

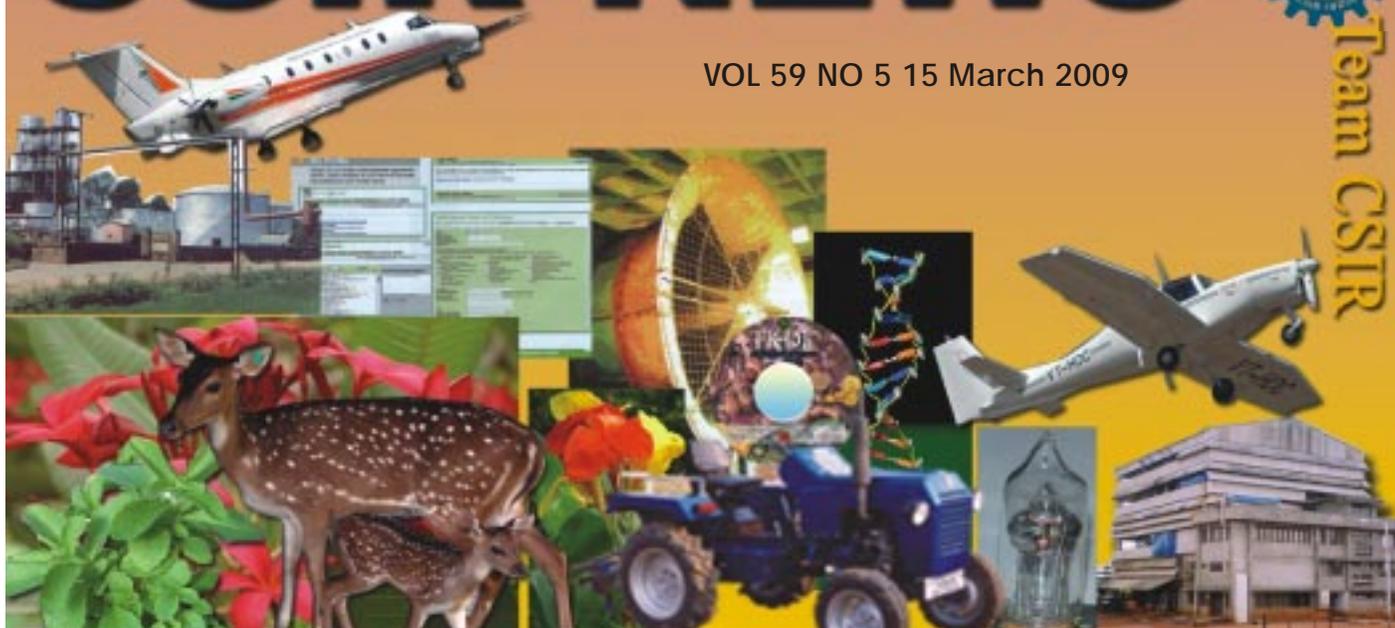
CSIR NEWS

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CSIR signs Working Programme of S&T Partnership with Czech Republic

As a follow up of CSIR-ASCR (Academy of Sciences of the Czech Republic) Protocol on S&T Cooperation, a high-level delegation from Czech Academy of Sciences, led by its President Prof. Vaclav Paces, paid a visit to India to finalize the CSIR-ASCR Working Programme of S&T partnership for the years 2009-2011.

The Working Programme was signed on 9 February 2009 at CSIR by Prof. Samir K. Brahmachari, Director General, CSIR and Prof. Vaclav Paces.

Both sides identified 10 joint research projects for networking, in the areas of Advanced Materials including Nanotechnology, Mining Research including Rock Mechanics, Plastic Waste Utilization, Biosensors and Neuropathogenesis.

Prof. Paces also delivered a public lecture on **"From the Peas of Gregor Mendel to the Human Genome and Beyond"** after the signing ceremony. The S&T personnel present on the occasion attended the lecture.



Prof. Samir K. Brahmachari, Director General, CSIR and Prof. Vaclav Paces, President, ASCR, signing the CSIR-ASCR Working Programme of S&T Partnership



R&D Projects undertaken by Central Road Research Institute, New Delhi

Quantification of Benefits of Delhi Metro Phase-I

The construction of metro in Delhi was started in 1998. The Phase-1 (total length 65.1 km) consisting of three lines — Line-1 (Shahdara to Rithala), Line-2 (Vishwavidyalaya-Central Secretariat) and Line-3 (Indraprastha-Dwarka) — was completed and became fully operational in November 2006. The total estimated cost of the whole metro phase-1 was approximately Rs 10,303 crore.

In view of the expertise available with the Central Road Research Institute (CRRI), New Delhi, the Metro Rail Corporation (DMRC), awarded a project on 'Quantification of Benefits Achieved by the Implementation of Phase-1 of Delhi Metro'.

The studies made by CRRI showed that there was a 3.3-3.5% decrease in rate of vehicle growth (mainly privately owned), number of accidents and traffic volume along the Phase-1 stretch of Delhi Metro besides a modicum improvement in air quality and average speed of the vehicles. Provision of more feeder services to increase metro ridership, facilities required at the stations, like drinking water, toilets, and escalators for old, sick and handicapped passengers, etc. have been recommended.



Erosion Control Measures for Border Roads at Rann of Kutch, Gujarat

Situated in western part of Gujarat, south of Thar Desert, Rann of Kutch is a salty desert type barren land, partly dry and partly marshy. Here, Arabian Sea water transgresses and regresses frequently, leaving inland marshy and swampy, dotted with small to very large salt water bodies. The Central Public Works Department (CPWD) and National Buildings Construction Corporation (NBCC) have been entrusted the responsibility of constructing border fencing, border roads, link roads and other related structures along India's border at Gujarat. These works have been partially completed.

During the monsoon of 2006, unprecedented rainfall occurred in the border areas of Gujarat and Rajasthan. As a result, large areas were inundated and flood water overtopped the border road and border link road at many locations causing heavy damage to the pavement, shoulders and embankment slopes. The road embankment height is quite less for a major portion of these roads.

Overtopping of the road pavement by flood waters was reported from some locations. The ponded water continued to erode embankment side slope owing to severe wave action.

