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From The Director's Desk

It is my great privilege to present this Progress Report 2007-09 of Advanced Materials and Processes Research Institute (AMPRI), Bhopal. During this period, the CSIR implemented a momentous decision of changing the name from Regional Research Laboratory to Advanced Materials and Processes Research Institute (AMPRI). AMPRI has been placed under Engineering Sciences Cluster.

AMPRI has successfully carried out fourteen network projects under CSIR Tenth Five Year Plan and has also undertaken several contract research and consultancy projects during this period. With the beginning of the Eleventh Five Year Plan, the institute has started a network project on development of lightweight metallic materials for engineering applications. AMPRI is the nodal institute for this project. In addition, the institute has a major project on sisal fibres potential for rural development and green technologies. Also it is a part of another network project on nano-materials and nano-devices for health and disease. AMPRI excelled in its performance in terms of research output like patents and SCI publications.

AMPRI activities in the development of light weight high performance metallic materials included aluminum metal matrix composites (Al MMCs), aluminum foam with uniform cell size and distribution, development of components, such as, Al MMC brake drums, Al foam filled crash boxes, Al foam filled sandwich panels, Mg alloy casings etc. The facilities for developing ultrafine particle reinforced Al MMCs through electromagnetic stirring followed by ultrasonic vibration are being established. Facilities for pressure die-casting, semisolid processing etc that will be utilized for developing light weight metallic components for automobile sector are also being added. Secondary processing, such as, hot and cold rolling, extrusion facilities have been set up for processing of Al and Mg alloys and their composites.

A unique approach and methodology for making highly effective shielding phases for X-Rays utilizing red mud and fly ash (US Patent Granted US, 7524,452 B2 dated April 28, 2009) was developed by AMPRI. The half value thickness (HVT) of these materials for 100 kV X-ray is observed to be equivalent to that of lead metal. Atomic Energy Regulatory Board, (AERB) Mumbai, has recommended use of this shielding material in areas like medical application x-ray diagnostic and CT scanner rooms/ establishments. The use of shielding tiles has been demonstrated at the Govt J. P. Hospital, Bhopal.

The tremendous potential of sisal fibres has not so far been exploited in India for value addition and employment generation in rural and semi - urban sectors. Preliminary investigations carried out at AMPRI indicate that there is a great potential for the development of sisal based technologies for rural and engineering applications. AMPRI plans to evolve know-how, processes, technologies, machinery and products for mass scale utilization of sisal fibres.

AMPRI coordinated CSIR rural technology dissemination programs and successfully implemented various activities such as, publication of Journal of Rural Technology, preparation of CSIR draft plan and construction of Rural Gallery. Prof. V.L. Chopra, the then Member, Planning Commission inaugurated the gallery named "Saranjamshala". Models, exhibits, products and other information related to CSIR rural technologies have been displayed in five theme showcases (Natural fibers, Leather, Glass and Ceramics, Food Technologies and Medicinal & Aromatic Plants) and fourteen individual laboratory showcases. The gallery is a permanent showcase of CSIR Rural Technologies to depict the success stories of rural development and is continuously visited by of Non Government Organizations (NGO`s) , Krishi Vigyan Kendras (KVK`s), Rural Artisans and Entrepreneurs. A mobile exhibition van for showcasing the CSIR rural technologies and a dedicated website is proposed.

AMPRI has made conscious efforts to reorient and reposition in terms of vision, thrust areas and strategy. The initiatives will be taken further to have effective networking with national and international agencies including industries. Towards this, AMPRI would best adopt all transformations to change its position to suit for the national and global R&D needs.

In consonance with the new identity, S&T and general infrastructure are being enhanced and upgraded. A state-of-the-art processing and characterization facility and simulation and modeling capabilities is proposed to be set up to trigger new materials development, innovations and improvements. A laboratory building complex has been planned and the foundation stone of a new building was laid by Prof. Samir K. Brahmachari, DG, CSIR in March 2008.

The guidance and support from DG, CSIR and the Research Council is acknowledged. I place on record my appreciation of the services rendered by Dr. N. Ramakrishnan as Director (June 2001-June 2008) and Dr. Navin Chandra as Acting Director (June 2008-April 2009) towards the progress of AMPRI during their respective tenures. I congratulate all the staff members of AMPRI for the commendable commitment and zeal and look forward to a period of major growth in terms of R&D, technology development and infrastructure development that would take AMPRI to newer heights.

Anil K. Gupta
Director

Vision

AMPRI, Bhopal is committed to develop innovative, cutting edge, internationally competitive, energy efficient and environment friendly technologies/products in the area of advanced materials for societal benefits and to contribute to the Nation`s Economy.

Name Change Of The Laboratory

The Governing Body of the Council of Scientific and Industrial Research (CSIR) has renamed all its five Regional Research Laboratories (RRLs) to enable them to reflect a futuristic outlook. The changed profiles of the laboratories with respect to their direction of growth, orientation of expertise and accumulated excellence have all been weighed in while re-christening them. The name change from Regional Research Laboratory, Bhopal to Advanced Materials and Processes Research Institute (AMPRI) is effective from March 6, 2007.

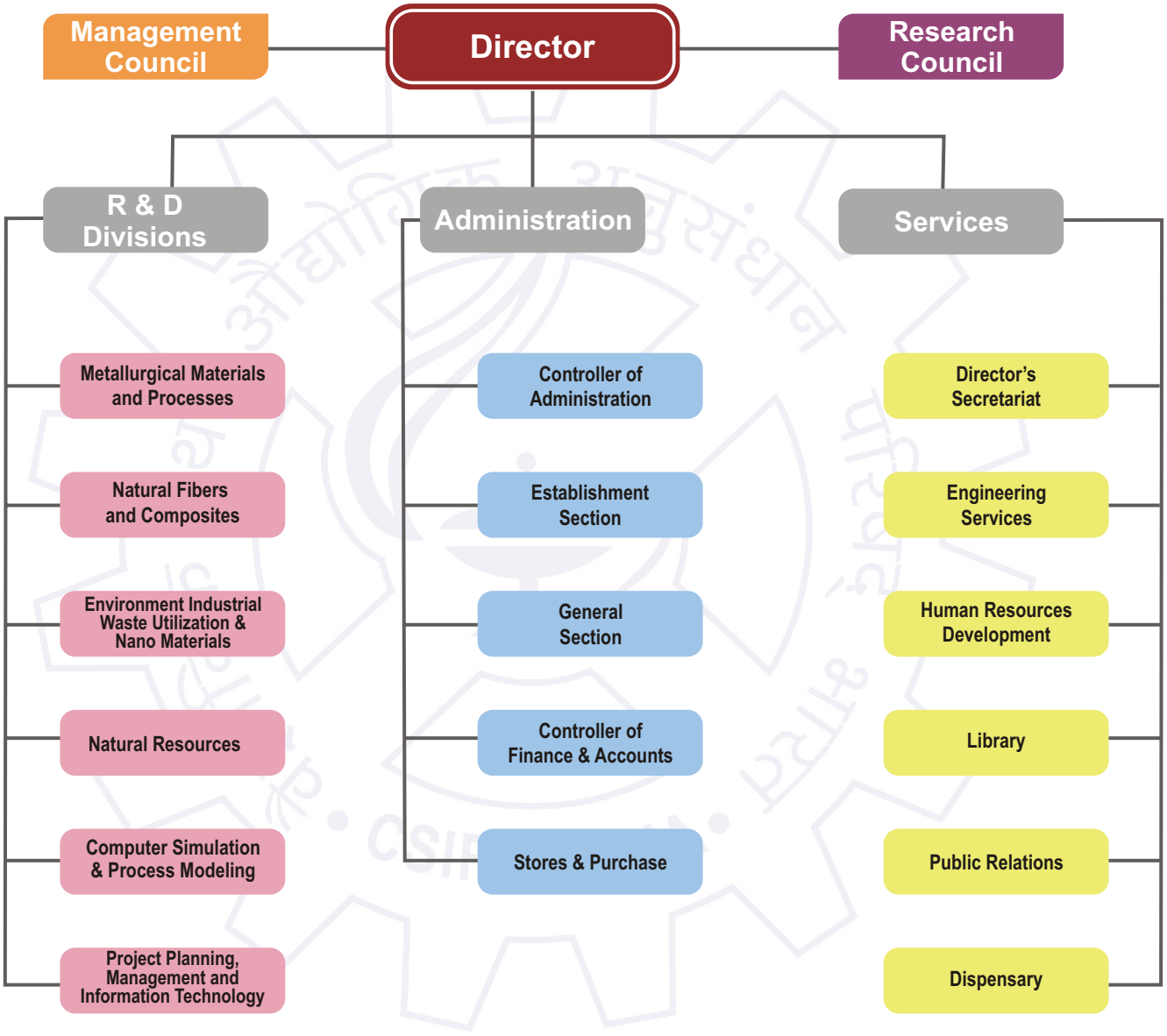
Change Of Head Of The Institute
Change of Head of the Institute

Dr. N. Ramakrishnan was the Director of the institute from June 11, 2001 to June 10, 2008 and completed seven years before relinquishing the office. During his tenure the institute has performed well in all spheres of R&D activities. It was during his tenure the laboratory was renamed as Advanced Materials and Processes Research Institute (AMPRI).

After Dr. Ramakrishnan relinquished his office, Dr. Navin Chandra, the senior most Scientist G of the institute took over as Acting Director on June 11, 2008 and continued till April 8, 2009.

Dr. Anil K. Gupta, Scientist G and Head, Engineering Materials Division of National Physical Laboratory (NPL), New Delhi joined the institute as Director on April 9, 2009. Dr. Gupta is very well associated with the institute activities and was Member of Management Council of the institute from 2003-2009.

Organization Chart



R & D Reports

Extrusion of Al Composites and Mg Alloys

Under the CSIR network project on light materials, an activity to establish the processing ability to rods and tubes for aluminium composites and magnesium alloys developed at AMPRI, Bhopal has been taken up with an aim to make products for different engineering sectors.

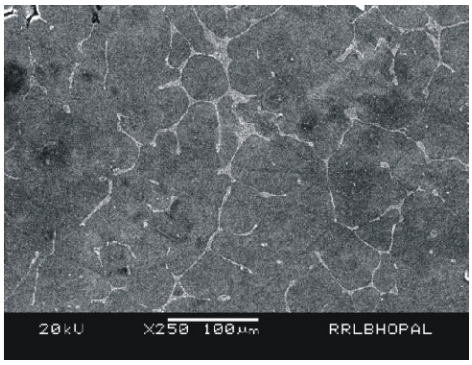
The parameters for extruding a few alloys namely Al-7075 and Al-2024 and their composites with 15% SiC particles dispersed in the matrix using particles of size 20-40 µm to rods have been optimized. The extrusion ratio has been maintained at 10:1. The properties attained in the extruded rods were evaluated in terms of microstructure, hardness and sliding wear behavior.

Extrusion temperature has been found to be very critical as at higher temperatures above 400ºC it was impossible to extrude the composites. The load required for extruding composites is nearly double that required for extruded the base alloy. Micro structural features show some conglomeration of the dispersoid probably after breaking in the process of extrusion; hardness marginally increased as a result of extrusion. Sliding wear properties in terms of material loss significantly reduced for the extruded composite over that of the cast and homogenized conditions.

