

# CSIR NEWS

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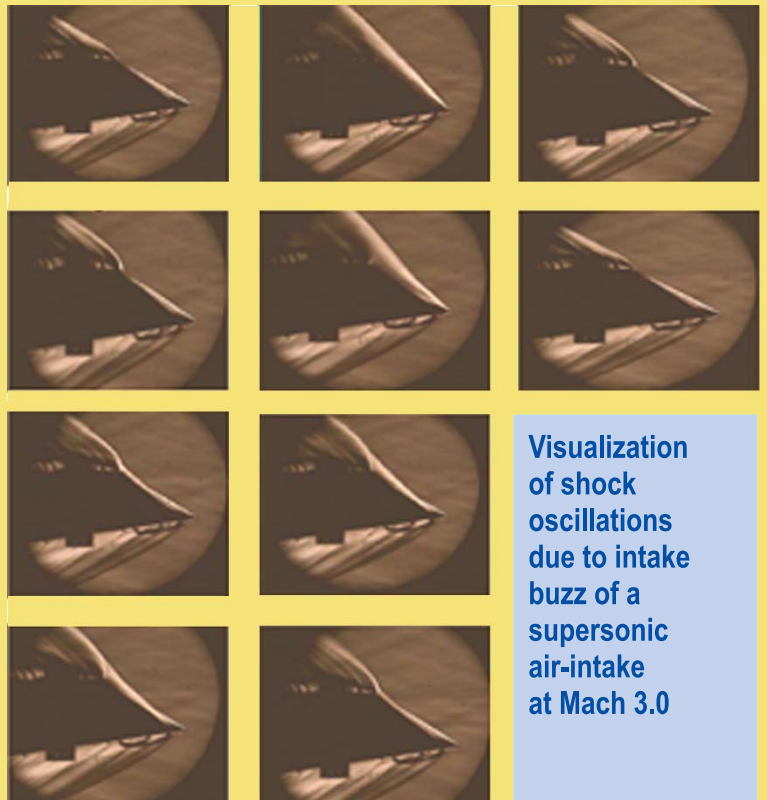


VOL 59 NO 19 & 20, 15 & 30 OCTOBER 2009



## Visualization of supersonic air-intake buzz using high speed digital camera

The National Aerospace Laboratories (NAL), Bangalore, has designed a supersonic air-intake to convert the total pressure in the free-stream into high static pressure inside the intake with minimum loss of pressure. During supercritical operation, the terminal shock occurs inside the intake downstream of the throat. The corresponding external flow field at the design condition of the intake features an oblique shock which starts from the ramp leading edge and glances the intake cowl at the lip. As the back pressure is increased, the terminal shock starts traveling upstream. At the critical condition, the terminal shock reaches the intake throat where it is close to neutrally stable condition. A small increase in back pressure pushes the normal shock into the upstream convergent flow passage where it is unstable and is pushed out of the air-intake. This sets up a subsonic flow in the intake, accompanied by spillage of the mass flow injected by the intake and consequent pressure loss.



Visualization of shock oscillations due to intake buzz of a supersonic air-intake at Mach 3.0



The spilled normal shock ahead of the intake tries to re-enter the intake, but the back pressure condition does not permit it to do so. This process is periodic and is popularly referred to as supersonic air-intake buzz.

As part of an internal research project, experiments were carried out on a supersonic air-intake at Mach 3. A PC controlled stepper motor was used to vary the back pressure by operating a butterfly valve at the intake exit plane. At the critical condition, intake buzz started. A high speed camera, borrowed from Prof. K. P. J. Reddy, Department of Aerospace Engineering, IISc, was used to record the images at 2000 frames per second, with pixel resolution of 800×600. The images corresponding to one cycle of oscillation are shown in the figure. From the frame count and the time between exposures (500 mS), the periodicity is found to be about 100 Hz. Amazingly, analysis of unsteady pressure signals measured from a Kulite pressure transducer inside the intake also showed a clear and dominant 100 Hz frequency. Correlation between what is visualized and what is measured adds immense value to the understanding of unsteady flows.

## R&D at CEERI, Pilani

### Fabrication And Characterisation Of Polymer Waveguide Based Optical Splitter

The Central Electronics Engineering Research Institute (CEERI), Pilani, has fabricated a 1×4 optical power splitter (using NOA-61 optical epoxy and SU-8 based photosensitive polymer) under a CEERI-BITS collaborative project work, sponsored by DIT (MCIT). The process to fabricate single mode polymeric channel waveguide based optical splitters using simple direct UV photolithography was optimised. Optical Adhesive NOA-61 has been used as under and over-cladding layers. Channel waveguides have been obtained on development after a cross-linkable negative tone epoxy SU-8 2002 polymer was exposed to UV light through a photo-mask. Figures 1, 2 and 3 show the design layout and processing steps for the fabrication and various portions of the device after fabrication, respectively. Following successful fabrication, the device has been characterized in terms of insertion loss and non-uniformity at two different wavelengths. Preliminary result shows insertion loss and non-uniformity of ~14.5 dB/1.2 dB (at 1310 nm) and ~19 dB/1.7 dB (at 1550 nm), respectively. Temperature, duration of baking and curing were found to play a significant role in this fabrication. As the output of

