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In The News

CSIR-CMERI's Small-range Tractor KrishiShakti Launched by S&T Minister



CONTRIBUTING to the Hon'ble Prime Minister's mission of "Make in India", the CSIR-Central Mechanical Engineering Research Institute, Durgapur, has developed a small range (11.2 hp) diesel engine tractor, KrishiShakti, to empower Indian farmers with small land holdings. The tractor was launched recently by Minister of Science and Technology and Earth Sciences and VP, CSIR, Dr. Harsh Vardhan. He handed over five tractors to the farmers.



Dr. Harsh Vardhan said: "The development has bridged a long felt technology gap. There is a need to develop agriculture implements that suit Indian agro-climates and are energy efficient, while at the same time removing farmers' drudgery."

The new tractor would be a boon for Indian farmers possessing small land holdings. The average land holding of the small Indian farmer normally does not exceed even 1 hectare. Therefore, for the average Indian farmer mechanized farming utilizing standard tractors of 35 hp and above ratings is beyond their reach.

CSIR-CMERI's latest offering in the form of the small, compact and easily maneuverable tractor is deemed fit for small and fragmented land holdings. *KrishiShakti* is the latest in the legacy of CSIR interventions in enabling mechanized

agriculture and empowering the small farmers. Besides, the small tractor and its matching implements are based on the available diesel engine and tractor parts in the market.

The *KrishiShakti* has already received *CMVR Certification* as an *Agricultural Wheeled Tractor* after rigorous trials and testing. The technology of *KrishiShakti* has been transferred to M/s Singha Components Pvt. Ltd., Howrah, West Bengal, who revealed that they have already started receiving orders from Bangladesh, Bhutan and South Africa.

CSIR-NEERI Installs Waste-to-Biofuel Reactor at Go-Vigyan Kendra



CSIR-NEERI RC and project team members at the reactor site

CSIR-National Environmental Engineering Research Institute (CSIR-NEERI) has undertaken a project to produce biofuel from municipal solid waste, including vegetable waste and food waste, under the 12th Five Year Plan.

In the first phase of the project, a baffled plug-flow reactor and mesophilic-thermophilic two-stage reactor have been designed and operated for management of various organic fractions of municipal solid waste including food waste, kitchen waste,

vegetable market waste, etc. One such reactor design has been scaled up to pilot level for producing biogas from food waste (up to 100 kg), and set-up at Go-Vigyan Anusandhan Kendra, Deolapar, in collaboration with Lien Foundation Environmental Endeavour 2–Nanyang Techno-logical University (NTU), Singapore, to provide benefits of the biogas produced to economically underprivileged communities and ensure their participation in solid waste management.

Prof. Kasturi Datta, Chairperson, CSIR-NEERI Research Council (RC), members of CSIR-NEERI Research Council and Dr. Satish R. Wate, Director, CSIR-NEERI visited the reactor site and expressed satisfaction over functioning of the reactor.

The 'waste to biofuel' project at CSIR-NEERI will be instrumental in providing suitable decentralized technological options for municipal solid waste management in big colonies, residential societies, hotels, community centers, vegetable markets, in and around Nagpur.

CSIR-CLRI Scientists Develop Technology to make High-grade Gelatine from Waste



Tannery waste, if left unattended, can have disastrous impact on the environment. Now, scientists at the CSIR-Central Leather Research Institute (CLRI) in Chennai have developed a technology to make high-grade gelatine from tannery waste.

Gelatine finds widespread use in the pharmaceutical and food industries. It is usually made from collagen extracted from animal bones and pig skins. With the new CSIR-CLRI technology, scientists have successfully produced gelatine from collagen protein from skin and hide remains.

To produce industrial gelatine, solid waste from tanneries has to be processed and cooked for long hours. This process however yields gelatine of low value. The CSIR-CLRI scientists hydrolysed or processed it in a controlled manner to obtain gelatine of high gel strength required for capsule making. With one ton of animal skin processed for leather manufacture, there would be 50 kg of trimming waste, from which 10 kg of gelatine can be made.

The Institute is in the process of patenting the technology that could be a successful alternative to make gelatine.

Gelatine finds widespread use in the pharmaceutical and food industries. It is usually made from collagen extracted from animal bones and pig skins. With the new CSIR-CLRI technology, scientists have successfully produced gelatine from collagen protein from skin and hide remains.

R&D Highlights

Cement-free Plaster Developed from Fluorogypsum by CSIR-CBRI

Energy-efficient, low-cost, high-strength, cement-free plaster has been developed from fluorogypsum for use in external and internal surfaces, masonry works, light weight gypsum blocks and prefabricated panels.

Fluorogypsum, a by-product of the hydrofluoric acid industry, is available in anhydrite form of gypsum. It does not set and harden due to close packing of Ca^{2+} and SO_4^{2-} ions in the structure. It is therefore essential to activate its hydration behavior by using chemical activators. After suitable treatment and activation of fluorogypsum with chemical activators comprising of sulphates of alkali/alkaline earths, high-strength gypsum cement with fast setting, low water absorption and porosity has been produced. The properties of the material comply with the

requirements of ASTM C-61-50.

The phases responsible for strength development of the gypsum cement were studied by differential thermal analysis (DTA) and scanning electron microscope (SEM). The gypsum cement is found suitable for use in plastering, light-weight blocks and prefabricated panels.

Masonry Works

Since the construction industry is facing a scarcity of source materials i.e. sand, a comparative study has been made by replacing sand with stone dust and fly ash.

Properties

- ❖ Setting Time (min) — Initial : 45
Final : 98
- ❖ Compressive strength: 35 MPa
- ❖ Flexural strength: 6.0 MPa
- ❖ Thermal Conductivity: 0.19 W/mK
- ❖ Water absorption: 5 % & Porosity :10%
- ❖ Possesses fire resistance & good acoustic properties

Table 1: Properties of masonry mortars with different aggregates

S.No	Mix Ratio of Mortars (by wt.)		Compressive Strength, MPa			Bulk Density, gm/cm ³			Water Absorption, % (24 h)
			3d	7d	28d	3d	7d	28d	
1	1 1 1	Sand (1.91) 1	9.3	16.5	20.3	1.92	1.93	1.98	5.4
		2	6.4	9.5	12.5	1.95	1.97	1.99	6.8
		3	3.8	5.2	7.9	1.96	1.98	1.99	7.7
2	1 1 1	Sand (1.28) 1	8.2	12.5	15.5	1.86	1.86	1.91	9.8
		2	4.5	6.5	8.7	1.87	1.91	1.95	12.5
		3	2.1	3.5	5.2	1.93	1.95	1.98	15.2
3	1 1	Fly Ash 0.5	7.5	9.2	9.8	1.64	1.66	1.67	12.3
		1	1.5	2.7	3.1	1.46	1.54	1.58	17.8
4	1 1	Stone Dust (2.47) 1	12.5	16.8	17.9	2.06	2.08	2.11	5.1
		1.5	10.5	15.4	16.7	2.07	2.10	2.14	5.6
IS: 3466-1967 Limits			-- Min.2.5 Min.5.0						