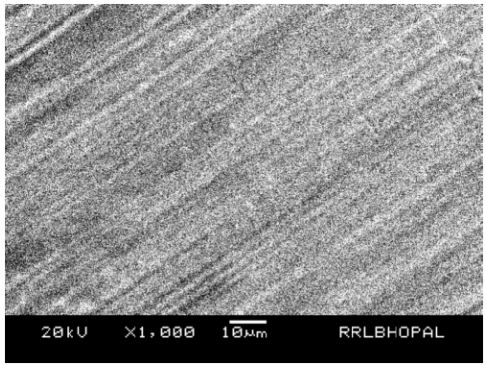
It was found that merely making composites drastically increases the hardness by nearly 40% over that of the alloy and extruding them further increases the value by some 10%. The advantages of making composites is realized even at the minimum applied load during sliding wear tests where the alloy seizes but the composite in both the cast and extruded case do not seize even at long sliding distances. The effect of speed seems to be more pronounced on material loss for the extruded composite than the applied load. Under all conditions of tests carried out the extruded composites fare much better in terms of lower material loss than their cast counterparts.

A successful attempt has been made to extrude 6063 Al-alloy to tubes. The parameters for extrusion have been optimized and the physical characteristics, microstructure, hardness and density have been compared between the rods and tubes with the initial alloy to note the effect of extrusion. The extrusion ratio for rods was 10:1 and tubes of thickness 2.9 mm thickness was attempted to be extruded. The extruded rods were uniform in cross section and there was no deformity externally. The extruded tubes due to the floating die did not have a uniform thickness as was expected, the thickness varied between 1 to 5 mm across the length of the extruded tube, though externally there was no deformity. The load required for extrusion to tubes was comparatively higher than for the rod. When unhomogenised billets were used for extrusion, the load required was less; however in the case of extruding to tubes the extrusion was not smooth in the case when unhomogenised billets were used and the mandrel was smeared. There was no appreciable change in the hardness after extrusion from the as received sample.

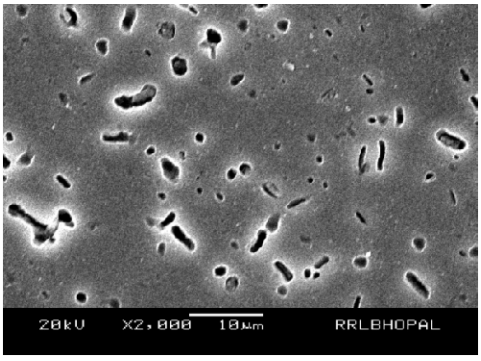
The microstructure of the as received sample shows grain structure with precipitates in the inter-granular regions; however the structure is completely broken down and un-resolvable in SEM after extrusion to either rods or tubes. This is probably due to stress concentration in the extruded specimens which could not be removed by tempering the specimens. The extruded tube shows directionality in its microstructure. Directionality is significantly less in the rods than in the tubes.



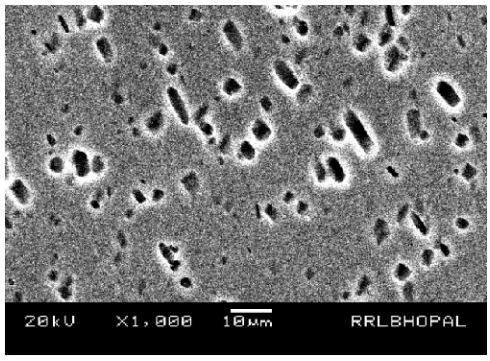
As received alloy



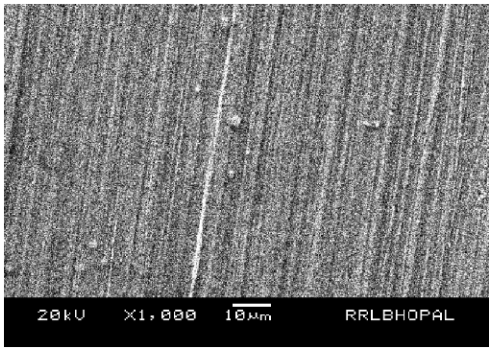
Extruded rod showing directionality



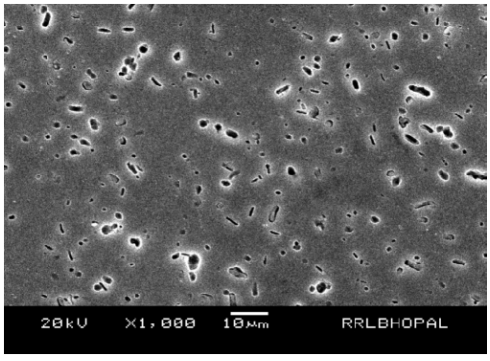
Extruded rod from homogenized billet transverse direction



Extruded rod from homogenized billet in longitudinal direction



Extruded tube from homogenised billet in transverse direction



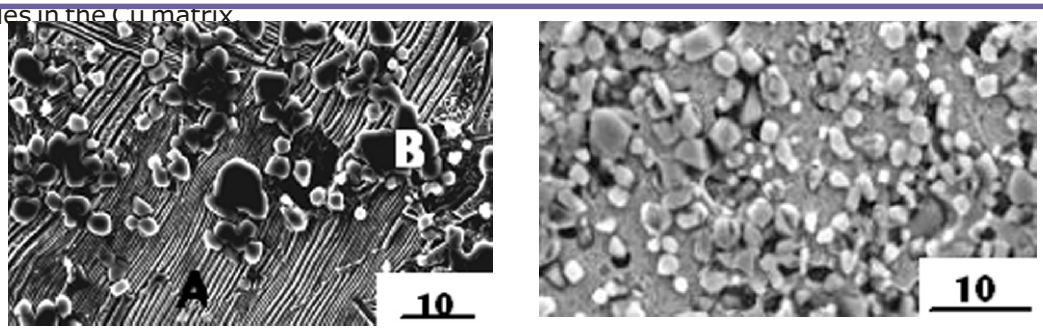
Extruded tube from homogenised billet in longitudinal direction

Microstructures under different conditions

Cast in-situ Copper-based Metallic Matrix Composites

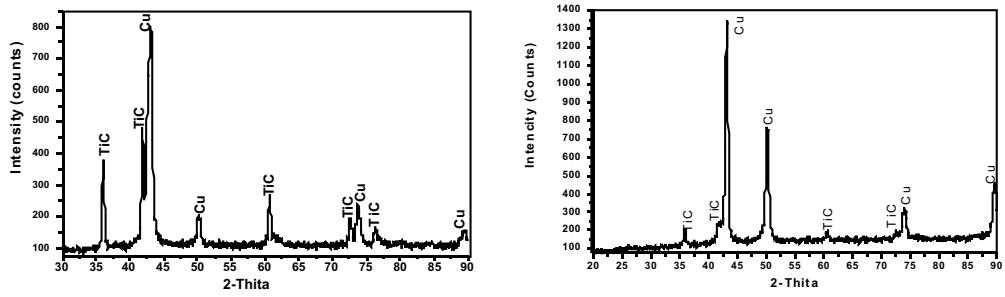
Self-propagating high temperature synthesis (SHS) is an attractive process for synthesizing engineering materials such as ceramics, composites and intermetallics as compared to conventional synthesizing techniques. Copper metal matrix composites are extensively used in electrical sliding contacts, resistance welding electrodes, high performance switches, motors, heat exchangers, electrodes etc. However, lower strength levels of pure copper limit its wide usage especially at high temperatures. Addition of non-metallic second phase particles such as oxides, carbides and borides dramatically improve mechanical properties and wear resistance. Incorporation of second phase particles to the matrix through conventional synthesis technique has some limitations. However, these limitations could be overcome by in-situ generation of the second phases during melting or other processes. By this in-situ technique an improved reinforcement and better bond strength between the matrix and second phases are achieved. In addition, the surface is free of contaminations such as gas absorption and oxidation. Moreover, fine-grained and thermodynamically stable ceramic phases are formed during in-situ technique and are responsible for improved physical, mechanical and tribological properties.

In view of the above, Cu/(Cu-Al) based metal matrix composites containing 50 wt.% TiC 0.7 have been synthesized by in-situ SHS process using casting route. The master composites have been diluted to contain 10% TiC by alloying technique. C/Ti ratio 0.7 has been maintained in this study to facilitate wetting and uniform dispersion of TiC in Copper matrix. The study also indicates that Al addition improves the wet ability of the dispersoid phase with the matrix and leads to more uniform distribution of the TiC dispersoid in the matrix along with micro structural refinement and superior mechanical and tribological properties. XRD results confirmed the presence of TiC particles in the Cu matrix.



Without Aluminum With Aluminum

Micro structural features of Cu-Tic particle composites



XRD Pattern of the Cu-TiC particle composites
(a) without Al and (b) with Al

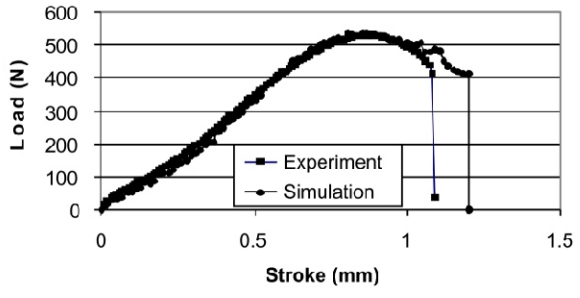
New Materials for Feed and Pressing Worms and Screws and Cage Bars of Oil Expellers

Samples of the cage bars and the worms were collected from five manufacturers [from Ludhiana, Kanpur, Faridabad, Hyderabad and Ghaziabad] and ten users around Bhopal, Indore and Kanpur. AMPRI analyzed properties of the pressing worms and cage bars collected from different oil mills and manufacturers and based on that developed three types of identified alloys to achieve enhanced life of pressing worms and the cage bars in commercial oil mills. These alloys when tested at laboratory scale gave twice the life of these alloys compared to the alloys commercially used in pressing worms and the cage bar. However, the techno-economic analysis revealed that the two fold enhancement in the life of worms and bars would be realized only during their very first use. Thereafter, present practice of rebuilding would be followed. Hence, suggested identified alloys were not economically justifiable considering about 6 to 8 times excessive initial investment.

AMPRI focused on to identify a couple of suitable identified rebuilding materials (welding rods) which would extend the life to the oil mill worms and would also be techno-economically viable. Such rods would also have easy adoptability by the commercial oil mills on large scale. Hence, in second phase, AMPRI identified and recommended two types of rebuilding materials i.e. welding rods available commercially in the market. These were Eutectrode 6450, size 4.00 mm and Type-2-B, size 4.00 mm (Make - L&T). These two welding rods were tested by CIAE through field trial in two commercial oil mills located in Bharatpur for milling of mustard / rapeseed and their operational life was determined and compared with the presently used combination of soft and hard welding rods.

Material Characterization using Small Punch Test

Small punch test (SPT) is a very useful technique for material characterization using miniaturized sample. This technique is based on driving a ball of 1 mm diameter through a clamped TEM specimen with 0.25 mm thickness till it fractures. It is a non conventional NDT tool for assessing the health of aging thermal and nuclear power plants without shutting them down. SPT experiments and its computer simulations will provide a novel approach for obtaining the material parameters via inverse engineering route. SPT and simulation based load stroke curves are found to be in close match.



Small Punch Test Machine installed at AMPRI

Mathematical Modeling and Computer Simulation

Under the CSIR TFYP network projects AMPRI has developed expertise in the area of mathematical modelling and computer simulation and produce deliverable FINEART software. The objective of this project having following features:

- Nonlinear explicit algorithms for impact and ballast loading.
- Smart materials and structures with adaptive control.
- Large deformation, plasticity and creep.
- Algorithm for solidification, metal forming and metal casting.
- Ultimate strength evaluation and damage assessment of typical RC structural components.
- Computational fracture mechanics.