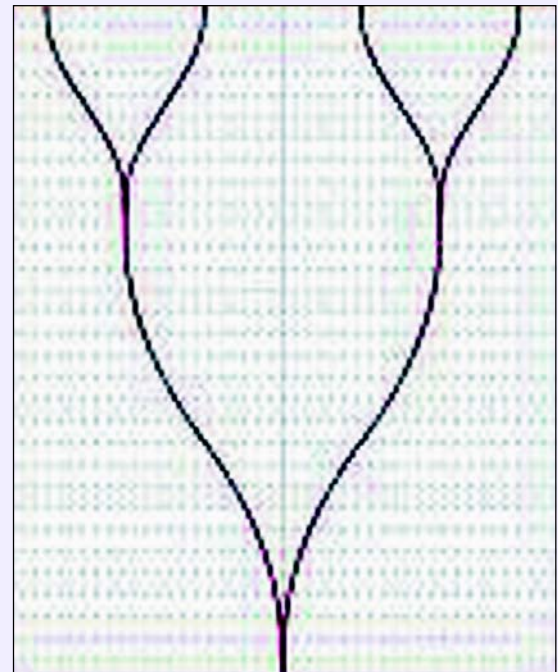


Fig. 1 : Design Layout of 1×4 Optical Splitter

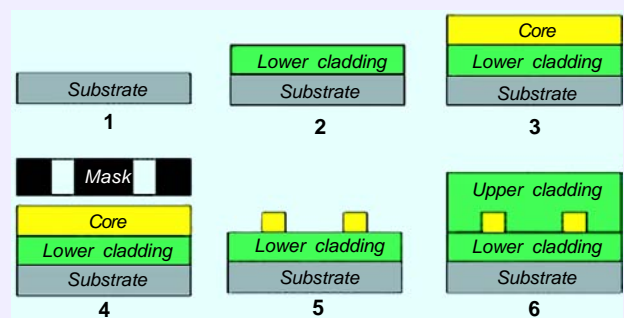


Fig. 2 : Processing Steps for the Fabrication of Polymer-based 1×4 Optical Splitter

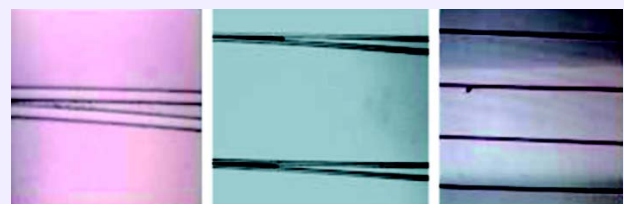


Fig. 3 : Various Portions of Polymer-based 1×4 Optical Splitter after Fabrication



Fig. 4 : Output of Polymer-based 1x4 Optical Splitter Tested at 633 nm

the device, four distinct spots tested at 633 nm, are shown in Figure 4.

Specifications achieved	
Splitter Parameter	Achieved Value
Total Insertion Loss	14.5 dB at 1310 nm 19.0 dB at 1550 nm
Non-uniformity	1.2 dB at 1310 nm 1.7 dB at 1550 nm

### 6 MW Peak, 24 Kw Average Power S-band Klystron

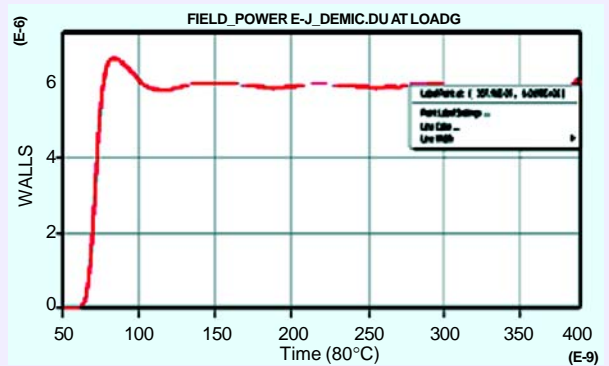
A project on ‘Design and development of 6 MW peak, 24 kW average power S-band Klystron’ has been taken-up at CEERI under sponsorship from Department of Atomic Energy, Government of India, with a financial contribution of Rs 473 lakh.

The major specifications of the tube to be developed are as follows:

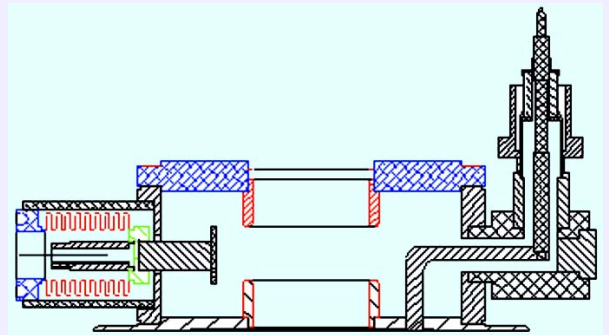
Frequency	: 2856 MHz
Peak power	: 6 MW
Average power	: 24 kW
Bandwidth	: 10 MHz
Pulse width	: 10 $\mu$ S
Beam voltage	: 150 kV (max)
Beam current	: 115 A (max)
Gain	: 40 dB

The tube is to be used as RF power source to energize an industrial RF linac that will be

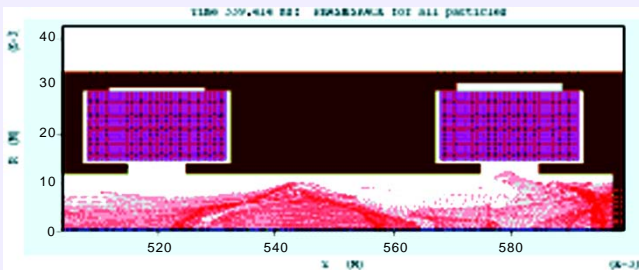
used for a variety of applications including scanning of large consignments at the ports, food processing, cable hardening, etc. The design of the tube was completed using analytical methods followed by optimization using advanced design codes like EGUN, TRAK, HFSS, MAGIC (2D & 3D), ANSYS, etc. The optimized design was converted into engineering design using CAD tools. The figures show typical results of beam wave interaction simulation



Computed Output Power



Assembly Drawing of the Input Cavity



Simulated Beam Wave Interaction



Individual Piece Parts of the Klystron



and output power computed using MAGIC code. The figure shows an assembly drawing of the input cavity.

All individual piece parts of the tube, as shown in the figure, have been fabricated using in-house workshop facility and integrated into sub-assemblies and a full tube using infrastructure facilities available at CEERI.

A 150 kV/115 A solid state pulse modulator was imported for performance evaluation of the tube. A special dust free enclosure with provision of chilled DI water circulation at high pressure was created for housing the modulator.