CRRI team undertook extensive field investigations to record the damages suffered by the road pavement/embankment. The measures suggested are broadly based on vulnerability of embankment, which in turn depends on the extent of flooding expected in a particular area. Toe wall construction protects the embankment from erosion owing to wave action. Construction of masonry or gabion toe wall, use of revert mattresses, geotextiles, stone aggregate rip-rap, etc. have been suggested depending upon site conditions. Sections which were severely eroded, some times leading to total wash out, require reconstruction. Length of such sections is about 15% of the total length. In the less vulnerable areas (which experienced rill erosion and toe cutting) there is a need to raise the toe wall level to 0.3m above HFL and to prevent side slope erosion, aggregate rip-rap has been proposed.

It was also noted that due to construction of gabion/masonry toe wall, stability of embankment improves which would considerably reduce the erosion owing to wave action. The recommendations have been under active consideration of the concerned authorities.

MERADO's Technology of 'Semi-continuous Biodiesel Plant released to M/s Fab Con Engineers, Chennai

The Mechanical Engineering Research And Development Organization (MERADO), Ludhiana, released the technology of semi-continuous biodiesel plant of 600 litres per day capacity to M/s Fab Con Engineers, Chennai, a leading company of the country in the field of bio-fuels, on 4 February 2009. The agreement was signed by Mr R. Jagannathan, CEO of M/s Fab Con Engineers and Cdr.(Retd.) V.R. Dahake, Scientist-in-Charge, MERADO.

Speaking on the occasion, Cdr. Dahake said that the development of the technology was the outcome of a well-coordinated team work and stressed that it should continue to accomplish the tasks in future endeavors as well.

Mr R. Jagannathan expressed his full satisfaction and appreciated the MERADO staff for building his confidence for taking this technology. Mr Bimal Kumar



Cdr. V.R. Dahake, Scientist-in-Charge, MERADO, and Mr R. Jagannathan, CEO, M/s Fab Con Engineers, Chennai, displaying documents of agreement after signing. Others seen (from left) are: Mr S. Salman Mojiz, Head, BDG; Dr K. Kundu, Project Leader; Mr Chaterjee and Dr P. Rajan of MERADO

Surekha, Executive Director of Namrata Agrotech Ltd, Mirzapur, U.P. who was present on the occasion, also appreciated the technology and showed keen interest.

Mr S. Salman Mojiz, Head, Business Development Group of MERADO, said that the technology has a great advantage over the conventional technologies as it can produce bio-diesel from any edible and non-edible vegetable oil crop like *Jatropha*, *Karanj*, *Neem*, *Mahua* and used cooking oil irrespective of it's

FFA content, while most of the technologies available abroad are based on edible oils only.

The licensee will be definitely benefited by this technology which will help them achieve efficient and effective results. Mr Mojiz said. MERADO is committed to move forward by synergizing its efforts with its licensees and would provide all possible support in imbibing the technology. MERADO strictly

believes in continual improvement in its technologies and services. Release of the bio-diesel technology is a milestone in its journey, Mr Mojiz added.

Dr K. Kundu, Project Leader, thanked M/s FAB CON Engineers, for showing interest in the technology and taking it up for commercialization. He also thanked his team members and other staff members who helped him directly or indirectly in developing this unique technology.

Development of Methodology for Emergency Repair of Airfield Pavements

Emergency repair of airfields is

required to be carried out in very short time and at utmost priority. New developments in weapon technology with deep strike and increased demand in aircraft operations make existing crater repair procedures inadequate. The

institute conducted field trials for crater repair at Hindon and Jaisalmer Air Bases. The filling of central crater and deep adjacent area has been recommended by the use of recycled pavement aggregates of different sizes in layers.



CRRI has developed a cost-effective scheme for emergency repair of bomb crater during war time, using stabilized granular sub-base/base layers followed by a wearing course with cold mixes using cationic bitumen emulsion. Preliminary field trials based on the laboratory studies were carried out at Hindon Air Base, Ghaziabad and best formulations that emerged from the above trials have been tried at Jaisalmer (Rajasthan).

Feasibility Study on Use of Construction & Demolition (C&D) Waste in Road Works

Construction & Demolition (C&D) wastes generated during the construction, renovation and demolition of buildings and other structures constitute one of the largest waste streams in the world, and their management is a major concern and requires an effective management strategy.

To evolve avenues for utilization of C&D waste, especially in the area of road construction, CRRI pursued a project entitled 'Feasibility Study on Use of Construction & Demolition (C&D) waste in Road Works' as fill material, in stabilized form and as a component of concrete and bituminous pavement layer. This project has been sponsored by Municipal Corporation of Delhi (MCD). C&D waste collected from MCD dumping site was crushed, mechanically sieved in the crushing plant, and segregated to different size material – C&D aggregates, C&D aggregate (*Jeera* size, passing

6.3 mm size) and C&D waste powder. The feasibility of C&D waste has been evaluated by CRRI for following purposes:

Embankment Construction: The investigations showed that the powdered C&D waste used as the fill material usually contains particles bigger than size specified by MoRTH specification. It should be crushed to less than 75 mm size (max) before it can be used for embankment construction. In view of C&D waste being a non-plastic material, the embankments constructed using it would be prone to erosion. Thus, it was suggested that side slopes of embankments constructed using C&D waste should be protected against erosion by adopting suitable erosion control measures. Design of such embankments can be carried out in a manner similar to the earthen embankments.

Sub-base and Base Course Construction: Processed C&D waste (after crushing and sieving) can be used as a component material for sub-base construction. Being a free draining material, C&D waste material of proper gradation and CBR value can be used as such (without any admixture) for sub-base course construction of low volume roads. However since its crushing strength does not meet the specification requirements, its usage for roads having high traffic volume, may be restricted to lower half of the sub-base layer. Cement stabilized powdered C&D waste can be used to replace a part of WBM/WMM layers.