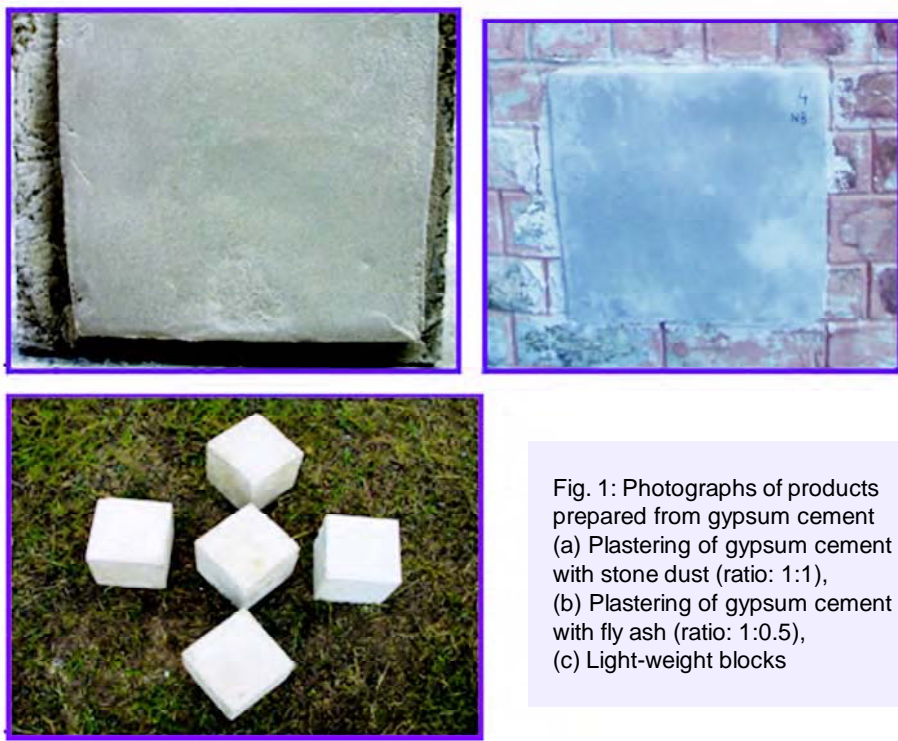


Fig. 1: Photographs of products prepared from gypsum cement (a) Plastering of gypsum cement with stone dust (ratio: 1:1), (b) Plastering of gypsum cement with fly ash (ratio: 1:0.5), (c) Light-weight blocks

The properties of masonry mortars prepared from the gypsum cement and different aggregates are given in Table 1. It was observed that after 24 hours of application on brick wall, the plaster patches developed adequate strength and hardness which further continued.

Light-weight gypsum blocks

The light-weight gypsum blocks (150 x 150 x 150 mm) were prepared by using air-entraining agent (<0.3%). These blocks possess compressive strength 5.6 MPa; bulk

density 1200 kg/m³ and water absorption 16.3% and fulfilled the requirements of Indian Standards.

Prefabricated gypsum panel

The prefabricated panel of size 900 mm x 300 mm x 135 mm has been prepared by vibration technique. The density of panel is 1.08 g/cc. Other physical properties are to be determined. Some typical photographs of the products are shown in Figure 1.

Mridul Garg and Team at CSIR-CBRI

Study of Impact Behaviour of Reinforced Concrete Elements at CSIR-CBRI



Some reinforced concrete structures have to be designed for impact loads, which may result from crashing of comparatively rigid heavy objects at low velocities, such as falling rocks in mountain areas and falling heavy loads dealt with in factories and warehouses due to accidents, aircraft impact on nuclear containments, and vehicular impact on bridges.

Presently, most of these structures, except nuclear power plants, have been designed by statically surcharging the maximum impact forces following the allowable stress design concept and/or the maximum impact forces with a construction coefficient following the ultimate limit state design concept. Based on these design concepts, the structural analysis results exhibit a high safety margin for the impact design event which has a low probability of occurrence.

Therefore, the safety level of such structures should be determined by means of a more accurate evaluation of the characteristic impact-resistant capacity which in turn requires study of impact behavior of structural components with focus on structural response parameters such as deflection, residual deflection, strains in steel reinforcement with acceptable degree of accuracy in a real impact event. This study being conducted at CSIR-CBRI hopes to come up with performance-based impact-resistant design of reinforced concrete beams. The scope of the study:

- Experimental study of impact behavior of RC elements (normal strength concrete) by drop-weight impact tests
- Prediction of impact behavior of RC elements by non-linear FEM analysis for generation of impact response data which has not been covered in experiments and
- Establishing relationship between impact energy, static flexural capacity, maximum

deflection and residual deflection for RC Beams for PBD.

An instrumented impact loading test setup for dropping the weight at variable height up to 2.5 meter and recording the impact event (deflection, support reaction and strains vs. time) has been designed. A specially designed support system (Fig. 1a) for loading the beam and installing the strain gauge based load cell has been fabricated. The impact loading system with the data logger and with the beam instrumented for performing the drop weight experiment is shown in Fig. 1b.

As shown in Figure 1b, the 100-kg weight is attached with an electromagnet, which in turn is connected to an electric wire hoist installed on top of a steel portal frame. With help of an electric wire hoist the weight can



(a)



(b)

Fig.1: (a) Support system to support beam and load cell (b) Experimental Setup

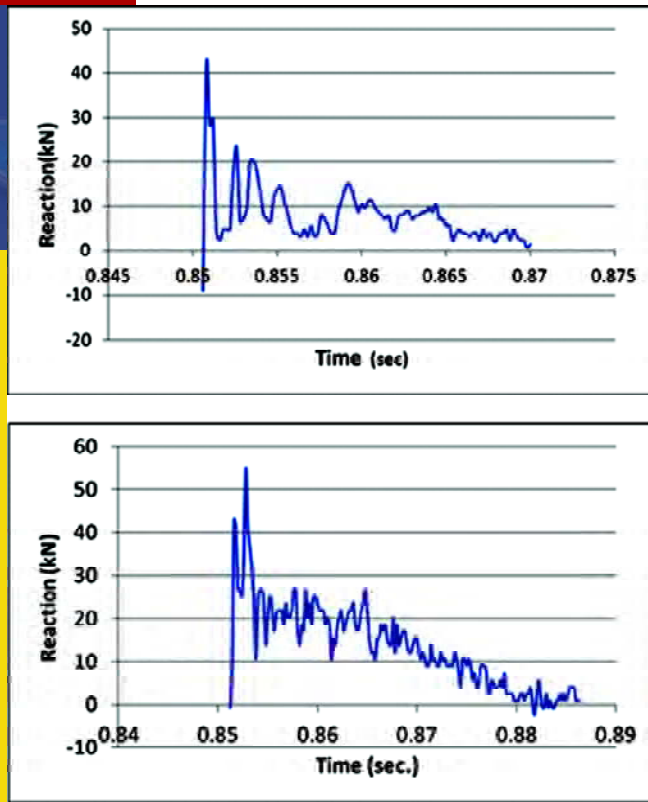


Fig.2: Reaction Force vs. Time for 1.5 k Joule IE (a) Sample A1- 1 L (b) Sample A1- 1 R

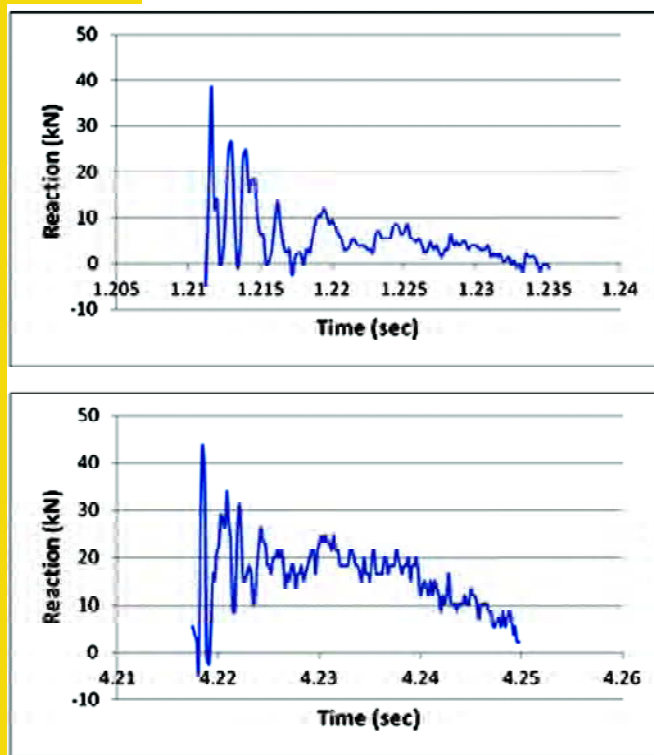


Fig.3: Reaction Force vs. time for 1.5 k Joule IE (a) Sample A1- 2 L (b) Sample A1-2 R

be raised to a desired height (0-2.5 m) and can be released with the electromagnet. In order to restrict the lateral movement of the electrical wire hoist a guiding cage of diameter 500 mm has been used to raise the hammer just above the test specimen. The drop hammer is cylindrical in geometry with a diameter of 360 mm and a depth of 145 mm. The striking surface of the hammer is of hemispherical type with a diameter of 90 mm and height of 10 mm. Two guiding rails are used near the test specimen to ensure proper fall on the specimen, and that after rebounding the hammer does not damage the surrounding, by falling back on the specimen.