This network project was participated by 5 laboratories namely, C-MMACS, SERC, AMPRI, NML and NIIST. After successful testing the FINEART software was launched. M/s Crains Software International Ltd. Bangalore has been chosen as strategic partner for its marketing.

Micro, Meso and Macro Analysis of Ductile Fracture

A fracture criterion that could accurately predict failure would be a useful engineering tool both for the evaluation of structural integrity and the selection of materials. Complex structures may experience stress in some regions that exceed the elastic limit necessitating a fracture criterion that would also include elastic-plastic behaviour. The path independent J integral proposed by Rice is a well-established parameter that describes the crack tip elastic-plastic field. Several methods are available to understand the process of crack initiation and propagation in ductile materials. In an attempt to achieve an overall understanding, some of these techniques were studied using a large deformation based finite element method (FEM). In the current investigation, typical crack-tip blunting prior to ductile fracture behavior of a standard (CT) specimen under mode I loading condition was simulated using FEM. An attempt was made to understand the ductile fracture by numerically determining the ductile fracture toughness at three length scales: macroscopic scale (Load-displacement method) and mesoscopic scale (path-integral method) and microscopic scale (Stretch Zone Width method). The experimentally obtained properties of Armco iron for different grain sizes are used as the effective properties of the homogeneous continuum in the present study. In addition, an attempt has been made to establish the characteristic distance correlation with fracture toughness. This method assumes a special significance since it links the fracture toughness to the microscopic mechanism of ductile fracture. The numerically predicted fracture toughness results at a particular load-line result showed good resemblance between numerical results from three different scale assessment methods and also with experimental results of initiation fracture toughness. Fracture toughness values determined through three methods using RRL FEM (in house code) and ABAQUS exhibit almost the same type of variation but with a dispersion of about 10%.

The study on Armco Iron showed that the zone of intense plastic deformation can be considered as the characteristic distance for the material. The study is also extended to numerical determination of stretch zone width (SZW) using the tensile test data. The region of high deformation at the crack tip is delineated using the critical and fracture energy densities obtained by tensile test. The proposed methodology also provides insight into the mechanism involved in the creation of stretch zone width. The present study also tries to model crack growth in CT specimen using FEM analysis considering Gurson-Tvergaard-Needleman (GTN) material model.

PTFE lined Thrust Bearing Pad Material for Hydro Generators

A project on "Development of a Process of Making PTFE Lined Thrust Bearing Pad Material for Hydro generators" was sponsored by BHEL, Bhopal. The aim of the project was to develop PTFE lined bearing material on laboratory scale. BHEL is currently using conventional babbitt lined thrust bearing pads in hydro generators which suffer from problems like thermal deformation, low scratch resistance, short life, low load bearing capacity, frequent break down of pads etc. Further, the coefficient of friction of such lining is higher which leads to additional power losses. Such problems may be overcome by using PTFE lined bearing pads in place of Babbitt lined one. There are many advantages of using PTFE lined pads such as antifriction, scratch resistant, higher load carrying capacity, extended thermal limit, possibility of having operation with a hydrostatic jacking system during a start up and shut down, and insulating characteristics as compared to traditional babbitt lined bearing pads. A successful method has been developed to make PTFE lined steel backing thrust pad bearing material on laboratory scale by joining PTFE with steel substrate with the help of bronze spring. The developed innovative method is to be upgraded for a life size thrust pad preparation and its commercial exploitation.

PTFE lined steel backing thrust pad sample

FRP V-block for Hydro Generators

Bharat Heavy Electricals Limited (BHEL) is a major public sector involved in manufacturing electrical power plants and heavy machinery. They are supplying hydro generators of different capacities all over the world. In the process of improving and upgrading their hydro generators, a component known as V-block was identified to develop with the scientific and technical collaboration with AMPRI, Bhopal. V-blocks are used to support field coil to avoid distortion and collapse and to remain at their position against very high loads generated during their rotation due to the centrifugal force. Existing V-blocks are made of Aluminium alloy, which was replaced by light weight, non-conducting, high strength fiber reinforced plastics (FRP). Glass fiber reinforced composite was developed for their special application, which has high strength, tough ness, stability and chemical resistance. V-block has been redesigned and is now been made by reinforcing of stainless steel in FRP material using unique molding technique. Reinforcing of steel into FRP was decided based on the FEM analysis carried out on V-block. Modification in design of FRP V-block was carried out jointly by AMPRI and BHEL Bhopal. V-blocks were made at M/s Associate Engineers, Bhopal under joint supervision and guidance of AMPRI, Bhopal, HEG and BHEL, Bhopal. The blocks have been installed successfully by BHEL Bhopal and are functional in hydro generators.

Different views of FRP V-block

Functionally Gradiant Polymeric Composites

AMPRI Bhopal has been developing different types of filled and reinforced composites in the past. Under a CSIR TFYP network project following objectives were addressed by the institute:

- to develop flow induced functionally gradient polymeric composites.
- to evaluate microstructure, rheology, tribology and modulated thermal properties of newly developed polymer composites.
- to understand the phenomenon of flow induced transportation of organic/ inorganic(virgin/recycled)particles in Newtonian fluids.
- preparation of Nd Fe B polymer composites
- to evaluate the mechanical and magnetic properties of Nd Fe B filled polymer.

Accordingly AMPRI completed following tasks during the project execution:

- Developed flow induced functionally gradient polymeric composites
- Evaluation microstructure, rheology, tribology and modulated thermal properties of newly developed polymer composites
- Understood the phenomenon of flow induced transportation of organic/ inorganic(virgin/recycled) fibers/particles in Newtonian or in non Newtonian fluids
- Preparation of Nd Fe B - polymer composites
- Evaluation of mechanical and magnetic properties of Nd Fe B filled polymer

Non-toxic Radiopac Materials

A new material and novel process has been conceptualized and developed by AMPRI, Bhopal which involves a unique approach and methodology for making "highly effective shielding phases" utilizing red mud and fly ash.

The wide application spectrum of "radiation based technology" ranges from radio wave to x-ray and gamma ray is well established. Application of high energy electromagnetic radiations i.e. x-ray and gamma ray are inevitable in areas like medical application (X-ray diagnostic and CT scanner rooms/ establishments, gamma radiation therapy of cancer), energy sector, power generation by nuclear power plants, defense sector (bunkers for army personnel's) etc., and utmost the challenges for strategic safety planning in view of increased global terrorist activities etc. However, the health hazards of radiation exposure are well established.

The use of toxic metals like lead and rare earth materials were obligatory so far for radiation shielding. Lead is highly hazardous and ranks second in the list of most hazardous materials in UPA list of USA. Development of new no toxic material with high radiation shielding efficiency and better physico-mechanical properties has become very much imperative to meet the challenges of radiation safety. To meet the challenges, AMPRI developed a novel process for making advanced new Radiopac materials. The shielding efficiency of developed radiopac materials, by the innovative process has been evaluated by radiation standards and Safety System Division of BARC, and Atomic Energy Regulatory Board (AERB), Mumbai and found that :

- The HVT (half value thickness) i.e. shielding thickness of the developed materials is as thin as Lead for diagnostic X-ray of 100kV.
- The HVT (half value thickness) i.e. shielding thickness of the developed materials is 60% less in comparison to conventionally used concrete for gamma radiations.

The cost effective new radiation shielding materials from no cost raw materials i.e. industrial waste, meets the ISI and ASTM standards to be used for construction radiation shielding installations for multifarious applications.

The technical challenges to be overcome of the conventionally used shielding materials are among the use of i) highly toxic metal lead and its compounds, ii) low melting temperature of lead metal and iii) very high shielding thickness requirement due to the use of conventional concretes. Therefore, to overcome the technical challenges of the conventional materials, a novel and innovative process for making a) non toxic lead free, b) high temperature resistant and c) requiring lower thickness, novel shielding materials has been developed which basically consist of chemically formulating highly effective, in-situ generated shielding phases, in the new developed radiation shielding materials, which can preferably be used in place of conventionally used shielding materials as suggested by Atomic Energy Regulatory Board, Mumbai, based on the radiation attenuation characteristics of the developed materials.

Demonstration of Radiation Shielding Tiles developed at AMPRI in X-Ray Room, District J. P. Hospital, Bhopal.

Waste Minimization in Zinc Industry

AMPRI carried out this project in TFYP network project. Objectives of the project were:

—Separation of lead content from the anode mud/ chips and activate the remaining MnO_2 to leach able form for in plant recycling with a view to minimize the waste generation
—Optimization of process parameters for zinc electrolysis to reduce parasitic reactions leading to acid generation.

The identified gaps in the technology were (a) non-availability of a process for activation of manganese content from lead impurities to make it suitable for recycling in the plant and (b) lack of suitable in-site in the reasons for the generation of acid mist during electrolysis of zinc and development of additives for its suppression and in turn evolve optimized process parameters for electro winning of zinc with low acid mist formation. To this end, a carbothermal reduction process, utilizing a liquid phase reducing agent (LDO) has been developed for the activation of manganese phases present in the anode mud. The activated material is acid leachable and helps in separation of lead compounds. The solution containing manganese sulphate is substantially free from impurities and is suitable for recycling in the electrolysis bath while the lead bearing residue has been used for making pigment for glazing materials.Some of the major achievements are summarized below:

•Carbothermal reduction process of anode mud has been developed to achieve 95% manganese recovery at 0.5 kg/batch levels.
—On up scaling the process of carbothermal reduction to 10kg/batch treatment level, a recovery of 90% manganese is achieved.
—The leaching of manganese content has been optimized in sulphuric acid. A 20% acid content with 7 hours leaching at 100oC has been found to be optimum.
—Separation of lead from anode mud and preparation of lead pigments, useful for glazing ceramic materials has been achieved.
—Parasitic reaction such as acid mist generation has been reduced successfully by the addition of a source of polysaccharides in electrolytic solution.

Clean Coal Yield Optimization

Most of the coking coal washeries are receiving coals of different washability characteristics and hence, the performance optimization of the coal washing circuits has become critical. To formulate a better methodology towards performance optimization of the gravity circuits with changing feed coal characteristics a new index termed as 'Near Gravity Material Index` (NGMI) has been developed. Based on the systematic experimental trials at the laboratory it has been found that for optimum yield at various clean coal ash levels the NGMI of that coal should be within 0.32.

New Software for Coal Washability Analyses

A new software has been developed for coal washability analysis which has the following features:

—Automation of the washability and NGMI curves generations from the float sink data of coal samples.
—Comparison of washability characteristics of various coal samples (max. 20 coals) based on their float sink data.
—Facilities like searching, import and export data to and from EXCEL files, printing of curves

Towards better understanding of Jigging Phenomenon

Although Jigs are one of the oldest unit operations in coal washing, the mechanism of particle separation inside it is not completely understood yet. Indian coals generally belong to difficult-to-wash category due to the presence of high amount of near gravity materials (NGM). To understand how these NGM particles behave inside a jig a few sets of innovative experiments were carried out in a laboratory scale eccentric jig. To test the validity of the new knowledge generated in an actual operation, coal samples from various product streams of the jig circuits were collected from Nandan coal washing plant of Western Coalfields Limited in association with CMPDI, Ranchi and ISMU, Dhanbad. Float sink analyses of the collected coal samples are in progress to develop a mathematical model towards performance optimization of jigs with changing feed coal characteristics.