Rigid Pavement Construction: Admixing C&D waste aggregates in pavement quality concrete (PQC)

showed that in 28 days, compressive strength decreased by about 12% when 60% of C&D waste was replaced in the conventional hard stone aggregates. The decrease in compressive strength of DLC mix was more. About 50% replacement resulted in 28% decrease in 28 days compressive strength. Hence it is suggested that while designing concrete pavement using C&D waste aggregates, proper mix design using the available C&D waste aggregates and conventional hard stone aggregates is to be carried out and replacement of conventional aggregates by C&D waste aggregates may be restricted to about 35% depending on compressive strength to be achieved.

Use of C&D waste in bituminous layers was not found to be feasible. However, field performance of C&D waste needs to be studied by constructing test sections.

Real World On-road Emissions of In-use Vehicles Running on Diesel, Gasoline and CNG

Motor vehicles play a major role in deteriorating the urban air quality. However, the relationship between tailpipe emissions invariably falls short of explaining the resultant air quality. CRRI has taken up a study for systematically measuring the average mass emissions of selected pollutants for selected categories of vehicles on predetermined test routes (Delhi as a case study) covering dynamic traffic situations of urban area. The monitoring instrument being employed for the



OEM-2100 Montana system

study, OEM-2100 Montana System, is designed to measure vehicle mass exhaust emissions under actual on-road driving conditions using vehicle and engine operating data and concentrations of pollutants in exhaust gas sampled from the tailpipe. The OEM-2100 system typically sits in the passenger seat or on the vehicle floor, and provides second-by-second information regarding emissions, fuel consumption, vehicle speed, engine rpm and temperature, throttle position, and other parameters. The study will help in enhancing the knowledge regarding emissions from different vehicles using different fuel types and taking corrective measures towards reducing pollution.

Use of Copper Slag in Embankment and Road Construction

Consumption of huge quantity of naturally available materials like soils and aggregates in the ongoing NHDP projects has created severe scarcity of these conventional materials. This has resulted in long haulage of materials increasing the total cost of construction. Use of waste materials like coal ash from thermal power stations, slags from

steel, zinc and copper industries in road construction would provide an alternative to conventional materials.

Laboratory feasibility study carried out by CRRI on copper slag usage in embankment and road construction showed that the slag has potential for use in embankment fill applications, Granular Sub Base (GSB), Wet Mix Macadam Bases and Bituminous mixes. About 50-100% of copper slag can be used instead of soil in embankment construction, and about 20-30% of copper slag can replace fine aggregates in sub base, base and bituminous construction. Different design specifications have been developed with the use of copper slag in different layers. It was planned to construct experimental test tracks in the ongoing NHDP project at Tuticorin (NH-45B). The construction methodology and quality control procedures would be as per MoRTH specifications. The experimental test tracks would be subjected to actual traffic and environmental conditions and monitored for two years before recommending the same for large-scale field applications.

Environment-friendly Cold Mix Technology for Construction of Roads

CRRI has developed environment-friendly cold mix technologies for the first time in India for different specifications such as Bituminous Macadam (BM), Semi Dense Bituminous Concrete (SDBC), Mix Seal Surfacing (MSS), Two Coat

Surface Dressing (TCSD) and Premix Carpet (PMC), using hot mix plant, paver and other conventional machineries generally used for road construction in desert, high rainfall and snow-bound areas. The institute has wide experience on the construction of roads using emulsion-based cold mix technologies in wet and inclement weather. These cold mixes can be produced either by using concrete mixer or in hot mix plant without heating facility. The paver and other construction machineries, as are normally employed for hot mixes, can be successfully used for execution of these works.

The field trials have been carried out on Jammu-Srinagar Highway on NH-1A near Srinagar (J&K) under cold and snow bound areas; Dantaur-Khajuwala Road near Bikaner in Rajasthan and in Aizawl-Mizoram (N.E. region) under heavy rainfall.

The advantages of cold mix technology are:

- Construction of binder course and wearing course (BM, MSS and SDBC), using bitumen emulsion is feasible in all weather including wet condition;
- This technology is environment-friendly and energy-efficient as heating process is not required;
- Performance of road with emulsion has been found to be satisfactory even after five years of service;
- Reduction in crack propagation to overlay when emulsion is used; and
- The cost of road construction



with emulsion is about 10-15 % less than the hot mixes.

The tentative specifications of BM, MSS and SDBC have been submitted to Indian Roads Congress for their finalization.

Use of Chemicals for Stabilization of Soils

Use of stabilizing materials in sub-grade and other layers would definitely reduce the total crust thickness/cost of construction of road pavement. With this objective, CRRI has carried out feasibility study on three new soil stabilizers for road construction, viz. RBI-81, Renolith and FS Emulsion.

RBI is an inorganic stabilizer. It is a fine grey-white powder, composed of natural hydraulic inorganic materials. Different type of soils such as gravelly, sandy, silty and clayey were stabilized with RBI – 81 stabilizer (2-12%). Laboratory investigation of stabilized soils with regard to their unconfined compressive strength, CBR and durability was carried out. Based on the laboratory results, different specifications were evolved for pavement layers of stabilized soils such as for sub-base layer-gravelly soil with 6% and silty soil with 4% stabilizer content, base layer-gravelly and silty soils with 8% stabilizer content and shoulder layer – all selected soils stabilized with 2% stabilizer content.

Renolith is a polymer-based product, composed of latex with cellulose and available in liquid form. Different type of soils such as stone dust, coarse sand, silt, laterite and

80% laterite + 20% fly ash were selected. These soils stabilized with cement and cement + renolith solution. The amount of cement used in the stabilization of soils was 5%. The amount of renolith used was 6% of amount of cement used. Laboratory investigation of stabilized soils such as unconfined compressive strength, CBR, flexural strength and durability test, showed that renolith stabilizer has no effect on the strength and durability test and also on the strength of cement stabilized soils.

FS emulsion is a specially formulated liquid additive. Different types of soils such as coarse sand (Badarpur sand), fine sand (Yamuna sand), silt and mix of 50% silt+ 50% Yamuna sand were stabilized with cement and cement + emulsion. The amount of cement used in the stabilization of soils was equal to optimum moisture content. Laboratory investigation of stabilized soils, such as unconfined compressive strength, CBR and durability test, showed that silt soil stabilized with cement + emulsion may be used for sub-base layer of pavement construction and has no effect on other soils studied.