The Deflection of the specimen is measured with strain gauge based dial gauge, which is kept just below the mid-span of the beam. The maximum deflection which can be measured by the electronic dial gauge used is 40 mm. The experimental setup included 2 load cells of capacity 500 kN capacity to measure the reaction force. The sensors are connected with a Data Acquisition system from National Instruments, consisting of an IBM computer, National Instruments PCI acquisition card and LABVIEW VI software with trigger function which had 8 LVDT channels, 4 accelerometer channels and 16 slots for universal channels which support strain gauge, dial gauge and load cell.

The reactions forces for three beams of A1 series (A1-1, A-12, A1-3) have been analyzed first. The reaction forces for beam A1-1 measured with Load cell installed at supports (Left and Right) have been converted into kilo Newton unit and the same are plotted with respect to time in Figure 2 (a&b). As seen, the peak value for the left and right supports are 41.8 kN and 54.8 kN respectively.

The reaction values for other two beams (A1-2 and A1-3) are plotted in Figure 3 (a&b) and Figure 4 (a&b) respectively. The average of peak reaction of the three cases (six numbers) are 43.2 MPa and coefficient of variation is 13.1%. The impulse (area of the reaction time curve) has been obtained for the three beams of the first series and the

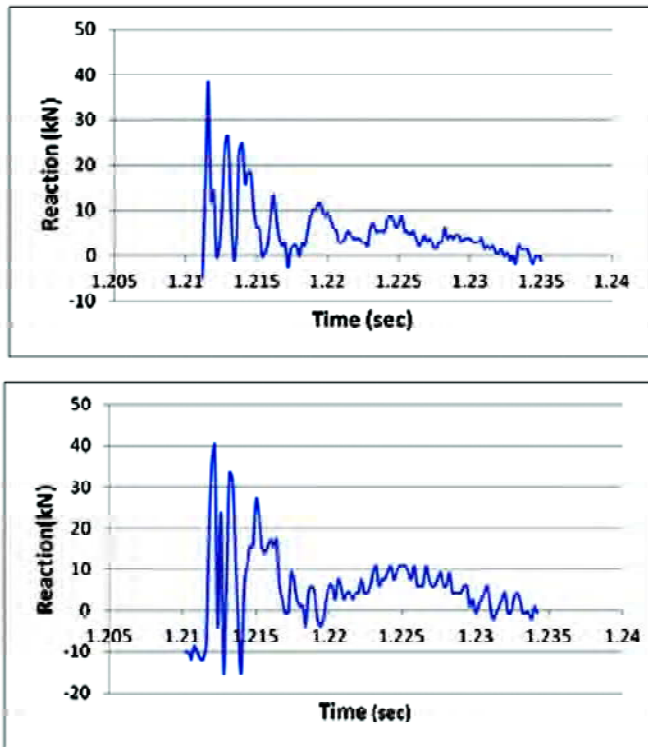


Fig.4: Reaction force vs. time for 1.5 K Joule IE
(a) Sample A1-3 L (b) Sample A1-3 R

impulse value for the three cases are close, the average impulse being 0.16 kN sec and coefficient of variation is 15%.

As seen from Figures 2, 3 & 4, initially when the striker strikes the beam, immediately for an instant the reaction is negative showing downward direction, the negative value is a fraction of positive peak. The reason for the negative reaction is that in the beginning as the weight is dropped there is tendency to uplift at the support which is resisted by the clamping device.

A.K. Pandey at
CSIR-CBRI

High Power RF Couplers being developed at CSIR-CEERI

CSIR-CEERI, Pilani has taken up a project on development of vacuum compatible RF couplers under an MoU with DAE. The couplers are to be used for feeding RF power to Low Energy High Intensity Proton Accelerator (LEHIPA), which is under development at DAE. CSIR-CEERI developed the uncooled and liquid cooled versions of the couplers.

The central and outer conductors of the couplers were fabricated out of OFHC copper while the coaxiality is maintained with the help of high purity alumina ceramic brazed to central and outer conductors. The ceramic disc provides isolation between ultra high vacuum in LEHIPA cavities and atmosphere. A stainless steel flange is used to fix the coupler to LEHIPA cavity that provides a demountable joint. Two uncooled couplers were delivered and are being used at DAE. The photograph of the coupler with ceramic window is shown in Figure 1.



Fig. 1: Uncooled coupler with its ceramic window

The couplers are to be used for feeding RF power to Low Energy High Intensity Proton Accelerator (LEHIPA), which is under development at DAE. CSIR-CEERI developed the uncooled and liquid cooled versions of the couplers.

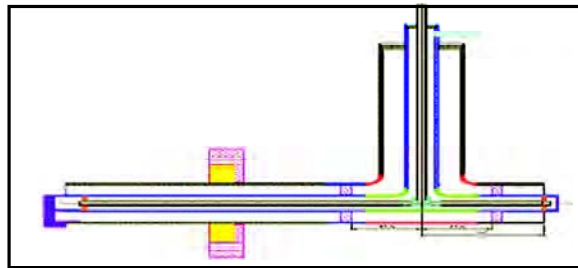


Fig. 2: Schematic diagram of liquid cooled section

In case of the liquid cooled coupler, the central conductor is cooled by passing liquid through it from a transverse arm. Here double ceramic windows have been used. The RF power from the source is coupled through a 6" coaxial transmission line. The coupler reduces the line size to 15/8" through a tapered section, which then feeds the power to LEHIPA with its central conductor cooled with liquid. The coupler was delivered to DAE and it is in regular use. The schematic diagram of liquid cooled section and photograph of complete coupler are shown in Figures 2 & 3.

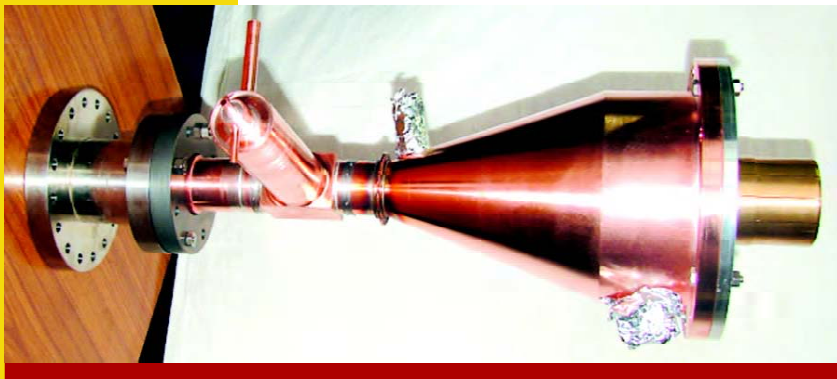


Fig. 3: Liquid cooled coupler

Thermo-Acoustic Power Generator Developed at CSIR-CEERI

CSIR-CEERI, Chennai Centre has developed a laboratory prototype of thermo-acoustic power generator for the purpose of experimental studies. The prototype converts thermal energy into electrical energy through acoustic energy. The thermo-acoustic energy conversion provides an alternative technology for harnessing solar energy especially in a decentralized setting.