Prediction of Calorific Value of Coal from its Proximate Analysis

The experimental determination of higher heating value (HHV) of solid fuels is a cost intensive process, as it requires special instrumentation and highly trained analyst to operate it, where as proximate analysis data can be obtained relatively easily using an ordinary muffle furnace. An effort has, therefore, been made to develop a simple correlation based on proximate analysis data for predicting HHV of coal (as-received basis). The model is developed using analyses of 250 coal samples and its significance lies in involvement of all the major variables affecting the HHV. The developed model appears to be better than the existing models and has the following form: HHV = -0.03(Ash) -0.11(Moisture) + 0.33(Volatile Matter) + 0.35(Fixed Carbon).

Cenospheres Processing

Cenospheres are hollow spherical particles available in the fly ash. Cenospheres are high value materials, which are light in weight with densities between 0.4 and 0.7g/cc. The spherical shell mostly contains minerals with compositions of aluminum silicates, which is stable at high temperature (~1000C). Due to hollow nature, the cenospheres possess high acoustic, thermal and electrical insulation and thus have applications as filler in wide range of composite materials (polymer, cement, ceramic, metal matrix etc.). Certain quality cenospheres have applications in adsorption of radioactive metals from liquid nuclear wastes. The cenospheres particles due to light in weight float on water in the ash dam. Along with cenospheres, the water floating fraction contains material like unburned carbon particles, broken shells of spheres, ultra fine entrapped ash particles etc. Thus the water-floating fraction is of variable composition, size and density. A research activity has been taken up to understand the characteristics and develop a process methodology to generate invariable composition cenospheres from the water-floating fraction. As cenospheres collection, processing and applications are relatively new in the country, initially a detailed survey on the formation of cenospheres, characteristic properties, applications in different industrial sectors, commercially available grades was carried out. Detailed physical, chemical, mineralogical and micro structural characterization studies on a typical water floater material collected from Satpura Super Thermal Power Station (SSTPS), Sarni, MP was carried out. Later, the methods for separation of unburned carbon and water sinker portions were carried out using different process techniques.

An overall process flow sheet has been developed including a method for simultaneous rejection of unburned carbon and water sinkers content, recovering the magnetic fractions of cenospheres and grading into different size and density fractions. Using the process flow sheet developed, about 84% of the feed floater fraction reported as concentrated cenospheres (yield) with invariable composition. Grades with sizes between +500m, 500-300 m, 300-212m, and with average sizes around 175m, 110m, 75m are generated which can have applications in different engineering sectors. By suitable control on the process and design conditions in the flow sheet, any suitable size range material can be generated within the above size range. About 6% of iron-enriched cenospheres are generated as a suitable grade for adsorption applications. The bulk density of the processed grades would be 0.35 to 0.45 g/cc.

Technology Enabling Centre (TEC)

Advanced Materials and Processing Research Institute (AMPRI), Bhopal has developed a technology for making composites (R-wood) using industrial wastes, natural fibre and polymer. The salient features of the composites are high strength to weight ratio, termite and corrosion resistant, self-extinguishing, durable and environmental friendly. These composites can be used for various applications such as doors, tiles, partitions, ceilings, boards, panels, furniture, instant houses, electrical applications etc., This technology was developed in view of the National Forest Policy of MOEF, Government of India for development of wood substitute for building application so that consumption of timber in building and house construction can be minimized along with solving the problem of pollution, deforestation and ecological imbalance. The door shutter with innovative technology was thoroughly tested by CPWD, BHEL and CBRI, Roorkee for their performance. After successful field trials CPWD approved the door shutters.

For upscaling and customization of these products, a Technology Enabling Centre (TEC) has been setup at AMPRI, Bhopal for manufacturing R wood products in semi to patch process in continuous operation with the following objectives:

- Training of entrepreneurs
- Commercialization
- Design and development of machineries

The production capacity of the TEC for one shift is about 100 panels size of 1 metre wide, 2 metre length having thickness of 6 mm. This center will also facilitate the development / commercialization of composites materials and products from different industrial wastes like fly ash/ red mud/ marble waste and natural fibre to be used in automobiles, railways, acoustics and noise barrier materials, light weight composites, insulating materials, boat and instant houses for disaster victims.

Surface Treatment of Natural Fiber Cloth

Preparation of Polymer

Polymer Composites Making

Composite Panels

Technology Enabling Center

Instant House

Instant house version 1.0 has been prepared with the targeted specifications. In this version Indian Standard Angle Sections has been used for frame structure. Sheets made of Jute-fly ash polymer composite have been used for the walls and roof. This first version is not having the provision of thermal insulation to protect the inhabitants from the outside weather, which will be incorporated in the next version. Deflection test for individual member of version 1 house has been done as per Indian standard at AMPRI, Bhopal to have the preliminary deflection control under different loading conditions.

Version 2 house have the provision of thermal comfort and has been constructed using square pipe sections. Presently commercially available high density thermocol sheets will be used for the thermal insulation later on another cheaper/waste material will be used for the insulation purpose.

A battery recharging station at Chandni Chowk, New Delhi was constructed using natural fiberfly ash polymer composite sheets developed at AMPRI, Bhopal. This was inaugurated by Smt. Sheila Dikshit, Honorable Chief Minister, Delhi, Sh. Kapil Sibal, Honorable Minister of Science & Technology and Earth Sciences, GOI and VP, CSIR along with Prof. S.K. Brahmachari, Director General, CSIR on October 2, 2008. This station will be used for housing the battery which will be charged using solar power.

Instant House as Battery Recharge Station at Chandni Chowk, New Delhi

Sisal Technologies for Rural Development

Sisal is one of the natural fibres widely available in most parts of the country and also being cultivated with least financial inputs and maintenance. Sisal fibre is a hard fibre extracted from the leaves of the sisal plant (*Agave Sisalana*) which exhibits very high strength among various other natural fibres. A sisal plant produces about 200-250 leaves and each leaf contains 1000-1200 fibre bundles which is composed of 4% fibre, 0.75% cuticle, 8% dry matter and 87.25% water.

Sisal fibre is traditionally extracted by retting, a biodegradation process involving microbial decomposition of sisal leaves, which separates the fibre from pith. The fibres are washed and processed further. This process takes 15-21 days for a single cycle of extraction and degrades the quality of fibre. The retting process is water intensive, unhygienic and not eco-friendly. The other methods available for the extraction of fibre are chemical treatment and mechanical extraction. The mechanical extraction is done with the help of Raspador machine, suitable for small scale operations. Sisal fibre consists of 66-72% cellulose, 12% hemicellulose and 10-14% lignin. The superior engineering properties (diameter 50-200 µm, microfibril angle 10-220, ultimate tensile strength of 468-640MPa, modulus of 9.40-15.80 GPa and elongation of 3-7%) makes it as an excellent material for manufacturing high strength textile and reinforcement in composites for various applications. Sisal fibre is mainly used for the manufacture of ropes for use in marine industry and agriculture, for making twines, cards, fishing nets, fancy articles such as purses, wall hangings, table mats etc. However, sisal fibre has great potentials to use as reinforcing materials that can be used for verity of applications. In the present study attempts are being made and explored the possibilities to effectively utilize sisal fibre for economic, employment, social and sustainable rural livelihood development.

Following activities have been undertaken in this project:

— Providing technical guidance for sisal nursery raising and cultivation in different regions in Madhya Pradesh and Chattisgarh.
— Development of improved methods of sisal fibre extraction for industrial applications.
— Processing and characterization of sisal fibres for yarn making.
— Development / adoption of technologies for making sisal yarn and textile.
— Product development: Building materials, instant house, Geo-textiles, Buffing wheel, Storage bin and fishing boat.
— Training of tribal and rural masses on different technologies for employment generation and rural development.

Design, Analysis and Health Assessment of Special Structures including Bridges

AMPRI carried out durability studies on concrete structures in the CSIR TFYP project. The objectives are:

Standardization of NDT investigation techniques (Using equipments i.e. Pulse Ultrasonic Tester, Rebound Hammer, Resistivity Meter, Half Cell Potentiometer, Permeability Tester) of concrete M20-M60 grades exposed to various atmospheric conditions i.e. CO_2, SO_2, NO_2, Combination of CO_2, SO_2, NO_2, Acidic, Alkaline, Salt and Urea.

— Database generation for environmental attack on concrete for various exposure conditions i.e. CO_2, SO_2, NO_2, Acidic, Alkaline, Salt and Urea attack.
— Durability studies on concrete structure built in Madhya Pradesh.

The agencies approached for identification of distressed concrete structures for conducting durability studies are BHEL, Bhopal; MES, MP Region; National Highway, Bridge Zone; PWD, MP; PHE, MP; Central & Western Railway; State Govt. Organization i.e. Housing Board, Police Housing Corporation, BDA, Municipal Corporation etc.; State Bank of India, MP Region.

AMPRI completed detailed investigations and made recommendation for strengthening the m/c foundation. Accordingly BHEL, Bhopal implemented the recommendations for rehabilitation of the concrete structure and 40 MVA MG set is working without any problem.

The durability of concrete is defined as its ability to maintain its properties, particularly strength, attained over the initial development phase when subjected to service exposure for a long time. The type of cement used in concrete has some influence on its durability. But, more importantly, the quantity of cement per unit volume, grading of aggregates, quality of cement, low water to cement ratio, good compaction and low permeability largely affect durability. AMPRI prepared "Manual for Durability Study of Concrete". Concrete specimen of M20 to M60 grade of concrete of size 150 X 150 X 150 mm cube were prepared and exposed in artificially created accelerated atmospheric conditions various atmospheric conditions i.e. CO_2, SO_2, NO_2, combination of CO_2, SO_2, NO_2, acidic, alkaline, salt and urea. Prior to start the exposure experiments, the specimens were evaluated for its soundness by performing Ultrasonic pulse velocity test on concrete from M20-M60 grades. Finally, the specimens were sorted for the Ultrasonic pulse velocity, 4200-4700 m/sec and exposed to accelerate atmospheric conditions.

Sixteen Chambers of 3.0375 Cu. Mt. each were constructed for creating accelerated atmospheric conditions. The size of each chamber was kept as 1.50 X 1.35 X 1.50 m^3 in which about 380 nos. cube specimens were kept for exposing in accelerated conditions. Following observations were made:

— In carbonation attack on various grade of concrete (M20 - M60), It was observed that after completing 450 days of exposure at 10000 PPM, the M20 grade concrete got carbonation attack 3.5-4 mm and pH reduction from 12.48 to 11.96. Whereas, in case of M-60 grade concrete, the carbonation attack was received, 1-1.5 mm depth and pH reduction was 12.48 to 12.25. From study it can be concluded that one year of designed accelerated exposure for 10,000-ppm concentration of CO_2 is equivalent to sixty-three years of exposure under normal atmospheric conditions in residential areas. There was no sign of puffing due to corrosion of reinforcement in concrete specimen.

— In case of sulphate attack it is observed that after completing 450 Days of exposure at 2000 ppm, M20 grade concrete slightly affected by the sulphate attack, which was noticed in gravimetric analysis and a pH reduction of 12.48 to 12.30, was observed. Whereas, in case of M 60 grade concrete, no sign of sulphate attack was noticed. Hence it is concluded that one year of designed accelerated exposure for 2,000 ppm concentration of SO_2 is equivalent to seventy-five years of exposure under normal atmospheric conditions in residential areas. It indicated that the specimen has been found safe for at least seventy-five years of normal exposure in residential areas.