Advanced Parking Management System (APMS)

To help meet the huge parking demand in metropolitan cities, there is an urgent need for Advanced Parking Management System in prominently dense, commercial areas of such cities. CRRI has taken initiative and sponsored such a system to be installed at Palika

Bazar, one of the major commercial centre of Delhi. The APMS installed at Palika Parking disseminates information on parking lot usage through Variable Message Signs (VMS). Statistics from a survey reveal that a large percentage of users have been benefited through VMS boards and many are willing to switch over to smart card payment system. Due to better management, there has been an increase in the number of two-wheelers and four-wheelers in the parking lot. This has resulted in an overall increase of about 24% in revenue generation.

It has been further proposed that the information from the system such as parking location, cost, reservation, etc. be also transmitted via mobile networks and FM radio; to use VMS inside the parking to guide the driver to a vacant space, thereby reducing congestion within the lot; and also to carry out economic viability of the system.

Development of Management System for Maintenance, Planning and Budgeting of High Speed Road Corridor

The country loses approximately Rs 12,000 crore per annum owing to excessive vehicle operating costs, which mainly depend on rideability level and extent of distress on roads. There is a need to develop a system which would enable engineers and decision makers to pre-conceive fund requirements for maintenance of the road network. Under the Eleventh Five Year Plan of CSIR, a

study has been undertaken on the Development of Management System for Maintenance Planning and Budgeting of High-speed Road Corridors, which would be capable of:

- Estimating the budget requirements and make logical decision about the allocation of funds within constrained budgets for pavement maintenance.
- Deciding the optimal maintenance of road network in order to bring them to a desired level of servicing within the given budget scenario.
- Carrying out distress diagnostics, performance evaluation & rehabilitation and retrofitting of bridges.

The developed system will assist in reduction of avoidable losses occurring every year on account of using maintenance fund judiciously and in prioritizing the maintenance treatments in view of limited resources.

Bridge Management System for Concrete Highway Bridges

Infrastructural management of key assets requires knowledge of their health and early warning of structural distress for timely and proper maintenance. Towards this goal, an R&D project entitled 'Distress Diagnostic, Performance Evaluation and Bridge Management System for Concrete Bridges' has been taken up at CRRI with support from DST, New Delhi. The following three tasks have been

completed under the project:

- (a) Development of visual inspection mobile unit
- (b) Bridge distress diagnostic system
- (c) Performance evaluation of highway bridges including degradation modeling and assessing their remaining life.

The outcome of the project would be a unique software, extremely useful in distress diagnostics, rehabilitation and management of highway bridges in India.

The visual inspection mobile unit is a truck mounted mechanical device which has been designed in collaboration with MERADO (CMERI), Ludhiana, considering commonly available 2/3 lane bridges on National highways. The unit-structure is a frame consisting of hollow tube sections. It consists of several mechanical joints to facilitate the desired movement of the platform underneath the deck namely, the launching mechanism along with support, resting on platform, vertical translatory motion of the mast, a mechanism facilitating the lower arm (platform) to rotate in a horizontal plane for wider coverage of inspection and the folding and variable length of the working platform. Operating conditions have been considered while designing the support system for the unit. The fabrication of the prototype is under progress.

The Bridge Distress Diagnostic software is capable of analyzing the data obtained by inspection and reports the severity of damage. Depending on the severity of damage, decision on further

investigations required is also specified by the software. It is also capable of identifying the distresses in RC T-girder bridge superstructure with the help of analysis of inspection data and subsequent confirmation of causes of deterioration from results of appropriate tests.

Studies on Composite Pavements — Design, Construction and Maintenance

To evolve alternative crust composition, and develop new construction materials and technology, CRRI has constituted a group to carry out studies on composite pavement, i.e. design, construction and maintenance aspects of rigid pavements laid over flexible and vice versa, including laying of these on stabilized layer/ low cement bound concrete mixes.

Patents Filed

CRRI has filed following patents in the recent past:

- Design of Trail Suspension Bridges (TSBD.FOR) – A computer-aided design which would result in considerable saving of times in addition to the refinement and economy.
- No Mobile When Mobile – Educative film showing how use of cell phone can cause unsafe condition on road, based on research finding, and provides some useful safety tips to use cell phone more sensibly.



NEIST Know-how Transfer Agreement with M/s Ahimsha Chemicals Ltd, Nalbari

The North East Institute of Science & Technology (NEIST), Jorhat, has signed agreement with M/s Ahimsha Chemicals Ltd, Nalbari for transfer of its know-how for

- Production of green tea polyphenols from Assam tea on as is where is basis at laboratory scale (10g of tea leaves). (Knowhow fee : Rs 4 lakh)
- Engaging NEIST as consultant for a series of tasks in connection with implementation of the knowhow for production of green tea polyphenols from Assam tea. (Total cost : Rs 4 lakh)



Technology package on Green Tea Polyphenols being handed over to the representative of M/s Ahimsha Chemical Ltd, Nalbari, Assam, by Dr P. G. Rao, Director, NEIST

Scientific Meet on Gyro-devices (SMG-2008)

The Central Electronics Engineering Research Institute (CEERI), Pilani, organized a scientific meet on Gyro-devices in the recent past. Dr Lalit Kumar, Director, MTRDC, was the Chief Guest and Prof. S. K. Srivastava and Prof. R. K. Jha were the guests of honour on the occasion. Dr Chandra Shekhar, Director, CEERI, Pilani, presided over the function.

In his inaugural address, Dr Lalit Kumar outlined the Gyrotron related R&D activities in India. He lauded the former Director Dr Amarjit Singh's farsightedness for these Gyrotron related activities during his tenure (1960s through 1980s). Although the efforts by him could not take off due to non-availability of funds and dedicated

technical manpower but the efforts by Prof. R.K. Jha, Prof. S.K. Srivastava, Prof. B.N. Basu and Dr Lakshman Prasad brought this research activity to the main stream. These days, a lot of technical manpower is there in the country and these devices should reach the users, he stressed. Dr Kumar also released a brochure entitled '*Gyrotron Devices – A Profile*' on this occasion. Prof. S.K. Srivastava lauded the contributions of Prof. B.N. Basu and Prof. R.K. Jha towards Gyrotron activities in the country. He suggested forming more research groups to bring awareness on the applications of Gyro-devices in the country. Today, there is no dearth of sponsorship, but need to add more people to execute

these R&D activities. He also suggested organizing this kind of meets at frequent intervals at various locations in the country as these would pave the way to plan and execute various activities in the area.