Solid State Pulse Modulator



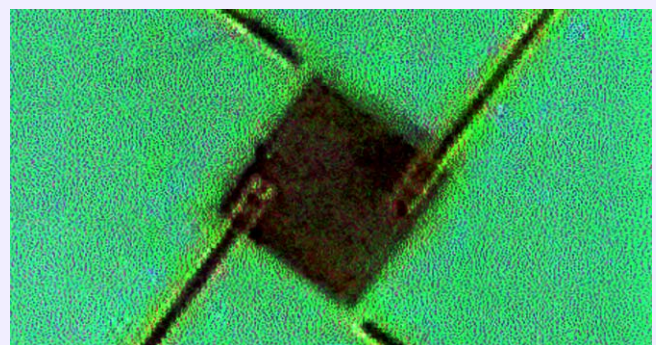
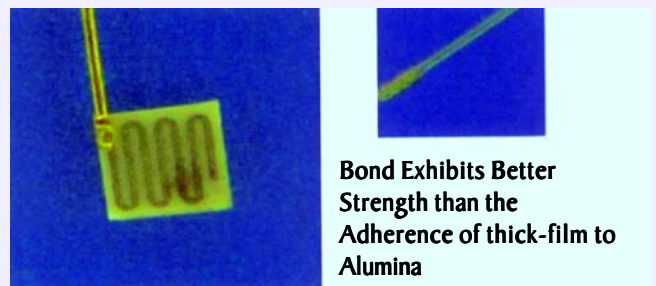
Prototype of the Klystron

## Technical Support To M/S Honeywell Technology Solutions Pvt Ltd, Bangalore

Parallel-gap resistive bonding of thick-film Pt heaters and Au electrodes on 4 mm<sup>2</sup> alumina chip (front and back) was demonstrated on five samples to M/s Honeywell Technology Solutions Pvt Ltd.

### Features

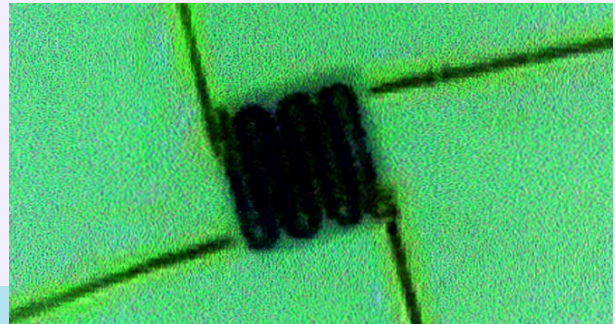
- Novelty in front and back bonding processes
- High temperature stability and mechanical strength of joints
- Environment-friendly bonding process
- Low-cost process and no joining material required



Front Side: Bonding on Au Electrodes

- No displacement, misalignment of floating problem during bonding

Bonds were found in conformity with the requirement of the industry and they have further requested CEERI, support for 30 more samples.



Back Side: Bonding on Pt Heaters

## Significant Achievements of NGRI

Some of the significant (R&D) achievements of National Geophysical Research Institute, (NGRI), Hyderabad, in the recent past include:

### Seismic evidence for sharp lithosphere-asthenosphere boundaries of oceanic plates

Oceanic plates are created at mid-oceanic ridges and spread away as a rigid body (lithosphere) to move over a weaker asthenosphere. The mobility of the lithosphere over a weaker asthenosphere constitutes the essential element of plate tectonics, and thus the understanding of the processes at the lithosphere-asthenosphere boundary (LAB) is fundamental to understand how our planet works. It is especially so for oceanic plates because their relatively simple creation and evolution should enable easy elucidation of the LAB. Data from borehole broadband ocean bottom seismometers show that the LAB beneath the Pacific

and Philippine Sea plates is sharp and age-dependent. The observed large shear wave velocity reduction at the LAB requires a partially molten asthenosphere consisting of horizontal melt-rich layers embedded in meltless mantle, which accounts for the large viscosity contrast at the LAB that facilitates horizontal plate motions. This work was published in *Science*, 324, 499-502, 2009.

### A new technique to analyze the gravity anomalies

A new technique to analyze the gravity anomalies of strike limited pull-apart basins was developed by Dr V. Chakravarthi, Scientist, NGRI and published in the Journal *Near Surface Geophysics*, 7, No. 3, 217-226, 2009. This technique has the novelty that it simultaneously estimates both the model parameters of the basin and regional gravity background from a set of observed Bouguer gravity anomalies. The interpretation of gravity anomalies of the Ranigunj

basin in India unravel the fact that this basin along with other basins of Damodar valley might have been formed due to both east-west kinematics and subsequent orthogonal extension rather than hitherto believed hypothesis of simple extensional tectonics.

### Establishment of high-resolution airborne geophysical survey equipment

Airborne geophysical survey is the first task of mineral exploration activity in considerably large areas. With the development of sophisticated equipment and navigation by GPS, it is now possible to pin point targets for drilling. Many (gravity, magnetic, radiometric and electro-magnetic) methods are suitable for measurements in air and use of two or more of these sensors is named as multi-parameter survey. With ever changing technology in equipment design and signal processing techniques, the



resolution, measurement accuracy, etc., of these sensors are improved from time to time. NGRI has been maintaining the high-resolution multi-parameter airborne survey technology at the state-of-the-art level, by updating the expertise and equipment. The latest addition to this facility is the heli-borne time domain EM system. The system, known by its trade name as VTEM has been proved to probe conductive targets up to a depth of 800 meters. The system can be used for a variety of applications starting from delineation of boundary between fresh water and saline water in the coastal regions, location of buried channels and alteration plumes for hydrocarbon exploration, and for the exploration of deep-seated ore bodies associated with conductors. NGRI procured this system to locate deep-seated uranium deposits as a major exploration programme funded by AMD, under the Department of Atomic Energy.