— In case of NO_2 it is observed, that after completing 450 Days of exposure at 2000 ppm, the M20-M60 grade concrete do not show any deterioration due to NO_2 attack, and there is no sign of reduction in pH value of concrete, which conclude that nitrous oxide attack over concrete act as corrosion inhibitor. Finally, it can be concluded from the observation that one year of designed accelerated exposure for 2,000 ppm concentration of NO_2 is equivalent to seventy-five years of exposure under normal atmospheric conditions in residential areas, which means the concrete under nitrous attack in residential areas is safe for at least seventy five years.

— Similar observations were noticed in case of combination of gaseous attacks. For the combination of gases it is concluded that one year of designed accelerated exposure for 5,000 ppm concentration is equivalent to forty-five years of exposure under normal atmospheric conditions in residential areas.

— In case of acid, salinity and alkali aggregate reaction attack no significant deterioration on specimens is observed.

— It can be concluded that the sound concrete of UPS (Ultrasonic Pulse Velocity) value 4200 to 4700 m/s can sustain for 75 to 100 years of normal atmospheric exposure without affecting the durability as per National Ambient Air Quality Standards (NAAQS) specified by Central Pollution Control Board, New Delhi.

New Building Materials and Technologies

AMPRI carried out following activities in a TFYP net work project:

— Development and Performance Evaluation of Industrial / Agro wastes based Coating Materials for Protection of Steel Structures from Corrosive Environment.
— Utilization of Industrial Wastes and Value Addition in developing Bricks & Blocks and its Performance Characteristics Studies.
— Development of Wood substitutes from Industrial Wastes and Fibre-Polymer Composites.

It was possible to develop anticorrosive and anti-abrasive paint formulations based on copper tailing wastes. Utilization of copper tailings in developing paint is environmentally safe. Paint prepared from copper tailing showed better physico-mechanical properties. AMPRI developed fired bricks from copper mine tailing of Khetri, Rajasthan. Joint efforts by BMTPC and AMPRI, Bhopal towards commercialization showed that field trials of Khetri copper tailing bricks are satisfactory. Interaction with HCL, Khetri and local brick manufacturers was carried out to identify prospective entrepreneurs. Imparted training on Khetri copper tailing based bricks and the bricks are tested by entrepreneurs and ready to manufacture on commercial scale.

AMPRI developed a process for immobilizing and recycling hazardous jarosite waste in developing value added products using coal combustion residues / marble processing residues. A process was developed for immobilizing and recycling hazardous Jarosite waste released from zinc industry in developing non hazardous building material using another industrial waste as an additives. Jarosite waste contain toxic elements like lead, zinc, sulphur, cadmium, chromium, copper and other metallic oxides. Detoxification/ immobilization of toxic substance in jarosite waste were achieved using coal combustion residues (CCRs) through s/s in combination with clay. Further thermal stability and strength of solidified products were achieved through low temperature sintering. The suitability of the s/s sintered products was performed for their use in engineering application like bricks / blocks. Toxicity leachate characteristics, mineralogical and morphological properties of s/s sintered products were also carried out and confirmed their environmental significance.

AMPRI developed jute reinforced polymer composite using fly ash and marble waste. Efforts were made to utilize fly ash and marble slurry dust for developing jute polymer based composites. In this process, marble slurry dust, polymer and fire retardant jute fibre are mixed with catalyst and synthesized in moulds of required length and width. The composite matrices were fabricated with requisite pressure and cured at room temperature. Panels were prepared using marble slurry

Rapid Environmental Impact Assessment for Beneficiation Plant Modernisation and Fluorspar Mining at Ambadungar, Gujarat

Gujarat Mineral Development Corporation Ltd., (GMDC), Ahmedabad is engaged in tapping and extraction of mineral resources and development of mineral based industrial products. The fluoruspar ore is excavated from the present mining lease area, which is 31.2 hectares at Ambadungar near Kadipani and is used for beneficiation plant. The plant site is located about 141 km south - east of Vadodara . The beneficiation plant at Kadipani at present is fed with 100,000 MT/year of ore from mine.The fluorspar concentrate produced is approximately 14,000 MT/year. The yield and recovery of the plant is 14% and 60% respectively. The plant has become old and wear and tear of machinery has further reduced the production efficiency. The GMDC proposes to update the technology and makes it economically viable. The production after modernization will be 30,000 MT/year and ore fed will be 150,000 MT/year. The modernization technology would increase yield from 14% to 20% and recovery from 60% to 80% thus making it economically viable.

The rapid environmental impact assessment study has been carried out for summer season. Baseline data was collected for air, noise, water, land, biological and socio- economic components of environment to identify predict and evaluate the potential impacts associated with the proposed beneficiation plant modernization activity. Eleven ground water, four surface water including two water treatment plant samples and fourteen soil samples were collected and analyzed for various environmental parameters. The noise levels were measured at twenty four locations within the study area with the help of an integrated sound level meter. Ambient air quality monitoring has been carried out at eight monitoring stations. Suspended particulate matter, irrespirable particulate matter as well as gaseous pollutants like sulphur dioxide and nitrogen oxide were monitored on 24 hourly basis.

The 95th percentile 24 hourly concentration of sulphur dioxide and nitrogen oxide found in the study area are in the range of 10.2 to 30.2 g/m^3 and 8.5 to 25.2 g/m^3 respectively. ISCST 3 (Industrial Source Complex Short Term) model was used to predict the ground level concentrations (GLC's) of suspended particulate matter due to fluorspar ore beneficiation plant modernisation activities. The model results shows that the maximum ground level concentration of suspended particulate matter and sulphur dioxide was found to be 36 g/m^3 and 10 g/m^3 respectively and occurs at a distance of 1 Km in South-East direction with a reference point of (5,5) which is centre point of 10 Km x 10 Km grid. Data on biological environment, demographic pattern, population density, educational facilities etc. has been collected for the study of socio-economic environment. On the basis of results of the analysis, significant impacts due to the proposed project on various environmental components have been quantified. Environmental management plan has been prepared along with post project monitoring, which would help in identification of proper mitigation measures wherever necessary for preventing deterioration in the quality of surrounding environment.

Environmental Impact Assessment Studies for Gujarat Mineral Development Corporation

AMPRI carried out following studies for Gujrat Mineral Development Corportion (GMDC):

- Rapid Environmental Impact Assessment and Environmental Management Plan for lignite Mine Panandhro, Kutch.
- Rapid Environmental Impact Assessment for lignite Mine at Umarsar, Kutch.
- Terms of Reference (TOR) report of Rapid Environmental Impact Assessment for ModernizationCapacity Expansion for Fluorspar Ore Beneficiation Plant, Kadipani.
- Terms of Reference (TOR) report of Rapid Environmental Impact Assessment for Lignite Mine at Panandhro, District, Kutch.
- Rapid Environmental Impact Assessment and Environmental Management Plan for lignite Mine Panandhro, Kutch.
- Rapid Environmental Impact Assessment for lignite Mine at Umarsar, Kutch.
- Report of Rapid Environmental Impact Assessment for Modernization and Capacity Expansion for Fluorspar Ore Beneficiation Plant, Kadipani.
- Report of Rapid Environmental Impact Assessment for Lignite Mine at Panandhro, District, Kutch.
- Rapid Environmental Impact Assessment for Beneficiation Plant Modernisation and Fluorspar Mining at Ambadungar, Gujarat

On the basis of results of the analysis, significant impacts due to the proposed project on various environmental components have been quantified. Environmental Management Plan was proposed along with post project monitoring, that would help in identification of proper mitigation measures wherever necessary for preventing deterioration in the quality of surrounding environment.

Utilization of Treated Effluents and Reduction in Water Consumption of Security Paper Mill, Hoshangabad

Security Paper Mill is situated on the bank of river Narmada in Hoshangabad District of Madhya Pradesh. It was set up by the Govt. of India under the Ministry of Finance (Department of Economic Affairs) to produce Bank Note Paper and other security papers.

The entire water requirements of the mill is received from the river Narmada. A total quantity of 14928 m^3/day of raw water is being pumped from intake well. The raw water from the river is treated in a conventional Water Treatment Plant (WTP) consisting of alum coagulation, clarification and filtration through the rapid sand filters. . At present the total water requirement of the industry is 14,760 m^3/day. Out of this 13 % of the total treated water (1920 m^3/day) from WTP is sent to SPM Colony for domestic purposes and old fire hydrant. Remaining 87% of the total requirement (12,840 m^3/day) is used in the factory for various process operations. Samples were collected from various locations of Effluent Treatment Plant, Sewage Treatment Plant, and Water Treatment Plant and analyzed for various environmental parameters. Sludge samples were also collected and analyzed. On the basis of results of analysis the guard pond design is provided and the proposed ETP units to be included along with the existing ETP system can be followed to conserve the water usage by adopting reuse/recycle system, thus meeting the zero discharge concept.

Evolving a Consolidated Project Proposal in the Area of Green Infrastructure Technology for ALCOA

Green technology applications and products are fast catching the attention world over due to growing environmental concerns. In this context, Alcoa Inc. USA under the aegis of CSIR-Alcoa Innovation Council expressed its desire to sponsor a project in the area of 'Green Infrastructure Technology'. The project aims at harnessing the existing expertise and facilities of Alcoa as well as exploring the new avenues for business advancement. The main objective of the project was to identify potential participants who fit in suitably as per the shopping list of Alcoa for the Green Infrastructure Technology project.

AMPRI, Bhopal was requested to co-ordinate the entire activity in the form of a project and establishes contacts with the interested individuals and institutions who hold the expertise and desire to participate in the aforesaid project. Potential participant were identified through a meeting held at AMPRI Bhopal in the month of May 2008 presented their proposals in a brainstorming forum where the experts from CSIR as well as Alcoa were invited to participate. The invited participants presented their views and the experts catalyzed their new ideas with their comments to guide the course of action. In all, twelve presentations were made by the participating scientists and experts attending from different CSIR and non-CSIR Institutes. The institutes participated are : AMPRI Bhopal, CSMCRI Bhavnagar, CGCRI Kolkata, IICT Hyderabad, CBRI Roorkee, IIT Kharagpur, C-STEP Bangalore, and TERI New Delhi. A compiled version of the proposals initially in the form of a draft document was prepared and submitted to Alcoa for comments. Once approved, the final document will be compiled and will be submitted to Alcoa as a final project document.

Fugitive Emission Monitoring and Development of Emission Factors for Petroleum Storage Sectors

Storage vessel containing organic liquids and petroleum products are found in many industries including petroleum product refining, petrochemical and chemical manufacturing, bulk storage and transfer operations and other industries consuming or providing petroleum liquids. Petroleum products are generally highly volatile. Literature survey was carried out to study the existing project scenario in country.

The study carried out for similar activities from USEPA is evaluated for conducting the monitoring methodology. Reliance Petroleum terminal at Bakaniyan Bhopal, Kanpur, Abu Road and IOCL Depot Nishatpura, Bhopal were identified for the project studies. Data was collected for petroleum storage tank farms based on designed details of the bulk storage tanks. Emission factors at different tank components for external floating roof tanks of MS, SKO and HSD were estimated at forenoon and afternoon hours.

On the basis of results of the analysis, significant impacts due to the proposed project on various environmental components have been quantified. Environmental Management Plan was proposed along with post project monitoring, that would help in identification of proper mitigation measures wherever necessary for preventing deterioration in the quality of surrounding environment.

Support Initiatives for CSIR rural action program (RAP)

During X Five Year Plan CSIR reoriented its efforts towards rural development activities for enabling smaller communities in the context of a demand driven approach. AMPRI was given the responsibility of publication of Journal of Rural Technology, Publication of Draft Plan and establishment of a rural gallery for showcasing the successful CSIR rural technologies.