Prof. R.K. Jha appreciated the overwhelming support from the experts to the Gyrotron activities. He called for viewing the progress of various R&D activities in the area in totality and move ahead. He remembered the great visionary Dr Amarjit Singh on this occasion and wished all success to Dr Chandra Shekhar and Dr A. K. Sinha, Project Leader (Gyrotron).

Dr Chandra Shekhar said that today CEERI was fortunate to have experts and reviewers on Gyro-



Dr Lalit Kumar presenting a memento to Prof. S.K. Srivastava



Prof. R.K. Jha inaugurating Gyrotron Laboratory

devices. “We realized the importance of these devices and started preliminary work on them. Now, we have sponsors and dedicated manpower to carry forward all its related activities. This is the time that we should develop and transfer this technology to the users so that our presence is established at international level. Only a few countries in the world have the know-how on the design and technology of Gyro-devices. We are proud that our country is a member of International Thermonuclear Experimental Reactor (ITER),” he added. Even though sufficient research manpower is not available in the specialized field of Gyrotron, this institute is making all-out efforts to attain its goals. During the current Five Year Plan, a lot of importance has been given to Gyro-devices and significant achievements are expected to come in another 5 to 10 years.

Earlier, Dr S. N. Joshi, Chairman, Organizing Committee, while welcoming the guests and delegates, explained the aims and purpose of the SMG. He

remembered the contributions of Dr Amarjit Singh to the field of microwave tubes. He informed that a multi-institutional project sponsored by DST on ‘Design and Development of 42 GHz 200 kW (CW) Gyrotron’ was started in 2006 with the participation of IIT-Roorkee, BHU-Varanasi, SAMEER-Mumbai, IPR-Gandhinagar and CEERI-Pilani. CEERI is the nodal agency for this project. He specially thanked Dr Lakshman Prasad, Advisor, DST, for promoting this activity. Under the Eleventh Five Year Plan, CEERI has taken up another R&D project on 120 GHz 1.0 MW Gyrotron sponsored by CSIR. CEERI has been establishing a full-fledged Gyrotron laboratory for developmental work.

Dr A.K. Sinha, Coordinator of the meet, gave a brief description about the Gyrotron R&D status in CEERI and also read out a message received from Dr Amarjit Singh (from USA) on the occasion. Dr Lalit Kumar and Dr Chandra Shekhar presented mementoes to Prof. S.K. Srivastava and Prof. R.K. Jha. Dr Vishnu Srivastava, Head, Microwave Tubes Division,

proposed the vote of thanks.

Prof. Jha inaugurated the newly established Gyrotron Laboratory after the function.

Sixteen invited talks on Gyro-devices were delivered in three technical sessions. In the concluding session, a panel discussion by Dr Chandra Shekhar (CEERI), Dr Lalit Kumar (MTRDC), Dr S. Kulkarni (IPR), Prof. P.K. Jain (BHU), Shri Rajiv Sharma (DST), Dr Vishnu Srivastava (CEERI) and Dr S.N. Joshi (CEERI) on ‘Gyro-devices – Indian Context,’ was held. The panel recommended the following:

- Introduction of subjects on Gyro-devices and their applications in engineering courses
- Development of human resource in microwave tubes through special drives
- Greater participation of research students, scientists and industry in R&D activities pertaining to Gyrotron
- Development of Gyrotrons for nuclear fusion reactors to meet present and future energy needs of the country.



CSIR RSWNET Programme

Inauguration of *Samadhan Kendras* in West Godavari District of Andhra Pradesh

The *Samadhan Kendras* are Rural Information Technology Centres set up for the benefit of community in rural areas. These are integrated internet-based with user-friendly software aimed basically to cater to the needs of the rural farmers. Four NGOs were selected based on their past track record in executing the government sponsored projects and based on their performance they were selected to run the *Samadhan Kendras* initiated by Indian Institute of Chemical Technology (IICT), Hyderabad, under the CSIR RSWNET Programme. Each *kendra* is designed to cater to the needs of 20 villages situated in and around the *kendra*.

Four such *kendras* were inaugurated in the West Godavari District in Andhra Pradesh on 13-14 November 2008. On this occasion a farmers' awareness meet was also arranged at each *kendra* involving the local village heads, agriculture officers of the A.P. State Government and progressive farmers. The objective of

the meet was to explain to the farmers how they can get authentic information to solve their day to day problems pertaining to their agriculture practices, and whole lot of other information related to procurement of seeds, fertilizers, pesticides, availing loans offered by nationalized banks. In due course of time information pertaining to other needs of the local populace would be included in the software for better dissemination of information.

The following Non Governmental Organizations in the West Godavari District have been selected to run the *Samadhan Kendras*:

1. Ganesh Rural Development Society, Prattipadu, Gudem Mandal
2. Dedication for Education. Economic Development Society, Nallajerla, Gudem Mandal
3. Geetha Sai Rural Development Association, Pydiparru Tanuku Mandal
4. Grameena Mahila Vikas Society, Balusumudi, Bhimavaram.

- The *kendras* were inaugurated by the respective local village heads/ progressive farmers, in the presence of Dr U.S.N. Murty, Project Leader and Head, Biology, IICT and his team members.



Shri Krishna Rao, Village President, addressing the gathering during inauguration of the *Samadhan Kendra* at Nallajerla village

Union Commerce and Power Minister Shri Jairam Ramesh visits NEIST

Shri Jairam Ramesh, the then Minister of State for Commerce & Industry and Power, Government of India, paid a visit to North East Institute of Science and Technology (NEIST), Jorhat, on 9 December 2008. He took particular interest in the Geosciences Division and had discussions with the scientists on current research activities of the

Division. Dr P.G. Rao, Director, NEIST and Dr Harsh Gupta, Chairperson of the institute's Research Council, who was also present, gave their views on the probable major earthquakes in future in the the Himalayan belt.