### Organic carbon and iron modulate nitrification rates in mangrove swamps of Goa, south west coast of India

Nitrification, fuelled by ammonium is the pivotal oxidative pathway to nitrogen cycling. In spite of its ecological significance, the factors regulating nitrification rates in the benthic realm remain poorly understood. In view of this, the scientists working at the National Institute of Oceanography (NIO), Goa, pursued studies and examined some of the factors like ammonium, nitrite, nitrate, organic carbon, iron and manganese on down-core variability in benthic nitrification rates in two different mangrove ecosystems, one under the influence of ferromanganese ore mining (experiment) and the other relatively undisturbed to be the control against the experiment. The scientists hypothesize that besides organic carbon, iron could also influence the rate of nitrification. The study also contrasts the distributive pattern of autotrophic and heterotrophic nitrifiers in the two regions. The concentration of iron at the control site ranged from 1.1% to 15.1% while at the experimental site it ranged from 2.9% to 46%. The levels of organic carbon at control and experimental sites ranged from 0.02% to 6.9% and 0.1% to 6.5%, respectively. The nitrification rates at the control and experimental sites are comparable and ranged from  $3.2 \pm 1.2$  to  $18.4 \pm 1.9$  ng at-N g(sediment)<sup>-1</sup> h<sup>-1</sup> and  $2.7 \pm 1.5$  to  $18.2 \pm 0.6$  ng at-N g(sediment)<sup>-1</sup> h<sup>-1</sup>, respectively. While the abundance of heterotrophic nitrifiers at both the sites ranged from  $10^{2-3}$  cells g<sup>-1</sup> sediment, the autotrophic nitrifiers at the experimental site was higher by an order at  $10^3$  cells g<sup>-1</sup> sediment reflecting the relatively higher refractile nature of organic carbon at the experimental site (Straus and Lamberti, 2000). Though organic carbon and nitrification rates are similar at both the sites, the underlying mechanisms governing the processes could be different. The studies suggest that at the control site, heterotrophic nitrifiers govern nitrification rates ( $r = 0.28$ ,  $p < 0.05$ ,  $n = 64$ ) using organic carbon ( $r = 0.32$ ,  $p < 0.01$ ,  $n = 64$ ). At the experimental site, nitrification was governed more by autotrophic nitrifiers ( $r = 0.43$ ,  $p < 0.001$ ,  $n = 64$ ) at the expense of iron ( $r = 0.47$ ,  $p < 0.001$ ,  $n = 64$ ). Therefore at the experimental site with higher load of iron, autotrophic nitrification could be more important. Based on the above studies it is inferred that both the quality of organic carbon and quantity of iron govern nitrification rates in these mangrove swamps.

For more information read:

Krishnan, K.P.; LokaBharathi, P.A. (2009) Organic carbon and iron modulate nitrification rates in mangrove swamps of Goa, south west coast of India, *Estuar. Coast. Shelf Sci.*: 84(3); 419-426.

## Studies on Assessment and Monitoring of Distress and Remedial Measures for Ancient Temples in Uttarakhand

Historical and recent earthquakes created large scale destruction of buildings in Uttarakhand Himalaya. It is reported in literature that ancient temples were also severely damaged during the earthquakes, and unfortunately they could not get sufficient attention owing to oblivious reasons and the rehabilitation strategies adopted by the administration centred on mass housing leaving the ancient monumental structures in distress state. On request of ASI, DehraDun, the Central Building Research Institute (CBRI), Roorkee, has undertaken the study on the present status of two famous ancient temples i.e. Sun temple located at Katarmal (Almora) and Gopinath Temple at Gopeshwar, to know the distress and instability to arrive at possible remedies.

The main objective of the study is to assess the present status of the Sun temple of Almora and Gopinath Temple of Gopeshwar with respect to seismicity and slope instability through instrumental monitoring study along with geological and geotechnical

investigations and suggesting possible remedies to minimize the deterioration process.

### Sun Temple, Almora

The Sun temple popularly known as Baraditya is one of the



Fig. 1 : Main temple

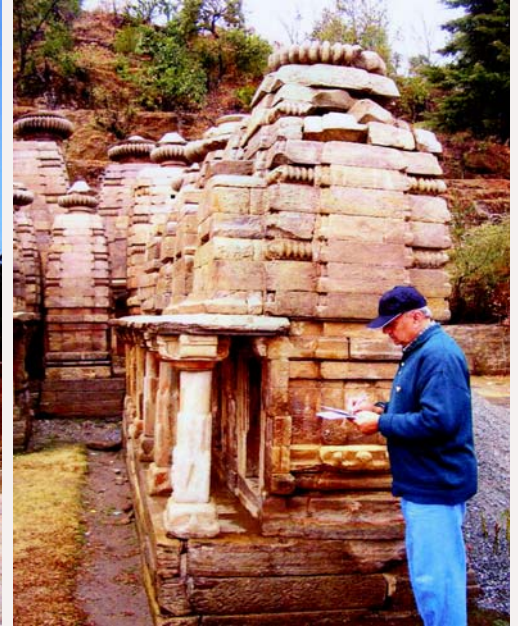


Fig. 2: Northward tilt in miniature temples



Fig. 3 : Displaced shikhras of the miniature temples



biggest and oldest temple of Kumaun Himalaya. The temple is located at Kosi-Katarmal area, which is about 15 km from the Almora town. It was probably built in 13<sup>th</sup> century by the Katarmal Raja, the Medieval king of Katyuri dynasty who ruled the Central Himalayan region. There are 45 miniature shrines clustering around the main shrine (Figure 1), which seems to be constructed in different periods. The region known to be prone for earthquakes is situated in the seismo-tectonically active zone. From the various sources of information, it is observed that the region has been affected by several earthquakes ranging between 4.5-6.8 magnitudes on Richter scale.

The visual inspection of the Sun temple of Kosi-Katarmal indicates that settlement and tilting around the main temple has taken place in the past. There are indications of seepage on the walls of the main temple. There are weak joints at several locations in the temple through which rain water seeps inside the temple. The sign of

distress was very prominent in some of the miniature temples (Figure 2). The inclination data of all the temples were obtained. It was observed that the majority of the temples have been inclined in North direction. The maximum inclination of a temple was found to be 13° degree. About 12 inches displacement of one of the *shikhars* of the miniature temple was observed.

### Gopinath Temple, Gopeshwar

The Shiva temple known as Gopinath temple (Figure 3) is one of the biggest temples of Garhwal Himalaya situated at Gopeshwar on

the ancient route of Badrinath and Kedarnath shrine. The temple is located centrally in the compound with a shikhar. The Gopeshwar town in the Chamoli region known to be earthquake prone is situated in the seismo-tectonically active zone with a close proximity to Main Central Thrust (MCT).