Thermo-acoustic power generator can be driven by heat energy derived from various renewable energy sources such as sunlight, biogas, etc. The generator

(Fig. 1) consists of a closed duct with a stack structure containing a number of micro channels. When one end of the stack is

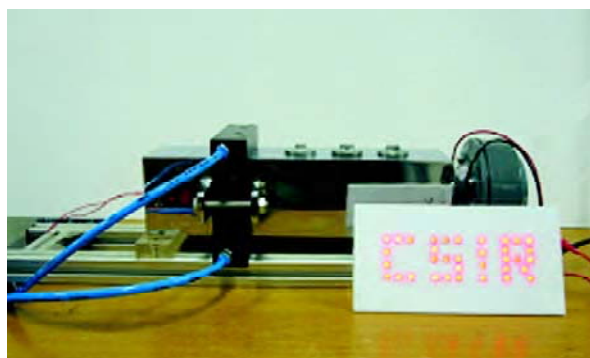


Fig. 2: Thermo-acoustic power generator prototype lighting up CSIR logo

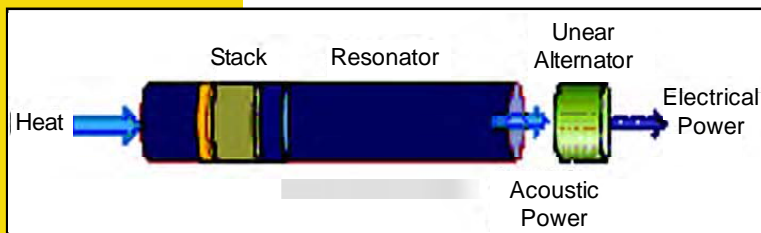


Fig. 1. Thermo-acoustic power generator

heated, an intense sound is generated on the other end, which is suitably converted into electricity using a linear alternator.

The thermo-acoustic power generator prototype (Fig. 2) fabricated at CSIR-CEERI, Chennai is presently powered by an electrical heater and is able to produce high intensity

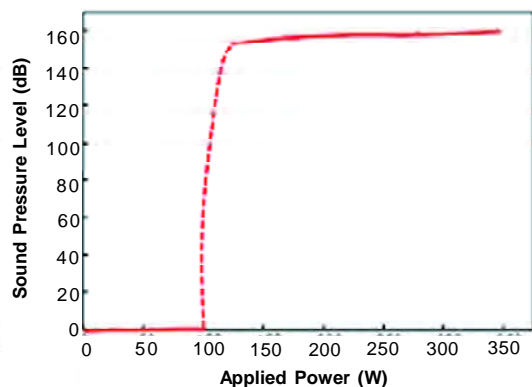


Fig. 3: Measured performance of thermo-acoustic power generator prototype

sound waves of 150-160 dB (1.5 kPa) (Fig. 3). This acoustic power is converted into electrical power using a speaker operating in microphone mode.

This is one of the first demonstrations of power generation using thermo-acoustic design. The system is presently being optimised to operate with the heat produced from various alternative renewable energy sources.



MoUs

CSIR-CMERI signs MoU with SCCL

CSIR-Central Mechanical Engineering Research Institute (CSIR-CMERI), Durgapur and the Singareni Collieries Company Ltd. (SCCL), Kothagudem, Telangana signed a memorandum of understanding (MOU) on 29 September 2014 for scientific and technical guidance and other related R&D activities pertaining to Mining Machinery and Mine Mechanization in all the 49 coal mines of SCCL.

In SCCL, the projected coal production by the year 2016-17 is 57 Mt (million tonne) and by the end of 13th plan period i.e. 2021-22 is 63.10 Mt. Out of this, 60% is from opencast and 40% from underground mines. At present SCCL is operating 34 underground and 15 opencast (OC) mines in four districts of Telangana state. SCCL is producing the major share of coal from OC mines of 79.10% and 20.9% from underground mines.

In OC mines HEMM (Heavy Earth Moving Machinery) plays a major role. Various equipments such as shovels up to 15 m³ and dumpers up to 180 ton capacity and other ancillary equipment such as drill machines, dozers, etc., are being used in underground high capacity longwalls and continuous miners. This equipment requires heavy and critical spare parts and maintenance.



Dr. Pijush Pal Roy, Acting Director, CSIR-CMERI and Mr S.V.S.S. Ramalingeswarudu, GM (R&D), SCCL during signing of MOU. Also seen are Mr Gautam Dhar, Advisor (Mining), SCCL and Mr Tapas Sarkar, Head, RPB DG, CSIR-CMERI

CSIR-CMERI has immense expertise in undertaking jobs such as planning/refining of preventive maintenance, scheduled maintenance, Non-Destructive Testing (NDT), designing and manufacturing of spare-parts and other ancillary equipment.

The MoU between SCCL and CSIR-CMERI, Durgapur, was signed in eleven potential areas and the formal work would start soon.

Symposia & Workshops**Symposium-cum-Workshop on 'Air Pollution-induced Health Effects, Health Risk Assessment Software Development & Demonstration' at CSIR-NEERI**

CSIR-National Environmental Engineering Research Institute (CSIR-NEERI) organized a two-day Symposium-cum-Workshop on 'Air Pollution Induced Health Effects, Health Risk Assessment Software Development & Demonstration' during 6-7 August 2014 in the CSIR-NEERI Auditorium. The event was inaugurated by Prof. P.K. Seth, CEO, Biotech Park, Lucknow; Dr. Kumara Vandan, General Manager, Sesa Sterlite & Vedanta Pvt. Ltd.,

He emphasized on assessment of environmental pollution exposure studies in human beings, which will be more effective than prevention and cure of diseases. He expressed satisfaction over the software developed by CSIR-NEERI which can quantify human health risks and effects. Dr. Seth also stressed on the need for a comprehensive study on gene-environment interactions.

While addressing the participants on the topic "Modelling of Health Impacts Due to Climate Change and Air Pollution", Dr. T. Chakrabarti talked about the success story of establishing a link between toxicity of manganese present in the environment and its impact on human health through genotoxicity studies. He also mentioned about some specific statistical tools that are instrumental to establish a link between climate change and its impact on human health. He informed that such studies were carried out on some patients of the Indira Gandhi Medical College, Nagpur. Dr. Chakrabarti inferred that high temperature and increase in environmental pollutants have an impact on the rate of hospital admissions for respiratory diseases.

Dr. Dhaliwal said that the Indian Council of Medical Research (ICMR) has identified environmental health as a very important area. He said that the software developed by CSIR-NEERI will definitely help in policy making with regard to prevention of air pollution and its impacts on human health. Citing an example of burning agricultural residues, Dr. Dhaliwal said that India needs to carry out health impact assessment studies through modeling.

Dr. Kumara Vandan emphasized on the need to further strengthen networking with researches and industries in India.

Earlier, in his welcome address, Dr. Satish R. Wate, Director, CSIR-NEERI briefed about the software developed by



Dr. P.K. Seth, CEO, Biotech Park, Lucknow inaugurating the symposium-cum-workshop

Tuticorin; Dr. T. Chakrabarti, Chair Professor, VNIT, Nagpur, and Dr. R.S. Dhaliwal, Deputy Director General, ICMR. Dr. Satish R. Wate, Director, CSIR-NEERI and Dr. K. Krishnamurthi, Organizing Secretary were also present on this occasion.

In his inaugural speech, Dr. P.K. Seth stated that many human diseases like cancer, diabetes, chronic lung disease, etc. are caused by environmental factors. About 1.7 million deaths take place due to diarrheal diseases, 1.6 million people suffer from respiratory diseases due to indoor air pollution and 8 lakh due to air pollution, he informed. Dr. Seth said that making our environment healthier can prevent about 13 million deaths.

CSIR-NEERI, which is able to assess and quantify human health risk due to air pollution. He recalled that CSIR-NEERI was established to work on issues related to public health.

Dr. K. Krishnamurthi, Organizing Secretary gave an overview of the symposium-cum-workshop. The vote of thanks was proposed by Dr. P.K. Naoghare, Scientist, CSIR-NEERI.

Three scientific sessions were organized

in the symposium-cum-workshop to address various contemporary issues related to air quality monitoring and modeling, occupational health risk assessment, genotoxicity and allied issues to prevent health impacts due to air pollution. The CSIR-NEERI developed software, which can quantify health effects of air pollution, was also demonstrated during the symposium-cum-workshop.



All India Farmers Empowering Workshop at CSIR-CFTRI

Under the CSIR-800 programme an “All India Farmers Empowering Workshop” was held at CFTRI, Mysore on 17 October 2014 in collaboration with the All India Sugarcane Farmers Association. The event was organized to empower the farming community across the nation for popularising the technologies developed by CFTRI.