Journal of Rural Technology published quarterly and was distributed to various rural development institutes/organizations as a gratis copy. First four issues of the journal covered the prominent technologies of the CSIR laboratories. Journal has received good attention among rural development institutes/organizations, NGO`s and smaller communities. The draft plan on CSIR orientation towards rural development was also published and distributed to various agencies.

CSIR-AMPRI established a Rural Gallery named "Saranjamshala" at AMPRI, Bhopal for showcasing its prominent rural technologies for their effective outreach. Models, exhibits, products and other information related to CSIR rural technologies have been displayed in five theme showcases (Natural fibers; Leather, Glass and Ceramics; Food Technologies; Medicinal and Aromatic Plants) and fourteen individual laboratory showcases. The gallery is a permanent showcase of CSIR Rural Technologies to depict the success stories of rural development and is regularly visited by entrepreneurs, rural artisans, NGO`s and KVK`s.

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Design & Rural Technology Department
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Bhubaneswar -751013

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BHEL, Bhopal

Dr. N. Ramakrishnan (till June 10, 2008)

Mr. M. K. Dube (June 2009 Onwards)
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Member-Agency Representative

Dr. Anil K.Gupta (from April 2009)
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Dr. Naresh Kumar
Head
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Member Secretary

Dr. Navin Chandra
Scientist 'G'
AMPRI, Bhopal

Management Council (July 2007- December 2009)

Chairman

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Scientist B, AMPRI

Mr. A.A Baksh
AEE, AMPRI

Head, PME / RDPD

F&AO/CoFA

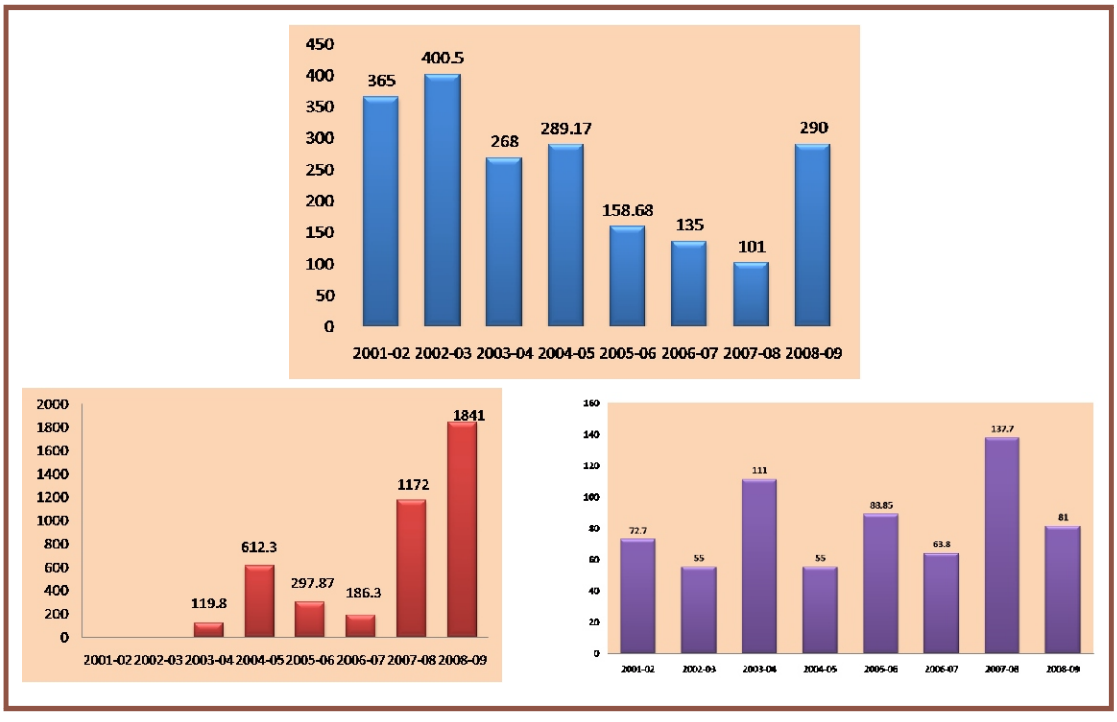
Member Secretary

Mr. S.K.Gupta
Controller of Administration

Financial Performance Indicators

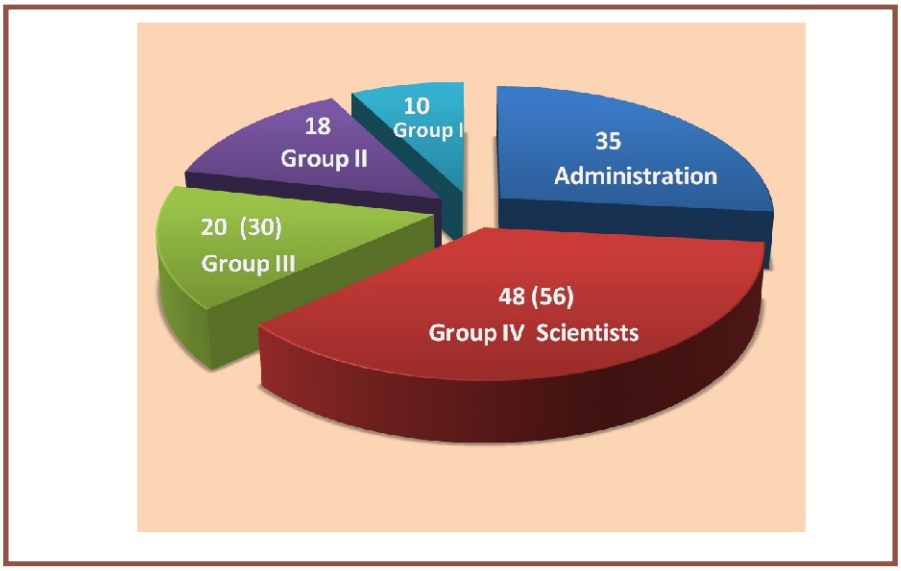
Rs. In Lakhs

Year	ECF Total	CSIR Network	Lab Reserve
2001-02	365.00	-	72.70
2002-03	400.50	-	55.00
2003-04	268.00	119.80	111.00
2004-05	289.17	612.30	55.00
2005-06	158.68	297.87	88.85
2006-07	135.00	186.30	63.80
2007-08	101.00	1172.00	137.70
2008-09	290.00	1841.00	81.00

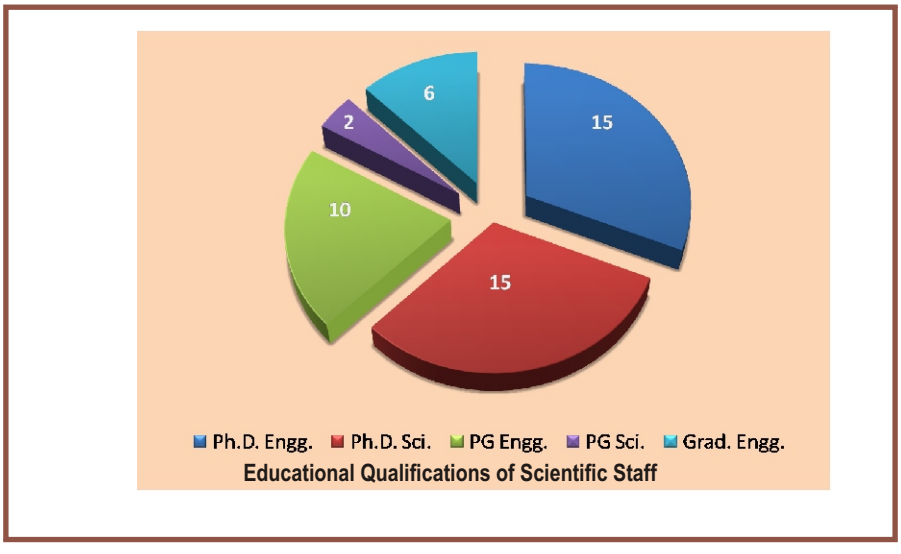


Human Resources Indicators

Staff Position (April 2009)	Numbers
Group IV	48
Group III	20
Group II & I	28
Administration	35
JRF`s/ SRF`s/ RA`s/ Project Assistants	56

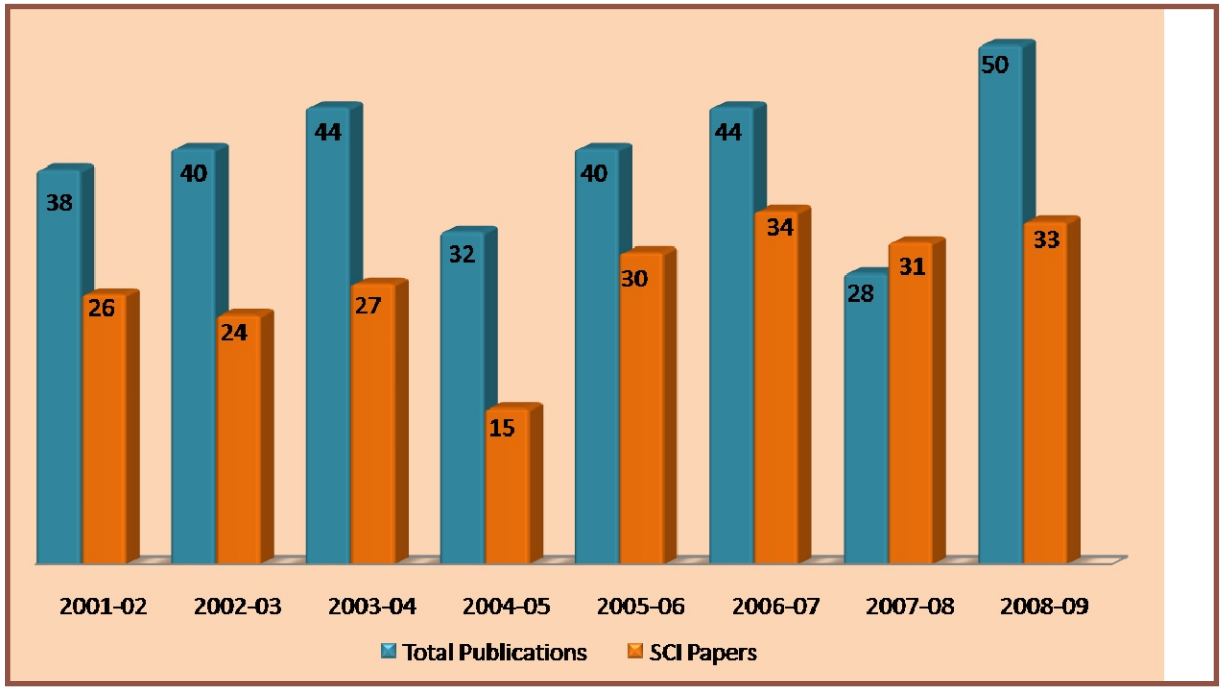


Total Staff : 131

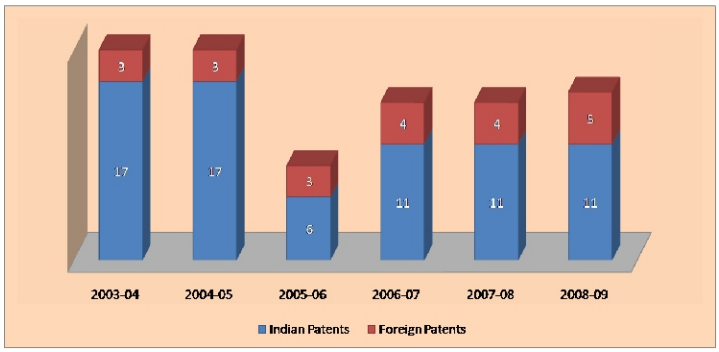


Research Publications

Year	Total Publications	SCI Papers
2001-02	38	26
2002-03	40	24
2003-04	44	27
2004-05	32	15
2005-06	40	30
2006-07	44	34
2007-08	28	31
2008-09	50	33