Shri Ramesh was happy to take a glimpse of the Central Recording Observatory for On-line/Real-time

Seismic Monitoring, and insisted that NEIST should get prepared in a much bigger way with due emphasis on environmental impact analysis since the Union Ministry has cleared the proposals for several Hydro Electrical Power Projects in Arunachal Himalayas. He ensured all financial support for a mega project on Seismicity of NE India on priority.

CPYLS at NISCAIR and NISTADS

The two-day 'CSIR Programme on Youth for Leadership in Science (CPYLS)' was jointly organized by National Institute of Science Communication and Information Resources (NISCAIR) and National Institute of Science Technology and Development Studies (NISTADS), New Delhi, on 15-16 January 2009. The programme was attended by eight meritorious students from various schools of Delhi and Uttar Pradesh along with their parents and teachers. Dr Vinay B. Kamble, Director, Vigyan Prasar, delivered the inaugural address. Dr Vikram Kumar, the then Director, NISCAIR and Dr Parthasarthy Banerjee, Director, NISTADS, also addressed the students in the inaugural function which was also attended by senior scientists from both labs. Smt. Deeksha Bist, Coordinator, CPYLS, NISCAIR, in her welcome address outlined the objective of the programme and the importance of science in today's world.

In the inaugural address, Dr Kamble emphasized the relevance of science in our day to day life. He called upon the students to think and live scientifically. He explained the difference between a good leader and a good manager. He asked students to become leaders in identifying problems in the society and removing them scientifically. He emphasized, through examples and real stories, on the importance of science in removing superstition from the society.

Dr Vikram Kumar, in his speech, mentioned about various inventions of CSIR and their importance in the life of common man. He highlighted specifically the recent contribution of CSIR — the development of 'Solar Rickshaw', the 'solar powered' cycle-rickshaw' and various other achievements of CSIR to help the common man.

Dr Parthasarthy Banerjee asked the students to pursue career in science not as a profession only for monetary purpose but to cherish it as bliss to



Seen on dais during the CPYLS (from right) are: Dr Parthasarthy Banerjee, Dr Vinay B. Kamble, Dr Vikram Kumar and Smt. Deeksha Bist



Participants of CPYLS with their parents and teachers

humankind. He also appreciated the interest of participating students in varied scientific fields.

Dr Naresh Kumar, Coordinator, CPYLS, NISTADS, proposed the vote of thanks.

The inaugural session was followed by the interactive sessions on the topics: 'CSIR contributions in the field of science' by Dr B. C. Kashyap, Head, Popular Science Division, NISCAIR and 'What is information technology' by Ms Ruma, Research Intern, IT Division, NISCAIR. In addition to some major accomplishments, Dr Kashyap highlighted the CSIR efforts towards S&T Human Resource Development in the country. Ms Ruma discussed the importance of



Information Technology in today's world and the flow of information on wireless networks. Mr H. J. Khan, Editor, *Science Reporter*, gave a lecture on 'Popular Science Writing'. The theory sessions were followed by a visit to Raw Material Herbarium Museum (RHM) in NISCAIR, where Dr H. B. Singh, Head, RHM, explained various exhibits of the museum. Dr K. K. Kakkar and Dr K Y Kavathekar, Coordinators of the Periodicals Division, explained the various steps involved in the publication of research journals.

On second day, the students visited the Graphics Art Division of NISCAIR. Shri Pradip Banerjee, Head, Print and Production, interacted with the students on the use of multi-media in information science and technology. Smt. Neeru Sharma, Technical Officer, told students about the formatting of popular science magazines and books. Shri Shiv Markan, Head, DTP, spoke about the steps involved in making the pages ready for printing. In the Printing Division, Mr Nagpal and Mr Pramod Sharma demonstrated various steps involved in the single/four colour printing on the machine. Following the visit, Dr Gauhar Raza, Scientist, NISTADS, made a presentation on evolution of mankind and advancement of science. Starting from the 'big-bang theory' to evolution of earth and the human beings and finally to the existence of present world, he pointed out the ultimate importance of science in the existence of today's world. The students were then taken on a visit to NISCAIR, S. V. Marg Campus. There Mrs Renu Arora, Head, Education and Training Division, took students on a round of the National Science Library (NSL). Mr Prakash Chand spoke about the e-Journal Consortium and open-access activities of NSL NISCAIR. Ms V.V. Lakshmi, Coordinator, SAARC Documentation Centre (SDC), talked about the activities of SDC and National Science Digital Library (NSDL).

The visit was followed by the valedictory function at S V Marg Campus. The function was presided over by Mr Pradip Banerjee, Scientist 'G' and Head, Print and Production Division, along with other senior scientists from NISCAIR. Mr Banerjee in his speech called upon the students to brighten their future in the field of science and technology. All the students appreciated the programme. Mr Banerjee facilitated the participating students with certificates and sets of books published by NISCAIR. Mrs Renu Arora, Coordinator, CPYLS, S. V. Marg Campus, NISCAIR, proposed the vote of thanks.

'CSIR in the service of North East'

NEIST organizes CSIR Stall in Pride of India Expo at ISC

The North East Institute of Science and Technology (NEIST), Jorhat, participated as the nodal organizing laboratory for the 'Theme pavilion — CSIR in the service of North East States' in the Pride of India Expo of 96th Indian Science Congress held at North East Hill University Campus, Shillong, Meghalaya, during 3-7 January 2009. The pavilion was a unique platform to showcase the CSIR contributions to the development of North East region. In view of NEIST being the only CSIR institute in this region, and which has made significant contribution towards the development of the region, the Director General, CSIR, had directed NEIST to coordinate and manage the pavilion on behalf of CSIR. Accordingly, the institute took upon itself to organize the exhibition stall at Shillong which was named as 'CSIR in the service of North East'.