A total of 120 farmers from various states participated in the workshop. Technologies such as sugarcane juice, Virgin coconut oil and Daal milling were demonstrated in three batches. Using CFTRI technology, sugar cane juice can be preserved up to four months in glass bottles. Similarly, Virgin coconut oil has a characteristic flavor and high nutritional value which could help the farmers explore national and international markets. Daal milling can help the farmers go in for efficient and quick milling.



Release of the Workshop Souvenir (from left)

Dr. Renu Agrawal, Chief Scientist & CSIR-800 Coordinator; Dr. Vishakanta, MD, KAPPEC, Govt. of Karnataka; Prof. Ram Rajasekharan, Director, CSIR-CFTRI; Shri Shanta Kumar, President, ISCF, New Delhi and Shri Somashekar, Joint Director, Dept. of Agriculture, Govt. of Karnataka



Participants of the All India Farmers Workshop during an interactive session at CFTRI, Mysore

On this occasion, a souvenir covering twenty of the selected technologies developed at CFTRI was released. Details of the technologies were made available in Kannada, Hindi and English to enable better understanding for the farmers.

New varieties of Chia (CHIampion-B1 and CHIampion W-83) were

also released. Seeds of Chia and Quinoa were distributed for farmers and the cultivation was done at CSIR-CFTRI. The new variety can help the farmers go in for alternative crop farming and intercropping. The high yielding varieties are called “Super Foods”, as they are nutritious and important for curing dietary disorders and combating malnutrition. Chia is rich in omega-3 fatty acids and Quinoa is rich in protein content while both of them have high fibre, iron, magnesium and riboflavin.

The programme had dignitaries representing different sectors such as Dr. Vishakanta, MD, Karnataka State Agricultural Produce Processing and Export Corporation Limited, Govt. of Karnataka; Mr Aravamudan, Joint Director, NABARD (Bangalore region) and Mr Shanta Kumar, President, Indian Sugarcane Farmers Association, New Delhi. Prof. Ram Rajasekharan, Director, CSIR-CFTRI presided over the function and Dr. Renu Agrawal, Chief Scientist and Coordinator CSIR-800 coordinated the programme.

CSIR-CIMAP organizes Farmers’ Meet in Uttarakhand

CSIR-CIMAP organized a Kisan Gosthi (Farmers’ Meet) on 17 November 2014 at its Research Centre, Purara located near Garur-Bajnath, district Bageshwar, Uttarakhand in which about 80 farmers hailing from different districts of Uttarakhand participated.

Director, CSIR-CIMAP called upon the farmers to adopt improved technologies and plant varieties of medicinal plants developed by CSIR-CIMAP for higher profit per unit area and time. Prof. Tripathi said that cultivation and value addition in medicinal plants have the potential for generation of employment opportunities in rural areas. He further said that CIMAP has planned to organize such meets and trainings for the farmers of Uttarakhand at regular intervals with the support of SMPB.

Prof. Tripathi also planted a sapling of *Taxus wallichiana* in the campus of the centre. He also presented a kit containing the planting material of geranium and lemongrass to the participants.



Prof. A.K. Tripathi, Director, CSIR-CIMAP presenting herbal products of CSIR-CIMAP

Organised under the Rural Development Project of CSIR-CIMAP, the meet was supported by the State Medicinal Plants Board (SMPB), Uttarakhand and Uttarakhand Council of Science & Technology (UCOST).

Welcoming the farmers and guests attending the meet, Prof. A.K. Tripathi,



Prof. Tripathi planting a sapling of *Taxus spp.*

Later in the technical session, Dr. V.K.S. Tomar, Senior Principal Scientist spoke about the important medicinal and aromatic plants suitable for cultivation in Uttarakhand. Shri Anand Singh Bist, Technical Officer explained about the agro-technology of Rosemary while Er. Sudeep Tandon gave a lecture on the distillation technology of aromatic plants. There was a live demonstration of making rose water from rose petals and essential oil of lemongrass. Visit of the participating farmers to the experimental fields was also arranged.

The farmers were also addressed by Shri Lalit Farswan, MLA (Kapkot), Shri Chandan Ram Das MLA (Garur), Dr. M.S. Gosain of SMPB, Dehradun, Dr. R.K. Yadav of CAP, Dehradun, Dr. Uma of KVK Gwaldam, Dr. I.D. Bhatt of GBPHIED, Kosi Katarmal, Mr Vinit Agarwal a Jari Buti Trader from Kanpur, Miss Bela Negi of Leaf Bird Foundation, Mumbai besides officials from Agriculture Deptt. of Uttarakhand.

Other senior scientists from CSIR-CIMAP including Dr. J.R. Bahl, Dr. Alok Kalra, Dr. Sanjay Kumar, Dr. A.K. Mathur, Dr. L. Rahman, Dr. Rajesh Verma, Mr Manoj Semwal, Dr. A.S. Negi, and Ex-Scientist and Consultant Dr. A.K. Singh also interacted with the participants.



Prof. Tripathi presenting a kit of planting material of geranium and lemongrass to a participant

Training Programmes

25th National Congress of Parasitology on “Global Challenges in the Management of Parasitic Diseases” at CSIR-CDRI

CSIR-Central Drug Research Institute, Lucknow and The Indian Society for Parasitology jointly organized the 25th National Congress of Parasitology on “Global Challenges in the Management of Parasitic Diseases” during 16-18 October 2014.

Director CSIR-CDRI, Dr. S.K. Puri welcomed the guest and briefed about the three-day National Congress of Parasitology. Padma Bhushan Dr. Vinod P. Sharma, Founder Director, National Institute of Malaria Research and Additional Director General, Indian Council of Medical Research was the Chief Guest of this function. In his address he talked about R&D in parasitic diseases in India. He said that many parasitic

diseases had been eradicated from the country due to the efforts of parasitologists of India but many more still need to be eradicated. He appreciated the contribution made by CDRI scientists in developing low-cost medicines to cure malaria.

During the inaugural program, the Guest of Honour Dr. P.S. Ahuja, Director General, Council of Scientific & Industrial Research, emphasized on the need to make the country free of infectious and parasitic diseases. He urged the young researchers to undertake targeted research for making India a parasitic-disease free country. He said that in the near future CSIR will establish a few more BCL-III laboratories to strengthen research

in the area of infectious diseases.

President of the Indian Society of Parasitology, Dr. S. L. Hoti, talked about the mandate of the society and appreciated the efforts made by the CDRI team in organizing the Congress.

On the first day of the National Congress of Parasitology, the proceedings of the scientific sessions were started under the Chairmanship of Dr. V.P. Kamboj, Former Director of CSIR-CDRI, Lucknow.



Director Genral, Dr. P.S. Ahuja delivering the inaugural lecture

The keynote address was delivered by Dr. Joachim Clos from Bernhard Nocht Institute for Tropical Medicine, Hamburg, Germany on the topic “Leishmania heat shock proteins and their roles in intracellular survival and signal transduction”.

Two parallel scientific session were organized, one on “Disease Diagnosis/ Immunology” and another on “Drug Discovery/Mechanism of Action/ Resistance”. Thirteen participants from various organizations delivered the oral presentations and forty participants presented their research work in poster form during the two sessions. In the evening, in the fond memory of Dr. B. N. Singh, the doyen of

microbiologists in India, his Birth Centenary Reminiscences was also organized.

The second day of the Conference witnessed intense deliberations on physiology and cellular and molecular biochemistry of parasites. Dr. Sushma Rathaur (BHU) identified filarial thioredoxin reductase a potential drug target and Prof. Swati Patankar (IIT-Bombay) presented experimental evidence suggesting that a thioredoxin peroxidase of the malaria parasite *Plasmodium falciparum* plays a role in handling oxidative stress in the plastid organelle and mitochondrion membranes as well as the cytosol. The role of the RuvB family of helicases in *P. falciparum* biology was discussed by Dr. Renu Tuteja from ICGEB, Delhi.