A field survey to the temple, showed that the region has been affected by several earthquakes ranging between 4.5-6.8 magnitudes on Richter scale. Evidences of severe damage during 1803 event in Gopeshwar temple has been reported and many parts of the temple have been reconstructed. The temple suffered only minor vertical cracks

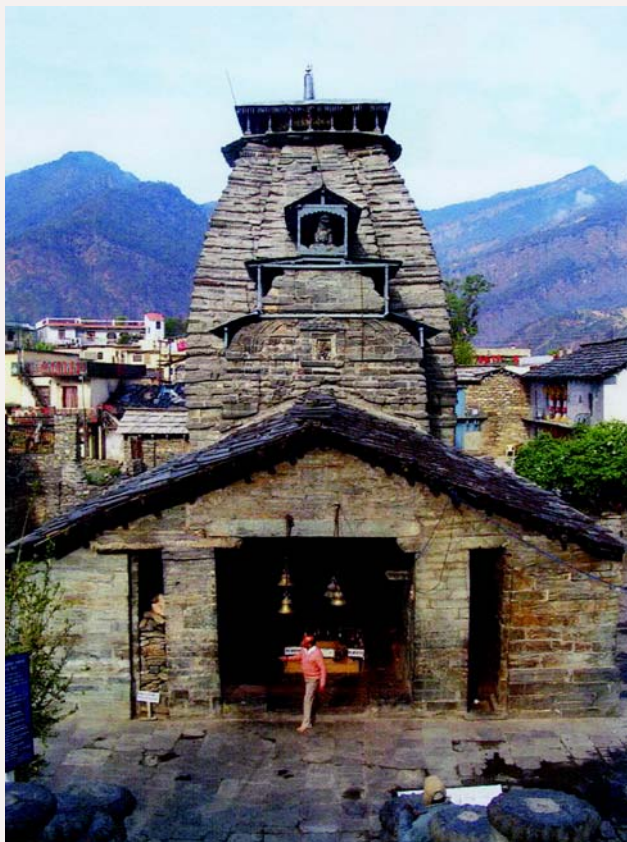


Fig. 3 : Gopinath Temple, Gopeshwar



Fig. 4 : Indication of water seepage



Fig. 5 : Indication of Settlement and tilting

during Chamoli earthquake 1999 in spite of it being located in meizo-seismal area. This indicates that the intensity of 1803 earthquake experienced at Gopeshwar have been much larger. During Chamoli earthquake nearest Strong Motion instrument was located in Gopeshwar and the peak ground acceleration (PGA) recorded was 0.359 g at a distance of 10 km from the epicenter.

In the Gopeshwar temple it was observed that water leakage was the main problem (Figure 4). There are weak joints and cracks at several locations in the temple through which rain water seeps inside the temple. The crown of the temple is also in very bad shape, allowing sufficient inlets for water. Further, problems of settlement and tilting were also observed in the temple structure (Figure 5).

Geological, geophysical, geotechnical and structural investigations are being carried out for possible causes of distress. Data pertaining to monitoring of inclinations and settlement of the temples are being analysed to know the present status of the temples. The structural integrity of the temple will be assessed and possible remedies will be suggested by CBRI.

## Sponsored Projects completed/taken up at IIP

The following sponsored projects have been completed/taken up at the Indian Institute of Petroleum (IIP), DehraDun, in the recent past:

### Sponsored Projects Completed

- Evaluation of hydraulic fluid samples for fire resistance characteristics, wear characteristics and air released test
- Kosti-Sudan 4×125 MW project – crude oil analysis
- Detailed evaluation studies on crude oil samples from OILEX Ltd, Vadodara
- Analysis of kerosene sample from police department, Mani Majra, Chandigarh, as per BIS-7574-1975
- Development of petroleum-based mesophase pitch for making high performance carbon fibres
- Studies on the propellant grade kerosene samples from LPSC, Tamilnadu

### Sponsored Projects Taken up

- Feasibility study for identifying alternative feedstocks for petrochemicals
- Study on the effect of driver behaviour on fuel economy
- Crude evaluation study
- Novel doped 3-D nanoporous oxides for dye-sensitized solar cells
- Establishing collaborative research for the development of processes for second-generation biofuels
- Feasibility study for the options of upgrading bottoms at BPCL-KR
- Studies on the quality of gasoline from Haldia Petrochemicals Ltd, Kolkata
- Column targeting studies for PRU revamp at HPCL, Vishakhapattanam refinery
- Study of Butene-1 plant at IOCL, Gujarat, refinery
- Feasibility study for change over from sulpholance to NMP in Hexane Unit
- Assay of crude oils from Reliance Industries Ltd.
- MAT testing of catalyst samples from HPCL, Vishakhapattanam
- Evaluation of samples ISO HV-68 and VG-32



## On-Going Projects at NBRI during 2009-2010

Some of the projects being pursued at the National Botanical Research Institute (NBRI), Lucknow, during 2009-2010 have been covered in 30 September 2009 issue of *CSIR News*. Some more are covered here:

Project	Code	Title of the Project	PI	Funding Agency	Start date	Completion date	Total Cost (Lakhs)
GAP	2445	Identification and role of ethylene response factors in ethylene signaling in tomato	Dr Anirudh P. Sane	DBT, New Delhi	Feb-05	Dec-09	36.17
CLP	2448	Collaborative research between NBRI, NAU and GSSC for the development of insect resistant transgenic cotton	Dr Rakesh Tuli	NAU, Gujarat	Jul-05	Jun-10	50.000
GAP	2454	Bt-gene stacking and gene targeting in brinjal for resistance to shoot and fruit borer	Dr P.K. Singh	DBT, New Delhi	Jan-07	Dec-09	46.510
GAP	2455	Peach decline disease: development of molecular diagnostics for management of disease	Dr Aminuddin	DBT, New Delhi	Feb-07	Jan-10	19.430
GAP	2457	Regulation of gene expression in plants (JC Bose fellowship)	Dr Rakesh Tuli	DST, New Delhi	Jul-07	Jun-12	40.000
GAP	2459	Generation of a seed specific EST library in <i>Jatropha</i> and identification of genes for oil biosynthesis pathway	Dr Vidhu A. Sane	DBT, New Delhi	Oct-07	Sep-10	22.15
GAP	2460	Functional analysis of novel petal abscission and senescence related genes from Rose and Gladioli	Dr Anirudh P. Sane	DBT, New Delhi	Oct-07	Sep-10	33.28
GAP	2461	Quality control and training on biofertilizers and efficient utilization of microbes at village level	Dr C.S. Nautiyal	Deptt of Agri, U.P, Lucknow	Dec-07	Mar-10	27.60
GAP	2462	DNA Barcoding in Indian Taxa of <i>Berberis</i> L. (Berberidaceae)	Dr Rakesh Tuli New Delhi	DBT,	Apr-07	Mar-10	61.820
GAP	2551	Study on impact of fly-ash on crops in the vicinity of Kahalgaon STPP, NTPC	Dr Nandita Singh Kahalgaon, Bihar	NTPC,	Sep-06	Feb-10	14.722