Patents



Foreign Patents in Force

S. No	Title of the patent	Date of Grant	Patent No.	Country
1	A process for the manufacture of aluminum graphite particulate composites using unquoted graphite particle for automobile & engineering application.	14.03.1990	2194799	UK
2	A process for the manufacture of aluminum graphite particulate composites using unquoted graphite particle for automobile & engineering application.	07.08.1990	4946647	USA
3	A process for the manufacture of aluminum graphite particulate composites using unquoted graphite particle for automobile & engineering application.	19.09.1990	610516	AUS
4	A Low temperature process for making alkali free high surface area, amorphous, silicon precursor and its application in making advanced ceramic materials such as silicon carbide and mullite	08.03.2007	19952337	Germany
5	Low temperature process for making radiopac materials utilizing industrial/ agricultural waste as raw material	28.04.2009	7524452	USA

Indian Patents in Force

S. No.	Title of the patent	Date of Grant	Patent No.
1	A process for the extraction of potash useful for fertiliser application from feildspar	29.12.2000	184097
2	An improved process for the preparation of alumina silicon carbide composites	28.03.2003	188036
3	A process for production and application of glazing material produced from foundry slag	15.03.2004	190600
4	An improved process for the preparation of beta-silicon carbide whiskers useful for making metal/ceramic/glass matrix composites	30.11.2004	191807
5	A process for recovery of zinc by oxidizing roasting of zinc ash	13.01.2006	193952
6	A non toxic composition useful for cleaning/ descaling of apertures/pipes and process for cleaning/de scaling of Apertures/pipes	20.01.2006	193953
7	A composition of red mud - thermopalstic composites useful for environment friendly domestic and industrial application	10.02.2006	194596
8	An improved process for making value added products such as ceramic tiles	07.04.2006	194600
9	An improved process for the preparation of metal matrix composites	23.06.2006	196946
10	A process for melts blending of incompatible non-interactive polymers in homogeneous mixture	07.07.2006	195804
11	A process for preparation of tiles and slabs from waste slag of foundry cupola	12.01.2007	202357

ONGOING PROJECTS

S.No.	Project Title	Project Cost (Rs. Lakh)	Date of Start	Date of Completion
	CSIR Eleventh Five Year Plan - NWP			
1	NWP 0028 Development of advanced light weight metallic materials for engineering applications AMPRI-NIIST-NML-NPL	2950	April 2007	March 2012
2	NWP 0029 Non-oxide ceramic based advanced structural materials for application in armours CGCRI-AMPRI-SERC	150	March 2009	March 2012
3	NWP 0035 Nanomaterial and Nanodevices for application in health and diseases CCMB-CEERI-AMPRI-CECRI	182	April 2008	March 2012
4	NWP 0037 Discovery and preclinical studies of new bioactive molecules (natural and semi-synthetic) & traditional preparations IIIM-CIMAP-CDRI-NBRI-IICB-IICT-AMPRI-NCL-NEIST-IHBT	15.50	April 2007	March 2012
5	NWP 0046 Sustainable Development and Management of Water Resources in Different Problematic Terrain NGRI-AMPRI-NEERI	61.77	February 2009	March 2012
6	NWP 0051 Nanostructured advance materials NML-AMPRI-CEERI-CGCRI-CMERI-IMMT-NAL-NCL-NPL	257	April 2009	March 2012
	CSIR Eleventh Five Year Plan : RSWNET RSP			
7	RSP 0001 Sisal- Potential for Rural Development & Green Technology	450.000	April 2007	March 2012
8	RSP 0002 Dissemination and Showcasing of Rural Technologies	50.000	April 2007	March. 2012

S.No.	ProjectTitle	Sponsoring Agency	Dateof Start	Dateof Completion	ProjectCos (Rs. Lakh
	Externally Funded Projects - Grant-in-Aid Projects				
1	GAP 0053-BRNS-03 Wear performance evaluation of Ni-Ti based Shape Memory Alloys and composite under sliding and cavitations erosion conditions	BRNS	April. 2006	March 2008	23.620
2	GAP 0057-BRNS-08 Development of lead free, multi component composite materials using conventional and advance ceramic route for simultaneous y and synergistically shielding of gamma and neutron radiation	BRNS	March 2008	February 2011	23.100
3	GAP 0058-TIFAC-08 Demonstration of the competence to develop automobile components using Electro Magnetic Forming (EMF) process	TIFAC	July 2008	July 2010	270.600
4	GAP 0059-MAPCOST -10 Ancient technology of Wootz steel making process up gradation, revival, dissemination and provision of safety net	MAPCOST	November 2008	October 2010	15.440
5	GAP 0060-BRNS-09 Feasibility studies on Development of Pulsed Electromagnetic Welding Technique for Refractory Materials used in High Temp. Reactors	BRNS	April 2009	March 2011	15.237
6	GAP 0061-MAPCOST-09 Development of Noise Absorbing Materials (Noise Barriers) from Industrial Rubber Waster for use in Engineering Applications	MAPCOST	April 2009	March 2011	6.63

Sponsored Projects

1	SSP 0030-CT-05 Modifications of PPG/PEF floor Lining	CT	June 05	March 09	6.612
2	SSP 0032-GMDC-06 Rapid Environmental Impact Assessment for Beneficiation of Plant modernization and fluorspar mining at Ambadunagar	GMDC	July 06	September 07	10.000
3	SSP 0034-BHEL-07 Alternative environment friendly material as replacement for the asbestos cloth	BHEL	April 2007	April 2009	9.900
4	SSP 0035-BHEL-07 Alternative environment friendly material as replacement for the asbestos putty	BHEL	April 2007	April 2009	9.900
	Consultancy Projects				
1	CNP 0097-TIFAC-06 Field demonstration cum training programme for use of fly ash in agriculture in farmer's field at Sarni Thermal Power Station of MPSEB	TIFAC	July 2005	July 2010	15.000
2	CNP 0099-GMDC-06 Rapid Environmental Impact Assessment and environmental management plan for Lignite Mine at Umarsar, Dist Kutch.	GMDC	April 2006	June 2007	5.000

List of Completed Projects 2007-09

S. No	Project Title	Sponsoring Agency	Project Cost (Rs. Lakh)
1	SSP-0022-RSMML-04 Risk Assessment and Safety Audit for Industrial Beneficiation Plant (Phosphate division) of RSMML, Udaipur	RSMML	3.00
2	SSP-0029-NMRL-05 Development of Cast in-situ Copper based Metallic Matrix Composites for Naval application and Simulation of their Micro structural features vis-à-vis Properties through FEM Analysis	NMRL	9.90
3	CNP-0086-BHEL-05 To advice on Suitable FRP Material and to Develop Prototype V block for Hydro Generator	BHEL	6.90
4	CNP-0094-RIL-05 Rapid Environmental Impact and Risk Assessment for Hydrocarbon Terminal at Abu road, Rajasthan	RIL	9.00
5	CNP-0102-UNICEF-06 Rapid Assessment of Drinking Water Quality in the State of Madhya Pradesh	UNICEF	16.06
6	GAP-0031-DST-03 Establishment of Permanent GPS station	DST	10.35
7	GAP-0045-BRNS-05 Development of a Noval and Energy efficient process for making Lead and Rare earth free Ceramic Shielding Material using Industrial Waste	BRNS	11.85
8	GAP-0049-BRNS-05 Micro Meso and Macroscopic analysis of Ductile Fracture using FEM	BRNS	35.28
9	COR-0005-CSIR-02 Development of Techniques and Methodologies for Exploration, Assessment and Management of Groundwater in Hard rock Areas	CSIR	103.68
10	COR-0008-CSIR-04 Industrial Waste Minimization	CSIR	101.00

S. No.	Project Title	Sponsoring Agency	Project Cost (Rs. Lakh)
11	COR-0009-CSIR-04 Quality Enhancement of Coal for its effective Utilization	CSIR	97.00
12	COR-0012-CSIR-04 Design Analysis and Health Assessment of Special Structures including bridges	CSIR	50.00
13	COR-0021-CSIR-04 Developing Capabilities in Advanced Manufacturing Technologies	CSIR	13.80
14	COR-0022-CSIR-04 Technology for Engineering Critical Assessment	CSIR	134.50
15	CMM-0011-CSIR-03 Developing Capabilities and Facilities for MEMS and Sensors	CSIR	173.83
16	CMM-0019-CSIR-02 Developing New Building Construct on Materials and Technologies	CSIR	140.60
17	CMM-0020-CSIR-04 Mathematical Modeling and Computer Simulation	CSIR	216.00
18	CMM-0022-CSIR-03 Custom Tailored Special Materials	CSIR	82.27
19	CMM-0023-CSIR-03 Capacity Building for Coastal Mineral Mining	CSIR	37.90
20	SMM-0005-CSIR-04 Fugitive Emission Monitoring and Development of Emission Factors for Petroleum Storage	CSIR	56.00

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27 (2007) 1945-51, 0.772

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Wear
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R Cable Layout Design of Prestressed Concrete Beams Using L Neural Networks
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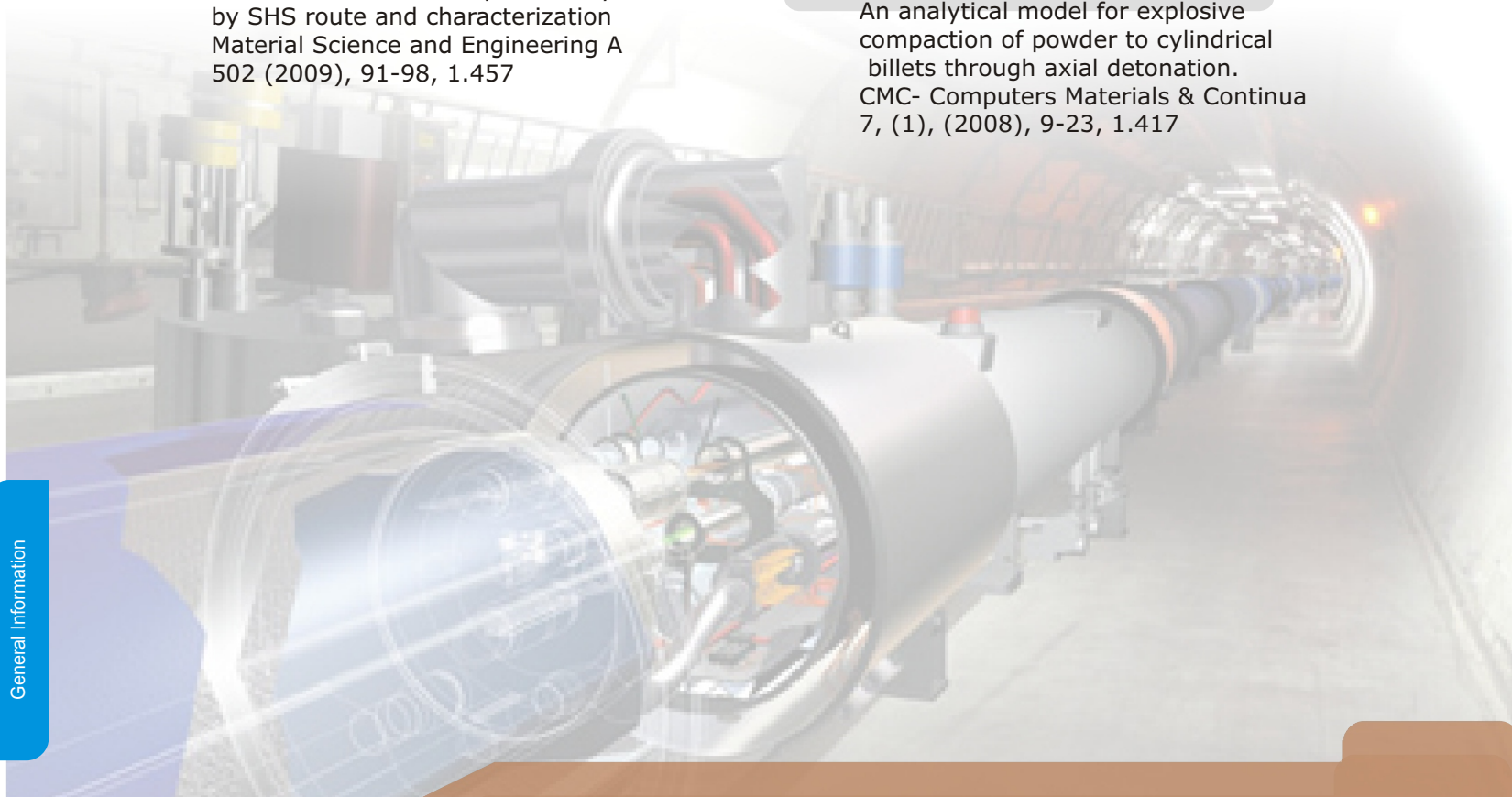