A separate session was dedicated to research where Dr. Raj from the University of Kerala, Trivandrum, explained the survival of filarial parasites in the host. Dr. Anand from the Madurai Kamraj University showed that, filarial infection alters the functional properties of circulating lymphatic progenitors in lymphedema subjects. Dr. Desai from the Pune University talked about the immunoinformatics approach for identification of epitopes for development of vaccine for visceral Leishmaniasis. Posters were also presented by research scholars.

The third and last day of the 25th National Conference of Parasitology ended with extensive discussions on issues of drug discovery and development against Leishmaniasis (kala-zar), and veterinary parasitology. The session was sponsored by DNDi, New Delhi and Dr. Rijal, Director DNDi, explained the challenges to the treatment of Kalazar in Indian subcontinent. Dr. Bhawna Sharma, Director R&D gave an overview of the ten-year experiences of DNDi in treating various neglected diseases.

Dr. K.V. Sashidhra from CSIR-CDRI focused on his group’s efforts to discover potential leads by activity-guided fractionation



from the Indian medicinal plants. He also highlighted the concept of medicinal chemistry hybridization for the design and synthesis of 'nature like molecules', thereby increasing therapeutic efficacy as well as improving the bioavailability profile. Prof. Sukhbir Kaur from, Panjab University, discussed the benefits of herbal drug options in parasitic diseases and the need for concerted efforts to discover newer lead molecules against visceral Leishmania. Dr. S.K. Singh from Patna talked about protective efficacy of Beta-D-Glucan in visceral Leishmaniasis.

In her talk on novel ways to impair cell division and growth of malaria parasites, Prof. Shobhona Sharma from TIFR-Mumbai, presented evidence for the involvement of a *Plasmodium falciparum* 60S stalk ribosomal protein P2 (PfP2) in nuclear division. She also described formulation of drug-free nanolipid carriers (NLCs) that show antimalarial protection as they target *P. berghei* and *P. falciparum* infected red blood cells (iRBCs) through rapid uptake.

Dr. A.M. Khan from RMRC, Dibrugarh, provided information on mass drug administration and prospects of elimination

of lymphatic filariasis in Assam and Dr. Paritosh Joshi from IVRI, Bareilly, described studies on survival strategies of a nematode parasite of sheep and goats with a view to develop future intervention strategies.

The conference concluded with the plenary talk of chief guest of the Valedictory Session, Dr. V.M. Katoch, Secretary to Govt. of India (DHR), Ministry of Health and Family Welfare and DG, ICMR, New Delhi. In his talk he emphasized that parasitic research should be more practical rather than remaining confined to books only. The ignorance towards occurrence of parasitic diseases must be avoided, he said.

After his talk, he conferred the awards for BN Singh oration award, Dr. B.P. Pandey memorial lecture award and Young Scientist awards for best scientific research in Parasitology, best poster awards for young researchers and Dr. M.B. Mirza award for best publication in Parasitology.

The conference was attended by more than two hundred delegates. The conference was brought to a close after a vote of thanks by the organizing secretary, Dr. J.K. Srivastava.



Release of Conference Proceedings

Visits

Union Minister of Science & Technology and Earth Sciences visits CSIR-NEIST

Addressing scientists and young researchers of CSIR-North East Institute of Science and Technology (NEIST), Jorhat, Dr Harsh Vardhan, Union Minister of Science & Technology, Earth Sciences and Vice President, CSIR remarked that, “Scientists should help North-East’s local communities to cope with climate change.”

In his day-long visit to the Institute on 15 November 2014, Dr. Harsh Vardhan emphasized the ‘Make in India’ vision of the Prime Minister, which he said needs regional synergies. He further added, “A terrific explosion of scientific energy is waiting to be tapped. The Narendra Modi government will channelize this into giving Indian industry a competitive edge in the global economy.”

He stressed on the need for the nationwide network of laboratories under the Council for Scientific and Industrial Research (CSIR) to give solutions to enable local communities everywhere to improve their standards of living. He appreciated the efforts of CSIR-NEIST in tackling the emergence of new agricultural pests and spread of new weeds in agriculture. He also said that CSIR-NEIST’s scientists are aware that climate change affects the phenology of crops.

Dr. Harsh Vardhan further said, “I am here to convey to you the Prime Minister’s message that we want a strong and developed India – but not at the cost of the environment. The North–East is India’s greatest resource of biodiversity, genetic resources, ground water and countless other treasures. CSIR-NEIST should develop programmes to safeguard these resources.”

He recounted that as Union Health Minister, he had laid particular stress on medicinal and aromatic plants for their vast medical use. He mentioned that CSIR-NEIST’s research output would be crucial to creating a viable economy for local communities.

Accompanied by Dr. D. Ramaiah, Director CSIR-NEIST, Dr. Harsh Vardhan visited various divisions of the Institute. He was given a presentation on the activities of CSIR-NEIST by the Director in the morning hours and later spent some time in its Biotechnology, Materials Science and Chemical Sciences laboratories. He also went



Dr. Harsh Vardhan, addressing the CSIR-NEIST staff members



Dr Harsh Vardhan, attended a meeting with Dr D Ramaiah, Director, CSIR-NEIST, Dr Sudeep Kumar, Head, PPD, CSIR, Dr RC Boruah, Outstanding Scientist and with Head and Area Coordinators, CSIR-NEIST

to the Drug Processing Unit, experimental farm and GSI station.

Dr. Harsh Vardhan showed keen interest in the drugs (ointments) to fight arthritis and fungus developed by the Institute. He stressed on the need to expedite development of the chemical lead compound for production of anti-lung cancer drugs – a project of CSIR-NEIST which is in its advanced stage.

The Minister also announced a project to accurately and systematically document the impact of climate change on the natural ecosystems and biodiversity of the Himalayas and the North-East region. He said, “I am in contact with renowned biologists all over the world who have pointed out to me the vital need for building up a database on the rapidly changing scene in these two regions. Accordingly, I am directing the scientists of NEIST to carry out a pilot study within a short time which will help local communities develop alternative systems.”

Dr. Harsh Vardhan said a social movement to bridge Science and Society is the need of the hour. He pointed out, “The people of North-Eastern India are far more educated and aware than other regions. Among local communities there is tremendous indigenous knowledge. Such knowledge can propel scientific inquiry and also help design solutions and adaptation measures. So a social movement involving all stakeholders to document the changes already experienced in local ecosystems is necessary.”

Dr. Harsh Vardhan urged that CSIR-NEIST must listen to local communities, not patronise them. There is much to learn from the North-East for the benefit of the rest of India, he opined.



Dr Harsh Vardhan, discussed on Liquid Deodorant Cleaner technology developed by Cellulose, Pulp and Paper Division, CSIR-NEIST



Hon'ble Minister visiting the labs in CSIR-NEIST



Dr Harsh Vardhan met young researchers at Biotechnology lab, CSIR-NEIST

Union Minister for Environment, Forests and Climate Change visits CSIR-NEERI

Shri Prakash Javadekar, Minister for Environment, Forests and Climate Change visited CSIR-National Environmental Engineering Research Institute (CSIR-NEERI), Nagpur on 20 July 2014.

In a meeting with CSIR-NEERI scientists, Principal Chief Conservator of Forests and officials from the Maharashtra Pollution Control Board (MPCB), MOIL Limited, Western Coalfields Limited, Indian

Bureau of Mines, Shri Javadekar discussed and took stock of various issues related to compliance of environmental regulations, status of pending proposals in the environment and forest departments, and issues immediately to be resolved by the Central Government, with reference to Vidarbha.

Ms Hema Deshpande, Sub-Regional Officer, Maharashtra Pollution Control Board informed the Minister that almost all the industries are meeting environmental norms except a few Public Undertakings. Shri Javadekar warned if an industry does not meet environmental standards, the industry will not be permitted to operate further.

Principal Chief Conservator of Forests Shri A.K. Saxena informed that 20 proposals are pending for forest clearance with the local forest department and 55 proposals are pending with the Central Govt.