GAP	2552	Microbial diversity and biotechnological prospects of cold adapted microorganisms of Gangotri glacier, Garhwal Himalaya, India	Dr R.D. Tripathi/ Dr Vinay Singh Baghel	DST, New Delhi	Jan-07	Dec-09	12.120
GAP	2619	Breeding and development of varieties for specific alkaloids in Opium Poppy ( <i>Papaver somniferum</i> L.) and cultivation in Climate Control Chamber	Dr Sudhir Shukla	MoF	Apr-06	Mar-10	179.660
GAP	2620	Studies on synergistic effect of <i>Trichoderma</i> on legume- rhizobium symbiosis and development of a mixed formulation of <i>Trichoderma</i> and <i>Rhizobium</i>	Dr Poonam C. Singh	DST, New Delhi	Oct-07	Sep-10	3.73
GAP	2741	Golden Triangle Partnership (GTP) scheme for validation of traditional Ayurvedic drugs and development of new drugs	Dr A.K.S. Rawat	Deptt. of AYUSH through CSIR	Jul-06	Mar-10	10.00
GAP	2745	Identification of potential antimutagenic phytochemicals from weeds and agri-wastes	Dr Ch.V. Rao	UPCST, Lucknow	Jul-07	Jun-10	4.800
GAP	2746	Screening of herbal drugs used in treatment of hepato cellular carcinoma	Dr Ch.V. Rao	DST, New Delhi	Jan-08	Dec-10	22.880
GAP	2747	Studies on relationship between ecogeography of the chemotypic variation of nine important but highly threatened medicinal plant species and prospects of their cultivation	Dr A.K.S. Rawat	ICAR, New Delhi	Jul-08	Mar-12	203.1138
GAP	2748	Study of herbal acaricides as means to overcome the development of resistance in ticks to conventional acaricides	Dr A.K.S. Rawat	ICAR, New Delhi	Jul-08	Mar-12	86.32
GAP	2749	Role of selected flavonoids on gastroesophageal reflux disease (GERD) and gastric ulcer in rats	Dr Ch.V. Rao	ICMR, New Delhi	Jan-09	Dec-09	7.637
GAP	2750	Identification and biological studies of potential bioactive constituents from important medicinal plants ( <i>Aegle marmelos</i> ) used in gastrointestinal disorders and their geographical variations in chemical markers	Dr Ch.V. Rao	NMPB, MH&FW, New Delhi	Jan-09	Dec-10	22.000



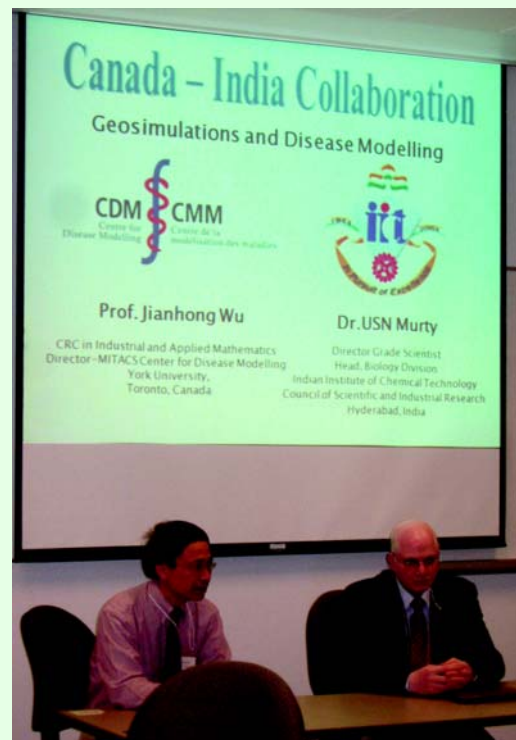
## R&D Highlights

GAP	2751	Identification of substitutes for traded drug chirayata ( <i>Swerita</i> species) using pharmacognostical parameters	Dr A.K.S. Rawat	NMPB, MH&FW, New Delhi	Jan-09	Dec-11	35.000
GAP	2752	Re-orientation training programme (RoTP) in quality assurance of herbal for teachers/paramedics of AYUSH	Dr S. Khatoon	Rashtriya Ayurved Vidyapeeth, Deptt. of AYUSH, New Delhi	Apr-09	Mar-10	3.593
GAP	2803	Establishment of bioinformatics infrastructure facility at NBRI	Dr S. Kumar	DBT, New Delhi	Apr-97	Mar-10	77.280
GAP	2807	Indian Botanic Garden Network: Developing web base software tools for digitization and identification of RET species and varieties	Dr S. Kumar	MC&IT, New Delhi	Jun-07	May-10	123.32
CNP	3036	Consultancy for Molecular Biology at JISL	Dr Anirudh P. Sane	Jain Irrigation Systems Limited, Jalgaon	Jun-08	Oct-11	2.00
SSP	3213	Development of cultivation protocol of Homoeopathic herbs, their cultivation at NBRI Farm site and supply to SBL Pvt Ltd	Dr S.K. Tewari	SBL Pvt Ltd, Ghaziabad	Jun-07	May-10	3.367
SSP	3214	Pilot scale assessment of short term agronomic protocol for cultivation of <i>Asparagus racemosus</i>	Dr S.K. Tewari	Dabur Research Foundation, Ghaziabad	Oct-07	Sep-10	4.40
TLP	4007	Genetic improvement of <i>Jatropha curcas</i> for drought tolerance and oil yield	Dr Rakesh Tuli	CSIR Under NMITLI	Jul-05	Jun-10	172.56
TLP	4009	Development of high throughput marker assisted selection systems for improvement of drought tolerance and fibre quality related traits in cotton	Dr Samir V. Sawant	CSIR Under NMITLI	Apr-07	Mar-12	496.500
TLP	4010	Novel approaches for production of hybrid seeds with characteristics of improved insect resistance and higher yield - Cotton Component	Dr Rakesh Tuli	CSIR Under NMITLI	Mar-08	Feb-11	254.200