The design of stall and display of posters and products was planned by NEIST. The stall emphasized on the R&D activities and technologies/products developed by NEIST and other CSIR laboratories relevant to North East region. The main aim was to make researchers and entrepreneurs aware of the technologies and agro-practices developed and already transferred for commercialization by these institutes and the ready-to-be-commercialized technologies. Some of the key technologies/products of NEIST and its branch laboratory at Naharlagun, Arunachal Pradesh and sub-station Imphal, Manipur, displayed were high strength proppant, green tea polyphenol, citronella distillation unit, low dust chalk pencil, mosquito repellent herbal agarbati, banana fibre products, liquid deodorant (Biokleen and Glaze), and bacterial formulation for crop



From left: Dr T. Ramasami, Secretary, DST and General Secretary, ISCA; Dr R.A. Mashelkar, former DG, CSIR; Prof. S.K. Brahmachari, DG, CSIR at the '*CSIR in the service of North East*' stall in discussion with Shri B.C. Saikia, Scientist, NEIST

enhancement & yield improvement. Scientists, technical officers and research students of NEIST explained and gave demonstration of the technologies to the visitors. Besides NEIST, other CSIR laboratories whose products were displayed included CIMAP, Lucknow, CLRI, Chennai, CSIO, Chandigarh, IMMT, Bhubaneswar, and NEERI, Nagpur. CIMAP displayed a wide range of its herbal based formulations like *Skinpro* broad-spectrum antifungal cream, *Mosaway* Mosquito repellent cream, *Geranium active* Herbal based anti-dandruff shampoo, *CIM Paushak* a scientific awaleh, etc. IMMT, Bhubaneswar displayed its low-cost 'Terafil' water filter whereas CLRI, Chennai displayed leather & non-leather products.

The technologies displayed by CSIO at ISC-Shillong (CSIR 800'stall) included: Myoelectric arm, Portable reading machine for the blind and Digital Moisture Computer. The people from Medical, Agricultural and Social fraternity showed special interest in the technologies developed by CSIO.

The '*CSIR in the service of North East*' stall was a grand success. The stall was visited by a large number of distinguished scientists and personalities from different scientific and research institutes, education and government departments of different states of India, entrepreneurs, researcher and students from various schools, colleges and common people. Dr R.A. Mashelkar, Former DG, CSIR; Prof. S.K. Brahmachari, DG, CSIR; Dr T. Ramaswami, Secretary, DST; Prof. Pramod Tandon, VC, NEHU; Dr SM Paul Khurana, VC, R. D. University, Jabalpur; Dr Naresh Kumar, Head, RDPD, CSIR, Dr B.K. Mishra, Director, IMMT, Bhubaneswar; Prof. G.D. Sharmah, PVC, Assam University, Former VC, Nagaland University, were some among the distinguished visitors. They highly praised the NEIST activities and other labs' effort for the development of the region. People from NGOs, NRDC and other public and private sectors showed interest in rural technologies. Over 4000 people

including students, entrepreneurs and others visited the CSIR stall.

It is worth mentioning here that the focal theme for this year's congress was *Science Education and Attraction of Talent for Excellence in Research*. The congress was inaugurated by the Hon'ble Prime Minister Dr Manmohan Singh. Dr T. Ramaswami, the ISCA General Secretary and Secretary, Department of Science & Technology and Earth Sciences, GOI, welcomed the gathering. Nearly 5000 scientists and scientific and research workers from all over India participated in the various sessions of the congress. The Prime Minister in his inaugural speech announced a higher allocation in science 2% from national income compared to 1% earlier. He also announced that the parliament has set up a new Natural Science and Engineering Research Board which will be responsible for major scientific research finding in the country. It is expected that the Board would bring in major changes in the scientific research scenario of the country in the coming times.



Dr Gangan Prathap takes over as Director of NISCAIR

Dr Gangan Prathap has been appointed Director of the National Institute of Science Communication and Information Resources (NISCAIR), New Delhi, w.e.f. 23 February 2009. A Shanti Swarup Bhatnagar Prize-winner in Engineering Sciences for the year 1990, Dr Prathap was Vice Chancellor of the Cochin University of Science and Technology (since 4 February 2008) and before that, Scientist-in-Charge of CSIR Centre for Mathematical Modelling and Computer Simulation (C-MMACS), Bangalore (since April 2000).

Dr Prathap (born, 6 June 1951) has had an outstanding academic career. He did his schooling in Singapore (First rank in School - Raffles Institution, Singapore 1968), Pre-University from Madras Christian College (First rank, 1969), and B.Tech. (Aero Engineering) and Doctorate from IIT-Madras (National Prize for First rank in Joint Entrance Exam to IITs 1969; President of India Prize for First rank in B.Tech. Degree Course IIT-Madras 1969-1974; and Institute Fellowship for Doctoral research, August 1974 - February 1977). He served as Research Assistant, Fibre Reinforced Plastics Research Centre, IIT-Madras (March 1977 - August 1978); Research Associate, National Aeronautical Laboratory (NAL), Bangalore, (September 1978 - August 1980) and Scientist, NAL (August 1980 - April 2000) before taking over as Scientist-in-Charge of C-MMACS in April 2000. During June 1983-September 1984, he was deputed as a DAAD Exchange

Fellow, DLR Institute of Structural Mechanics, Braunschweig, Germany.

During the past 30 years of his research career, Dr Prathap has published 90 papers in international journals; 70 reports, technical memoranda, papers at symposia and conferences, etc. (one paper with over 80 citations, 18 papers with over 10 cumulative citations and 34 papers with over five cumulative citations). Of these, about 30 papers are in the area of non-linear structural mechanics - he contributed a definitive resolution to the long standing controversy regarding the physics and mathematical modelling of the non-linear vibrations of thin shells, provided a clear insight into the controversial use of the Berger approximation in non-linear structural mechanics, provided a definitive clarification about the correct way to model the in-plane deformation and to interpret the non-linear frequencies in a finite element model of non-linear beam and plate vibrations and resolved the controversy about whether finite element models could recover the second spectrum of the Timoshenko beam theory.

His contribution pertaining to founding the basic principles of science of the finite element



formulation of constrained multi-strain field problems - statement of conceptual scheme, definition of the appropriate vocabulary for this new area, design of operational procedures to remove inconsistencies in constrained strain-field definitions and for error analyses, etc. and the design and development of a library of field-consistent elements, earned him the Bhatnagar Prize for Engineering in 1990.