Shri Javadekar also took stock of the forest area of Nagpur and its future plans. The Minister expressed concern over the historic Central Museum (popularly known as Ajab Bangla) of the Nagpur city, currently neglected and in dilapidated condition, and said that concrete efforts should be made to rejuvenate this museum. The Minister sought suggestions in the meeting to simplify the procedures for obtaining environment and forest clearances. In order to further improve and expedite the environmental clearance process and make it more effective, time bound and transparent, Shri Javadekar emphasized on its comprehensive review.

Earlier, Shri Javadekar visited the Lab-to-Land Exhibition organized by CSIR-NEERI. He took keen interest in the achievements of the Institute. Shri Javadekar interacted with the CSIR-NEERI scientists, and took cognizance of the R&D activities being carried out by the Institute.



Union Minister Shri Prakash Javadekar interacting with the CSIR-NEERI scientists during his visit to the Lab-to-Land Exhibition

Union Minister for Water Resources, River Development and Ganga Rejuvenation visits CSIR-NEERI



Sushri Uma Bharati, Minister for Water Resources, River Development and Ganga Rejuvenation visited CSIR-National Environmental Engineering Research Institute (CSIR-NEERI) on 26 October 2014 to discuss various issues related to rejuvenation of the river Ganga in the light of the proposal submitted by CSIR-NEERI with regard to water quality monitoring of Ganga River.

The Minister reviewed the activities related to water quality monitoring and sediment analysis for the Ganga River from Gomukh to Hooghly, proposed by CSIR-NEERI. After the review, Sushri Bharati advised CSIR-NEERI to include such parameters in the study which have a direct bearing on human and aquatic life. She also directed the Institute to include one more parameter – ‘Arsenic’ – as this is also a major concern for human and aquatic life.

The Minister also interacted with the CSIR-NEERI scientists on the selection of various locations for the study considering the most polluted stretches of the river Ganga. In particular, she briefed about some critical locations and directed CSIR-NEERI to include these locations in the monitoring studies. She also mentioned that the water quality monitoring and sediment analysis study needs to be completed in 15 months, as the government will formulate a final plan based on CSIR-NEERI’s study to clean up the river Ganga.

Earlier, Dr. Hemant Purohit, Chief Scientist & Head, Environmental Genomics Division, CSIR-NEERI welcomed the Hon’ble Minister. Dr. Pawan Kumar Labhasetwar, Head, Water Technology & Management Division, CSIR-NEERI presented an overview of the activities proposed by CSIR-NEERI in relation to Ganga rejuvenation, including identification of unique characteristics of Ganga water and diversity of flora in upper catchment,

particularly medicinal plants. Dr. Rajesh Biniwale, Head, Cleaner Technology Centre, CSIR-NEERI briefed about the phytorid wastewater treatment technology, which can be instrumental in the mission of “Cleaning the Ganga”. The Hon’ble Minister was taken to the site located in Nagpur where this phytorid technology has been implemented for sewage treatment and is still in operation for the past four years.



Dr. Hemant Purohit, Senior Most Scientist, CSIR-NEERI interacting with the Hon’ble Minister



Sushri Uma Bharati interacting with CSIR-NEERI scientists

Honours & Awards

CSIR-NIO Hindi Officer receives Rajbhasha Award from President of India

Dr. Rakesh Sharma, Hindi Officer, CSIR-NIO has been awarded with the first prize for his Hindi article “*Gebun ka Jawara: Prakruti ka Vardan*” (The wheatgrass: blessing of

nature) under the Rajbhasha Award Scheme of Department of Official Language, Government of India for the year 2013-14.

Dr. Sharma received a certificate and a cash award of Rs 25,000 on 14th September 2014 on the occasion of Hindi Divas from the President of India Shri Pranab Mukharjee in the President’s House auditorium, New Delhi.

Dr. Sharma is the Hindi officer in CSIR-NIO since July 2009. He has given many presentations on Hindi computing, translation technology, Unicode and applied Hindi in many national and international Hindi conferences and seminars. Many of his articles have been published in different printed and online magazines. He is the life member of *Bharatiya Anuvad Parishad*, New Delhi. After Dr. Sharma joined CSIR-NIO, the institute has received two prestigious awards from the Department of Official Language and a letter of appreciation from the Parliamentary Committee on Official Language.



Dr. Rakesh Sharma received Rajbhasha Award from Honorable President

CSIR-CMERI CoEFM conferred Three (SESR) Awards at Kumarakom

CSIR-CMERI Centre of Excellence for Farm Machinery (Ex MERADO), Ludhiana has bagged three SESR awards namely, ‘SESR Brilliance in Research Award’ (Dr. K. Kundu), ‘Best Project’ (CPCFM) & ‘Best Project Team Award’ (CoEFM). The awards were conferred by the ‘Society for Educational & Scientific Research’ (SESR), Kannur, Kerala during a seminar on 11 September 2014 at the ‘International Conference on Biosciences – State-of-the-Art Advances’ held at Lakesong Resort, Kumarakom, Kerala.

Dr. K. Kundu, Senior Scientist, CSIR-CMERI Centre of Excellence for Farm Machinery (CoEFM), Ludhiana was felicitated for ‘SESR Brilliance in Research

Award-2014’. The ‘Best Project Award’ for the project under ‘Centre for Precision Conservation Farm Machinery’ was bestowed to Dr. Pradeep Rajan, Senior Scientist, CoEFM. Over all ‘Best Project Team Award’ for Centre of Excellence for Farm Machinery, Ludhiana was conferred on Cdr. V.R. Dahake, Scientist In-charge, CoEFM. These awards are based on criteria such as merit and achievement of the individual scientist and implementation and deliverables of the crew. Selection is done after evaluation by a panel of eminent scientists.

Bio-fuels: CSIR-CMERI CoEFM, Ludhiana has delivered technologies like semi continuous biodiesel plant, biogas plant

operated on deoiled cake of *Jatropha*, Neem decorticator, dehuller & expeller, optimized process for *jatropha* expelling, kitchen waste biogas plant, India's first tractor to run on B100, Biofuel from algae, Bioethanol from algae wastes, etc. Former two technologies have been successfully commercialized in India and abroad. The work has been recognized in the form of publications in national and international journals and awards.

Centre for Precision & Conservation Farming Machinery (CPCFM): CPCFM programme has been sanctioned to CMERI-CoEFM (MERADO) as work centre and co-ordinator as Networked project for PAU, Ludhiana, IARI, New Delhi, C-DAC, Mohali, CSIO, Chandigarh, G.B. Pant University, Pant Nagar, JMI University, New Delhi, IIT M Gwalior and Industrial partners. Under this programme, following technologies have been developed:

- a) Pneumatic Precision Planter for direct planting of vegetable seeds,
- b) Inter-row Rotary Cultivator for Wide-row crops like vegetables, cotton, maize, peas, grams, etc.,
- c) Irrigation Scheduler (programmable) for automated pressurized irrigation like drip & sprinkler irrigation, and
- d) Electrostatic Nozzle for ultra-low volume chemical application & increased efficacy.

Technologies currently in development stages are:

- a) Offset Rotavator for intercultural operations of orchards,
- b) ADI technology for rotavator blades,
- c) Cotton Picking Head for machine harvesting of cotton bolls, and
- d) Application of image processing & electronics in vacuum picking of cotton.

This research project resulted in creation of: a) state of art technology/facilities for design, development and evaluation of agricultural machinery, b) efficient and cost effective farm equipment for increasing production and productivity particularly for small farmers. and c) a research team committed to achieve the goals for societal benefit.

The Mobile Bridge Inspection Unit (MBIU) developed at CSIR-CMERI-CoEFM, Ludhiana is a Simple and robust articulated steel structure unit mounted over a 25-ton truck chassis. It helps the bridge inspectors to conduct 100 percent bridge inspection within a stipulated time period. Currently, no such device is available indigenously. Only a few companies in the world like *Moog* of Germany and *Hydra* of USA are manufacturing MBIUs which are hydraulically-operated folding machines with cost as high as Rs 6-7 crore. Annual maintenance cost of such machines ranges between Rs. 20-30 lakhs and requires highly skilled manpower. MBIU, on the other hand, is estimated to cost just Rs 1 crore. Its



(From L to R): Dr. S. Siva Ram, Padma Shri and Former Director, NCL, Pune, giving away the award to Cdr. V.R. Dahake, Dr. P. Rajan and Dr. K. Kundu of CSIR-CMERI-CoEFM, Ludhiana

maintenance cost is expected to be low and it can be operated by semi-skilled personnel.