## IICT signs MoU with York University Toronto, Canada

The Indian Institute of Chemical Technology (IICT), Hyderabad, has signed a Memorandum of Understanding (MoU) with Centre for Disease Modeling (CDM), York University, Canada, on 19 August 2009 at York University, Toronto, Canada. With the signing of MoU, IICT/CSIR and CDM have mutually agreed to collaborate with each other especially in the areas of disease modeling and also on new collaborative activities in the development of mathematical models at different epidemiological settings to explore the mechanisms regulating infection, disease spread, prevention and control policy decisions, specifically pertaining to Disease transmission models; Climatic factors impact on the disease and vector dynamics and their spread; and Immuno-epidemiological models to understand the drug resistance and its consequences on population and disease propagation.

Dr U. S. N. Murty, Director Grade Scientist/Head Biology, IICT, has signed MoU on behalf of Director, IICT, Hyderabad, India and Prof. Jianhong Wu, CRC in Industrial and Applied Mathematics, Director, MITACS-CDM, Professor, Department of Mathematics and Statistics, York University, Toronto, ON, Canada, signed on behalf of York University, Canada. After signing the agreement Prof. Wu addressed the gathering and briefed about the MoU and collaboration.



Dr U.S.N. Murty, Head Biology, IICT and Prof. Jianhong Wu, Director, CDM York University, after signing the agreement, on behalf of their respective organizations

## Workshop on ASTM Digital Library and Standards

“Give the scientist the required information immediately you have fed him for the day, provide seamless, exhaustive and appropriate information access to his desktop you have fed him for the life time,” so goes the saying. Keeping this in view ICAST, through the CSIR consortium organized half a day workshop on ASTM Digital Library (DL) and Standards on 16 September 2009 at the National Aerospace Laboratories (NAL), Bangalore. ASTM is one of the most

comprehensive and authoritative resources available with its exhaustive coverage and market relevance products. ASTM’s DL is a veritable information super-store and is one of the important resource sought after.

Dr Poornima Narayana, Head, ICAST, welcomed the gathering and gave an insight about the inception of CSIR consortium which was initiated during 2002 with access to just one publisher Elsevier’s ‘Science Direct’. She mentioned

that over the years this consortium continues its tireless efforts in providing access to many more e-resources and the latest addition was to ASTM DL and standards a year back. She explained that efforts and negotiations with publishers/vendors at the CSIR level are continuously being pursued to give seamless access to many more products of interest to CSIR and individual laboratories’ scientists.

Shri Shyam Chetty, Chairman of LAC and Head, FMCD, was full of



appreciation about ICAST's services which in his opinion, is always striving hard in making information available to users at their desktops. He called upon the scientists to make use of the ICAST's facilities and services for better scholarly communication in turn leading for high quality research and publication in high impact factor journals.

The representative from ASTM Inc, USA, Mr Marty Farrell gave a brief overview of ASTM's products, the salient and unique features of both digital library and standards through a power point presentation. He explained that the ASTM DL has access to six peer reviewed high quality, market relevant papers published in journals, nearly 30,000 symposium papers published in book format (Special Technical Publication or STPs), manuals and highly technical monographs from experts in their respective fields. He also touched upon the browsing features by the alphanumerical standards listing and search facilities in the Standards collection.

Mr K. Gupta, Head of Book Supply Bureau (BSB), Delhi, the exclusive agents for ASTM products in India, conducted the workshop online. He demonstrated live examples by using the browsing features by topic, sub topic, ASTM Committee, symposium and e-books while interacting with the NAL scientists and conducted searches by keyword for both DL and standards. He showed the unique features of standards like the 'withdrawn' and 'work' items of standards. The scientists were very interactive and showed a keen interest in these products. The response to this workshop was very encouraging and overwhelming with scientists not only from NAL, also from CFTRI and JNC SAR. The event concluded with a vote of thanks proposed by Mr S.R. Dey of ICAST.

### Training Programme on Aircraft Structural Assembly Techniques and Quality Standards

The National Aerospace Laboratories (NAL), Bangalore, organized a training programme from 3 to 31 August 2009 at the request of M/s. Tata Advanced Systems Ltd (TASL), New Delhi. The purpose of this specialized training was to familiarize their newly inducted technicians with aerospace structural assembly practices so that they acquire the necessary skill levels for carrying out the assembly operations which are crucial in any aircraft production plan. The programme was tailor made to meet the requirements of TASL, wherein the technicians had "hands on practice" coupled with theory classes which were conducted by Senior Scientists from NAL and its collaborators in civil aircraft programme M/s Aircraft Design & Engineering Services Private Limited (ADES). This programme was planned and coordinated by Head, C-CADD and Head, ESD.

The theory classes conducted in the morning session at C-CADD, emphasized the critical requirements of quality and reliability. The topics covered included general aircraft/helicopter engineering, aircraft materials, fasteners, hand tools used in aircraft structure build, guidelines and technicality of rivet forming and their acceptance standards, usage of sealants and their types, study of aircraft structural assembly drawings, quality assurance practices and inspection requirements.