His other major accomplishments relate to: finite element analysis of composite structures - development of FEPACS - a general purpose package for analysis of composite structures, Development of finite elements based on higher order theories, Studies on finite element modelling of structural dynamics and Production run stress analysis of aircraft structures.

He was a Consultant to the AR and DB project 'Non-linear analysis of anisotropic multi-layered structures using the finite element method' at IIT-Madras under Drs K. A. V. Pandalai and T. K. Varadan, and Advisory consultant to a project 'Stress and vibration analysis of turbine blade/shroud arrangement' with GTRE, Bangalore.

He has published a very well received book titled *Finite Element method in Structural Mechanics*, Kluwer Academic Publishers, Dordrecht, Holland, 1993; a review article 'The Displacement Type Finite Element Approach - From Art to Science,' *Progress in Aerospace Sciences*, (an International Review journal), 295-405 (1994); and guest



edited a special issue of *SADHANA* on Computational Structural Mechanics, Vol. 21 Part 5, Oct. 1996.

In addition to the most coveted S&T award in the country, the Bhatnagar Prize, Dr Prathap has won several other prestigious honours/awards which include: Associateship of Indian Academy of Science in 1985, NAL Foundation Day Award for Outstanding Contributions to Basic Research 1988, Honorary Senior Fellow, Jawaharlal Nehru Centre for Advanced Scientific Research, Bangalore, Distinguished Alumnus Award of Aero. Soc of India 1996, for best Aero. Engg. Alumnus of IIT-Madras, and Distinguished Alumnus Award 1999 of IIT-Madras.

Dr Prathap is a Fellow of the Indian Academy of Sciences, Fellow of Indian National Science Academy, Life Member of the Indian Society for Theoretical and Applied Mechanics, Life Member of the Indian Society for Advancement of Materials and Process Engineering, Founder Life Member of the Indian Society for Mathematical Modelling and Computer Simulation, and Member, Current Science Association.

Dr Prathap has served as member of numerous committees which include: International Panel of Reviewers of *Applied Mechanics Reviews*; Divisional Advisory Committee, Department of Aero. Engg., IIT-Madras; Management Committee of NAL; Indian National Committee for International Union of Theoretical and Applied Mechanics (IUTAM), General Assembly, IUTAM; Research Councils of CMRI-Dhanbad and SERC-Chennai; Governing Council,

INCOIS, Hyderabad; DOD Steering Committee for INDOMOD and SATCORE; DST Steering Committee on HRD in Earth Sciences; DOD Steering Committee for National Data Buoy Programme; Advisory Committee, C-MMACS; Technology Advisory Board for Engineering Sciences & Technology, CSIR; Engineering Sciences Research Committee, CSIR; Expert Committee on Engineering, CSIR; Publications Committee, Indian Academy of Sciences, 1992-94; Sectional Committee for Engineering and Technology, Indian Academy of Sciences, 1995-99; Review Committee on PG Education in Engineering, AICTE; Board of Research in Nuclear Sciences Panel and Editorial Boards of *RESONANCE*, *International Journal for Engineering Analysis and Design*, *Computer Modelling & Simulation in Engineering*; *International Journal of Computational Engineering Science*, and also as Editor of *SADHANA* and *Journal of Engineering Sciences*, and Associate Editor of *J. Aero. Soc. of India*.

His vision for NISCAIR is to transform it into a national repository of current and traditional knowledge using the latest computer and web technologies and also act as a think tank to plant the nation's future thrust areas in creation of new knowledge and wisdom. The noblest things one can do, said philosopher Bertrand Russell is "to enlarge the fund of human knowledge and diminish the sum of human misery". This could very well be NISCAIR's motto.

CSIR Pavilion wins Award

The CSIR pavilion set up at the 'Pride of India Expo' during the 96th Indian Science Congress held at Shillong from 3 to 7 January 2009, was awarded for being the 'Most Innovative'.

The pavilion showcased CSIR initiatives under the CSIR 800 Programme which is specifically targeted to benefit those 800 million, who are "the bottom of the pyramid of the quality of life." The CSIR 800 Programme is geared to help fulfil Mahatma Gandhi's expectation: "Just as some of the experiments in your laboratories go on for all the twenty-four hours, let the big corner in your heart remain



Prof. Promod Tandan, Vice Chancellor, NEHU, Shillong and Chairman, Organizing Committee, 96th Indian Science Congress, handing over the 'Most Innovative' award for CSIR Pavilion to Mohd. Asif Akhtar, Unit for Science Dissemination, CSIR



Appointments/Honours & Awards

perpetually warm for the benefit of the poor millions.”

CSIR seeks to use S&T interventions for inclusive growth through: Potable water for all, Low-cost housing, Affordable drugs, Diagnostics & Biomedical instrumentation, Wealth from waste, Sustainable energy, Empowerment by way of extensive use of ICT, Value addition to agricultural products, Entrepreneurship development, etc.

Representatives from CIMAP, CMERI, CSIO, CSMCRI, IMMT, NEERI, NEIST, and NISCAIR also participated in this event.

Shri Umesh Tiwari gets the Best Paper Award in International Conference on Fiber Optics & Photonics

Shri Umesh Tiwari, Scientist, Central Scientific Instruments Organisation (CSIO), Chandigarh, has been awarded the OSA/IEEE LEOS/SPIE best student paper award, for his paper ‘Characterization of a novel Raman/EDF Hybrid amplifier with enhanced performance presented in International Conference on Fiber Optics and Photonics held at IIT Delhi during 13-17 December 2008.

The paper deals with detailed experimental characterization of a new

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Raman-Erbium doped fiber (EDF) hybrid amplifier design. The hybrid amplifier is characterized in terms of single-channel gain and noise figure, and the results of measurements are shown to be in close agreement with the simulated results. Polarization dependent gain (PDG) characteristics of the Raman/EDFA hybrid amplifier

have also been presented. The author showed that the performance characteristics of the proposed hybrid amplifier are better than those reported earlier. The paper is co-authored by K. Thygarajan and M.R. Shenoy of IIT, Delhi.

The award carries a cash prize of US\$ 200.00 and a certificate.