For a small centre like CoEFM, it was a great honour to achieve three awards in an International Conference organized by SESR. Cdr. V.R. Dahake also delivered a lecture which was overwhelmingly received and participants showed keen interest in his projects and excellent team building strategy.

Dr. R.A. Mashelkar receives Dr. Mohan Dharia Award for Nation Building



Minister for Road Transport, Highways & Shipping Shri Nitin Gadkari felicitating former DG-CSIR Dr. R.A. Mashelkar

The Minister for Road Transport, Highways & Shipping Shri Nitin Gadkari conferred the Dr. Mohan Dharia Nation Building Award to Padma Vibhushan Dr. R.A. Mashelkar, Ex. DG-CSIR at a felicitation ceremony held in the CSIR-NEERI Auditorium. The award consisted of Rs. one lakh cash, memento, shawl, sreefal, etc. The function was organized by Vanrai Foundation on 12 July 2014.

Addressing the gathering, Dr. Mashelkar said there is a need to utilize the knowledge of science and technology to make 6 lakh villages self-sufficient. Scientists have learnt how research converts money into knowledge but now they should focus on

creating innovation, because it converts knowledge into money, he said. Emphasizing on “inclusive growth”, Dr. Mashelkar said that research and innovations should go hand in hand together and India should think of achieving accelerated inclusive growth through inclusive innovations. “Innovation and passion is all fine, but scientist community should have compassion in the heart for nation building. I have got success because I have worked for every hour, 24x7 in a week and I will continue to work for nation building,” Dr. Mashelkar said. Dr. Mashelkar announced that he will add Rs. 50,000/- in the cash prize and donate Rs. 1.50 lakh to the Institute of Chemical Technology, Mumbai for upgradation of its laboratory.

Shri Nitin Gadkari said innovation and entrepreneurship are the keys to success and under the guidance of scientists the Government is planning to develop villages through science and technology. The innovative ideas will be helpful in creating employment opportunities in villages, he added. Shri Gadkari advocated that various projects should be started in villages to eradicate poverty, unemployment and achieve sustainable growth.

Earlier, Dr. Satish R. Wate, Director, CSIR-NEERI welcomed the dignitaries and introduced Dr. R.A. Mashelkar to the audience.



Dr. R.A. Mashelkar addressing the gathering

International Cybernetics Expert and former CSIR Scientist Breathes His Last



Professor Amitava Ghosal, an international expert in the area of Cybernetics and one of the founder key players in shaping the Management Structure of CSIR, breathed his last on 27 October 2014 during his visit to Dehradun in the Dipawali vacations.

Born on 25 November 1928 in Chaibasa (now in Jharkhand), Dr. Ghosal had a first class Honours degree from Patna University, post graduation from Presidency College and PhD from Kolkata University. He also acquired Associateship of the Institute of Actuaries, London and Fellowship of Actuarial Society of India.

Having worked for nearly ten years in CFRI, Dhanbad under renowned coal-expert, Dr. A. Lahiri, Dr. Ghosal was invited to join the CSIR Headquarters in New Delhi in 1963 at the time the foundation of the Planning Division was being laid in CSIR by Prof. A. Rahman.

Dr. Ghosal was invited to Monash University, Australia during 1967-70, invited as Visiting Professor to Baruch College, City University of New York during 1974-76, also as Visiting Professor in Royal Military College, Kingston, Canada in 1980, and once again to City University of New York in 1989. Dr. Ghosal made a couple of short visits to Deakin University Australia during 1989, 1994, 1996 & 2001 and to Winnipeg University, Canada during 1980, 1987 & 1989.

Besides his tactical role in the Planning Division, Dr. Ghosal also headed an Operation Research Unit (OR Unit), established in CSIR HQ in 1979 to carry out specialised jobs typically related to OR. One of the major contributions had been his role in an International Project getting recognition for the country, the first time in the world, as a “Pioneer Investor in Oceanography”.

Dr. Ghosal retired from CSIR in 1988 and later continued as Emeritus Scientist till 1995. He worked with as many as eight Director Generals starting from Prof. H.

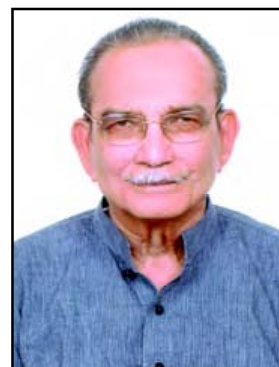
Zaheer, during his tenure in CSIR. Afterwards he was a Visiting Professor at the International Management Institute (IMI), New Delhi. At CSIR he was also associated as Consultant with a number of organisations like the Planning Commission, Indian Airlines, Kolar Gold mines, etc.

Dr. Ghosal was an Honorary Fellow of the ‘World Organisation for Systems and Cybernetics’ (WOSC) and an editor of its journal *Kybernetics*. He had quite successfully organized the ‘Asian Congress of Cybernetics’ in 1984 & 1987 and WOSC’s ‘Triennial Congress 1993, the first time in Asia-Pacific, at New Delhi. In addition, Dr. Ghosal actively participated in various WOSC related conferences like in Mexico in 1981, Vienna in 1984, London in 1987, New York in 1990, Melbourne in 1994, Brunel University UK in 1999, etc.

He had been instrumental in establishing the ‘Society of Management Sciences and Applied Cybernetics’ (SOMAC) in 1972 and was its Founder Secretary, and had also been Editor of its journal SCIMA. Dr. Ghosal also played a significant role in shaping the Operational Society of India and was Founder Editor of its journal *OPSEARCH*.

Dr. Ghosal has written several books. Two of his publications, *Some Aspects of Queuing and Storage Systems* and *Applied Cybernetics* have been well received. Dr. Ghosal had been PhD supervisor for several students from City University of New York, Monash University Melbourne and University of Delhi.

A combination of empirical work and Mathematical approach transformed Dr. Ghosal into a renowned worker in Operations Research. His research inputs on various subjects and close contacts with a large number of distinguished dignitaries of the area, enabled him to extend the applications of Cybernetics to several critical areas.



Besides his tactical role in the Planning Division, Dr. Ghosal also headed an Operation Research Unit (OR Unit), established in CSIR HQ in 1979 to carry out specialised jobs typically related to OR. One of the major contributions had been his role in an International Project getting recognition for the country, the first time in the world, as a “Pioneer Investor in Oceanography”.

COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH
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Pusa, New Delhi 110 012

NOMINATIONS INVITED

2015 CSIR Young Scientist Awards

The Council of Scientific & Industrial Research (CSIR) invites nominations for the CSIR Young Scientist (YS) Awards for the year 2015. The awards are to be given for research contributions made primarily in India. The nominee should be a regular scientific staff of CSIR system holding a post of Junior/Trainee Scientist or above (Previously Scientist 'B' or above in Group IV) and should have joined the CSIR laboratory on or prior to 26th September 2014. The age of the nominee should not be **more than 35 years as on 26th September 2014**.

The YS Awards are given annually in the following disciplines: (1) Biological Sciences, (2) Chemical Sciences, (3) Earth, Atmosphere, Ocean and Planetary Sciences, (4) Engineering Sciences, and (5) Physical Sciences (including instrumentation). The YS Award comprises a citation, a cash award of Rs 50,000 (Rupees fifty thousand only), and a plaque.

Nominations addressed to **Scientist Incharge, SSB YSA Unit, Human Resource Development (HRD) Group, CSIR Complex, Library Avenue, Pusa, New Delhi 110 012** should be sent as per the prescribed proforma (original + one copy) latest by **31st January 2015**. A CD/DVD/USB flash drive is also required containing digital photograph (in JPEG format), duly filled proforma and significant publications (*in PDF format*) of the nominee.

The details of the YS Award and the prescribed proforma for nomination may be obtained from above address or may also be downloaded from website: www.csirhrdg.res.in

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