The practical training was carried out at C-CADD Saras hangar where the technicians underwent specialized training on different types of hand tools and their operations, layout, marking, rivet up assembly as per drawing using round and countersunk head solid rivets, blind rivets and other fasteners and also carryout checks on the riveting quality. The technicians were also trained to use different types of drilling and riveting guns, rivet drivers, bucking bars/ reaction blocks and other hand tools. The technicians were evaluated with a mid term and final test. In the final test every technician had to fabricate a sheet metal component based on drawing given by TASL.

The programme successfully concluded with a valedictory function which was attended by Lt. Gen (Retd.) Davinder



Kumar, CEO & MD, TASL, who in his remarks informed that TASL would be manufacturing fuselage cabins of S-92 helicopter at their upcoming Hyderabad plant and whole heartedly thanked Director, NAL, and the faculty for providing such a high quality training which would benefit them to successfully accomplish the aero structure projects. Dr A.R. Upadhyaya, Director, NAL, in his remarks mentioned the importance of the involvement of private sector in aerospace industry and said that he will be particularly happy to see Tata group partnering in aerospace programmes for the benefit of the country. He further expressed NAL's keenness to work with Tata group as possibilities exist in many areas, including the design and development of Regional Transport Aircraft (RTA). Director, NAL, then presented the Best Trainee Awards and distributed the course certificates to the TASL technicians. Mr M. S. Chidananda, Head, C-CADD and Mr S. Ravishankar, Head, ESD also spoke on the occasion.

The programme concluded with vote of thanks by Dr M. N. Sathyanarayana, Jt. Head, KTMD.

## Dr Pabbaraja Srihari receives OPPI Young Scientist Award-2009



Dr Pabbaraja Srihari receiving the OPPI Young Scientist award by Dr A. P. J. Abdul Kalam, former President of India

**D**r Pabbaraja Srihari, Scientist of Indian Institute Of Chemical Technology (IICT), Hyderabad, has received OPPI Young Scientist Award for year 2009 in the field of pharmaceutical sciences. This award was constituted by Organization of Pharmaceutical Producers of India (OPPI) for the first time to Young Scientists within the age of 35 years, as a part of public private partnership initiative in collaboration with CSIR to honour outstanding young research scientists working in India towards human healthcare. This award comprised of a memento, citation and cash prize of Rs 1,00,000/-

Dr Srihari was presented this award during Annual General Meeting of OPPI held at ITC Grand Central, Mumbai on 8 August 2009 by Dr A. P. J. Abdul Kalam, former President of India. Dr Srihari received this award for his work on identification of small molecules as new chemical entities for treatment of arthritis and having antifungal properties. His investigations lead to identification of some potent NCEs as lead products which can be further elaborated for increased potencies.

Dr Srihari's area of research includes the total synthesis of lactone containing natural products which show anti-tumor, antimycobacterial or phytotoxic properties. He also explored acid catalysis for C-C bond formation reactions. He has 39 publications in international journals, to his credit. Recently, he has also been selected for CSIR Young Scientist Award 2009 in Chemical Sciences for his research work.



## Prof. Sriman Kumar Bhattacharyya takes over as Director, CBRI

Prof. Sriman Kumar Bhattacharyya has taken over as Director, Central Building Research Institute (CBRI), Roorkee, w.e.f. 5 August 2009. His current research areas include: Fluid-Structure Interactions, FRP – Concrete Composite Structures, Structural Health Monitoring; Analysis of Fibre-composite Structures, and Structural Restoration. During May-July 2007, as Guest Professor at the Technical University of Braunschweig, Germany, Prof Bhattacharyya offered a course on ‘Finite Element Technique’ to masters students and interacted with research groups in the area of fluid – structure interactions. From December 2000 to February 2001, as Visiting Professor at the same university, he offered a course on Fluid- Structure Interaction to research students. He worked as Professor of Structural Engineering in the Civil Engineering Department, at the University of Durban – Westville, South Africa. He has been Lecturer, Assistant Professor, Associate Professor and Professor in the Structural Engineering Section of the Civil Engineering Department at Indian Institute of Technology (IIT), Kharagpur, from February 1987 to August 2009.

Prof. Bhattacharyya worked as Assistant Design Engineer/Senior Astt. Design Engineer with M/s Tata

Consulting Engineers, Bangalore, in the field of Design & Engineering of Thermal Power Plant Structures, and Industrial Structures.

Prof. Bhattacharyya has been the recipient of several honours & awards, some of which include: Fellow of Indian National Academy of Engineering (FNAE) in 2004; ‘K.F. Antia Memorial’ Gold Medal for the best publication in the *Journal of the Institution of Engineers* in December 2000; ‘Telkom Best Lecturer Award’ for the best teacher in Civil Engineering at the University of Durban – Westville, South Africa, in 1999-2000; Merit Award for work performance in Tata Consulting Engineers in the year 1984; University Gold Medal for securing first position in B.E. Examination in Civil Engineering (Calcutta University) in 1979; National scholarship during 1974-1979 based on Secondary examination.

Prof. Bhattacharyya has been Fellow, Indian National Academy of Engineering (INAE); Life Member of the Institution of Engineers (India); Life Member of Indian Association of Structural Engineering; Life Member of Indian Association of Computa-



tional Mechanics; Life Member of the Indian Society of Theoretical and Applied Mechanics; Life Member of the Coal Ash Institute of India; Member, Institute for Steel Development and Growth (INSDAG), India; and Member, International Association of Steel-Concrete Composite Structures (IASCCS).

Prof. Bhattacharyya has 45 research publications in international/national referred Journals, and 61 publications in international/national Conference Proceedings. He has been reviewer for several journals.

Prof. Bhattacharyya has developed video course on ‘Strength of Materials’ under NPTEL programme which is available online for use by the Undergraduate students, 2007; he along with Somnath Ghosh, edited Proceedings of ICTACEM (International Conference on Theoretical, Applied Computational and Experimental Mechanics) 2004; contributed a chapter on ‘Design of Warehouse and Silo’ for an International Handbook on Post-Harvest Technology, edited by Prof. A. Chakraborty, IIT Kharagpur & published by Marcel & Decker Inc., 2003; he edited Proceedings of the SEC (Structural Engineering Convention) 2003; and completed a Laboratory Manual on ‘Concrete and Stress Analysis’, 2000.