable liquid fuel in storage tanks and technology for its extinguishment, development of fire detectors and alarm system, computer modeling of fire in buildings, evaluation of fire characteristics and burning behaviour of materials and products.
- Software CALFIRE (calculate fire in room and enclosure) developed to predict the behaviour of fire.
- New system for cable installation using cavity blocks developed to make fire-stop walls and to separate cables from each other minimising risk of fire hazards.
- Fire properties of new building materials developed in the country for commercial purposes were determined.
- For protecting and reducing fire hazard to aircraft seat cushion an innovative method of fire blocking layer (FBL) has been developed at the Institute.

CSIR-CBRI technologies were used in construction of more than 200000 urban houses, 50,000 rural houses, 10,000 education, health and other buildings giving a saving of about 50 crores to the nation on the total cost of construction of Rs 900 crores.

The Institute has linkages with International bodies like CIB, Netherland; TWAS, Italy; BRE, UK; ASTM, USA; CSIRO, Australia; RILEM, France; BRS, Canada, UNCHS, Nairobi, Kenya, etc. At the national level the Institute has close liaison and linkage with HUDCO, DST, MUD, Housing Boards and Societies of the State Governments, engineering and academic institutions of the country and construction and building material industries.



*For further details contact:*

#### Director

Central Building Research Institute, Roorkee-247667, Uttarakhand, India  
 Phone: 01332-272243, 272235, 27630  
 Fax: 01332-272543, 272272  
 E-mail: [director@cbrimail.com](mailto:director@cbrimail.com) & [director@cbri.in](mailto:director@cbri.in)  
 Website: [www.cbri.res.in](http://www.cbri.res.in)

फार्म 4/FORM IV  
(नियम 8 देखिए/See Rule 8)

- |   |  |  |
|---|--|--|
| 1 | प्रकाशन का स्थान/Place of Publication  | New Delhi  |
| 2 | प्रकाशन की अवधि/Periodicity of its publication   | Semi-monthly   |
| 3 | मुद्रक का नाम/Printer's Name<br>(क्या भारत का नागरिक है?)/(Whether citizen of India?)<br>(यदि विदेशी है तो मूल देश)/(If Foreigner, state the country of origin)<br>पता/Address   | Deeksha Bist<br>Yes<br>National Institute of Science Communication and Information Resources<br>Dr. K.S. Krishnan Marg,<br>New Delhi 110 012 |
| 4 | प्रकाशक का नाम/Publisher's Name<br>(क्या भारत का नागरिक है?)/(Whether citizen of India?)<br>(यदि विदेशी है तो मूल देश)/(If Foreigner, state the country of origin)<br>पता/Address  | Deeksha Bist<br>Yes<br>As above in (3)   |
| 5 | संपादक का नाम/Editor's Name<br>(क्या भारत का नागरिक है?)/(Whether citizen of India?)<br>(यदि विदेशी है तो मूल देश)/(If Foreigner, state the country of origin)<br>पता/Address  | Hasan Jawaid Khan<br>Yes<br>As above in (3)  |
| 6 | उन व्यक्तियों के नाम व पते जो समाचार-पत्र के स्वामी हों तथा जो समस्त पूंजी के एक प्रतिशत से अधिक के साझेदार या हिस्सेदार हों<br>Names and addresses of individuals who own the newspaper and partners of share holders holding more than one per cent of the total capital |  |

मैं ----- एतद् द्वारा घोषित करता हूँ कि मेरी अधिकतम जानकारी एवं विश्वास के अनुसार ऊपर दिए गए विवरण सत्य हैं.

I, Deeksha Bist, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Dated 15 March 2015

Sd/- Deeksha Bist  
प्रकाशक के हस्ताक्षर/Signature of Publisher

## Nominations are invited for G N Ramachandran Gold Medal for Excellence in Biological Sciences & Technology - 2015

The Council of Scientific & Industrial Research (CSIR) invites nominations for the **G N Ramachandran Gold Medal for Excellence in Biological Sciences & Technology for the year 2015**. The award is bestowed every year to an outstanding Indian scientist, who has made conspicuously important contributions, applied or fundamental, in the inter-disciplinary subject / field of Biological Sciences and Technology. The award would be given for the work done primarily in India during ten years preceding the year of the award.

Nominations addressed to Scientist Incharge, SSB YSA Unit, Human Resource Development Group, CSIR Complex, Library Avenue, Pusa, New Delhi 110 012 should be sent as per prescribed pro-forma (Original + one copy) along with reprints of five most significant publications of the last 10-year's period by **31 May 2015**. The details of the award and the prescribed pro-forma for nomination may be downloaded from the website [www.csirhrdg.res.in](http://www.csirhrdg.res.in)

### Printed and Published by

Deeksha Bist on behalf of CSIR-National Institute of Science Communication And Information Resources  
Dr K.S. Krishnan Marg, New Delhi -110 012 and printed at NISCAIR Press  
Dr K.S. Krishnan Marg, New Delhi -110 012

**Editor:** Hasan Jawaid Khan; **Editorial Assistance:** Neelima Handoo

**Design:** Neeru Sharma & Sarla Dutta; **Production:** Supriya Gupta

Phone: 25848702; Fax: 25847062; E-mail: [csirnews@niscair.res.in](mailto:csirnews@niscair.res.in); [hjk@niscair.res.in](mailto:hjk@niscair.res.in)

**Website:** <http://www.niscair.res.in>

Please direct all Subscription-related queries to:

Sales & Distribution Officer, NISCAIR; E-mail: [sales@niscair.res.in](mailto:sales@niscair.res.in); Phone: 25843359

Annual Subscription: Rs 500; Single Copy: Rs 50.00

RN 4512/57