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Awards & Recognition

Dr. Navin Chandra	Member of Registration committee for hazardous waste recyclers constituted by CPCB, Delhi
Dr. M.J.Nandan	International Wetland Scientist Travel Award by Society of Wetland Scientist (SWS), USA
Dr. A.K. Majumder	National Design Award in Mineral Engineering by National Design & Research Forum of The Institution of Engineers (India)
Dr. J.P. Barnwal and Dr. A.K. Majumder	Coal India Award (JG Kumaramangalam Memorial) by The Institution of Engineers (India)
Dr. Navin Chandra	Chairman, Advisory Council of Regional Science Center, Bhopal
S. Sawla, Dr. S. Das, Dr. D.P. Mondal, Dr. N. Ramakrishnan	Binani Gold Medal for the Best paper titled Microstructure and mechanical properties of Al alloy and Al alloy-SiCp composite foam. Transactions of IIM, under Non ferrous Group by Indian Institute of Metal.
Dr. Navin Chandra	Chairman, Project Guidance cum Review Committee on E-Waste Management in India, DSIR
Dr. Navin Chand	Editorial Committee, Indian Journal of Tribology
Dr. J.P. Barnwal	Council Member, The Mining, Geological & Metallurgical Institute of India
Dr. J.P. Barnwal	Council Member, The Institution of Engineers (India)
Dr. J.P. Barnwal	Chairman, Mining Engineering Division Board of The Institution of Engineers (India)
Dr. Navin Chand	Editorial Board, Advances in Tribology
Dr. Navin Chand	Editorial Board, The Open Material Science Journal
Dr. Navin Chand	Council Member, MRSI
Dr. Navin Chandra	Chairman, MRSI, Bhopal Chapter
Dr. Navin Chandra	IIM ATM Meeting 2008

DEPUTATIONS ABROAD 2007-09

S.No	Name	Desig.	Country	Duration	Programme
1	Dr. I. B. Singh	Sc. E-II	USA	30.07.2007 to 5.08.2007	Invited visiting scientist Air Force Research Laboratory and NASA Research Laboratory
2	Dr. K. Udaya Bhaskar	Sc. E-II	USA	02.08. 2007 to 31.01.2008	Raman Research Fellowship
3	Dr. P. Asokan	Sc. E-II	UK	11.11. 2007 to 02.08.2008	Post Doctoral Research Program
4	Dr. S.P. Narayan	Sc. F	Japan	28.02. 2007 to 26.03.2007	To carry out synthesis
5	Dr. M.J.Nandan	Sc. C	USA	09.06.2008 to 18.06.2008	(SWS)International Wetland Scientist Travel Award, SWS Annual Meeting and Conference
6	Dr. S.P. Narayan	Sc. F	Greece	08.09.2008 to 10.09.2008	International Workshop (REPM-08)
7	Dr. Raghuvanshi Ram	Sc. E-I	Tunisia	11.11.2008 to 18.11.2008	International Conference on Desert Technologies
8	Dr. S.A.R. Hashmi	Sc. E-II	Turkey	28.11.2008 to 30.11.2008	Lind Polymer Composite Symposium, Workshop, Exhibition
9	Dr. (Ms.) Rupa Dasgupta	Sc. F	Singapore	03.12.2008 to 05.12.2008	ICAT-08; present a paper and chair a session at iCAT-08
10	Mr. P.D. Ekbote	Sc. G	Italy	14.12.2008 to 17.12.2008	CRdC Napoli, Italy, Prospective Collaboration
11	Dr.(Ms) V.S. Gowri	TO C	Portugal	21.12.2008 to 20.12.2009	Post Doctoral Fellow, Univ. of Minho
12	Dr. S.P. Narayan	Sc. F	Japan	24.01.2009 to 22.02.2009	Project work
13	Mr. Meraj Ahmed	Sc. B	Germany	08.02.2009 to 19.02.2009	Technical Interactions
14	Dr. A.K. Jha	Sc. F	Germany	08.02.2009 to 19.02.2009	Technical interactions
15	Dr. M.J.Nandan	Sc. C	U.K.	22.03.2009 to 26.03.2009	RICS 2009 Rural Research Conference
16	Dr. J.P. Shukla	Sc. E-I	UK	22.02.2009 to 28.02.2009	4th IASME/WSEAS International Conf. on Water Resources, Hydraulics & Hydrology (WHH '09)

Expert Lectures

Speaker	Date	Topic
Dr. N. Ramakrishnan Director, AMPRI, Bhopal	26.07.2007	Metal Foam: Processes & Applications
Dr. K. Anand Scientist, GE Research Centre Bangalore	07.08.2007	Building Material Technologies from First Principle
Dr. Dipankar Banerjee Distinguish Scientist Chief Controller R&D (AMS) DRDO, New Delhi	26.09.2007	Technology and the Battle-Field
Prof. K. Narasimhan, Dept. of Met. Engg. & Matar. Sci., IIT Mumbai	25.01.2008	Hydroforming
Dr. Balakrishnan, Scientific Officer G, BARC, Mumbai	19.03.2008	Miniature testing techniques for evaluation of structural materials
Mr. L. Pugazhenthy, Executive Director India Lead and Zinc Development Association and Vice-President & Chairman, Non-ferrous Division, IIM, Kolkata	05.05.2008	Indian Non-ferrous metal industries unleashing its time potential
Mr. Durgesh Joshi Asstt. Professor Department of Mechanical Engineering SGSITS, Indore	24.06.2008	Simulation of casting solidification
Prof. S.P. Garg, IREDA Chair Emeritus Professor, IIT, Delhi	11.07.2008	Energy scenario with special reference to issues, policies, sustainability, security and material aspects
Prof. K.K. Shukla, Dept. of Applied Mechanics, MNNIT, Allahabad	26.08.2008	Smart Composites
Dr. Anish Upadhyaya, Associate Professor, Dept. of Materials & Metallurgical Engg., IIT, Kanpur	23.10.2008	Advances in Powder Metallurgy Microwave Sintering of Materials
Prof. K. L. Chopra, Ex-Director, IIT, Kharagpur	12.01.2009	Nano Science & Nano Technology Demystified

Awards & Recognitions

Dr. Navin Chandra	Member of Registration committee for hazardous waste recyclers constituted by CPCB, Delhi
	Chairman, MRSI, Bhopal Chapter, (September 08 Onwards)
	Chairman, Project Guidance cum Review Committee on E-Waste Management in India, DSIR
	Chairman, Advisory Council of Regional Science Center, Bhopal
Dr. Navin Chand	Editorial Committee, Indian Journal of Tribology
	Editorial Board, Advances in Tribology
	Editorial Board, The Open Material Science Journal
	Council Member, MRSI
S. Sawla, Dr. S. Das, Dr. D.P. Mondal, Dr. N. Ramakrishnan	Binani Gold Medal for the best paper titled Microstructure and mechanical properties of Al alloy and Al alloy-SiCp composite foam. Transactions of IIM, under Non ferrous Group by Indian Institute of Metal.
Dr. J.P. Barnwal and Dr. A.K. Majumder	Coal India Award (JG Kumaramangalam Memorial) by The Institution of Engineers (India)
Dr. J.P. Barnwal	Council Member, The Mining, Geological & Metallurgical Institute of India
	Council Member, The Institution of Engineers (India)
	Chairman, Mining Engineering Division Board of The Institution of Engineers (India)
Dr. A.K. Majumder	National Design Award in Mineral Engineering by National Design & Research Forum of The Institution of Engineers (India)
Dr. M.J.Nandan	International Wetland Scientist Travel Award by Society of Wetland Scientist (SWS), USA

DEPUTATIONS ABROAD 2007-09

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1	Dr. I. B. Singh	Sc. E-II	USA	30.07.2007to 5.08.2007	Invited visiting scientist Air Force Research Laboratory and NASA Research Laboratory
2	Dr. K. Udaya Bhaskar	Sc. E-II	USA	02.08. 2007 to January, 2008	Raman Research Fellowship
3	Dr. P. Asokan	Sc. E-II	UK	11.11. 2007 to 02.08.2008	Post Doctoral Research Program
4	Dr. S.P. Narayan	Sc. F	Japan	28.02. 2008 to 26.03.2008	To carry out synthesis
5	Dr. M.J.Nandan	Sc. C	USA	09.06.2008 to 18.06.2008	(SWS)International Wetland Scientist Travel Award, SWS Annual Meeting and Conference
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7	Dr. Raghuvanshi Ram	Sc. E-I	Tunisia	11.11.2008 to 18.11.2008	International Conference on Desert Technologies 2009
8	Dr. S.A.R. Hashmi	Sc. E-II	Turkey	28.11.2008 to 30.11.2008	Lind Polymer Composite Symposium, Workshop, Exhibition
9	Dr. (Ms.) Rupa Dasgupta	Sc. F	Singapore	03.12.2008 to 05.12.2008	ICAT-08; present a paper and chair a session at iCAT-08
10	Sh. P.D. Ekbote	Sc. G	Italy	14.12.2008 to 17.12.2008	CRdC Napoli, Italy Prospective Collaboration
11	Dr.(Ms) V.S. Gowri	TO C	Portugal	21.12.2008 to 20.12.2009	Post Doctoral Fellow, Univ. of Minho
12	Dr. S.P. Narayan	Sc. F	Japan	24.01.2009 to 22.02.2009	Project work
13	Sh. Meraj Ahmed	Sc. B	Germany	08.02.2009 to 19.02.2009	Interactive visit
14	Dr. A.K. Jha	Sc. F	Germany	08.02.2009 to 19.02.2009	Interactive Visit
15	Dr. M.J.Nandan	Sc. C	U.K.	22.03.2009 to 26.03.2009	RICS 2009 Rural Research Conference
16	Dr. J.P. Shukla	Sc. E-I	UK	22.02.2009 to 28.02.2009	4th IASME/WSEAS International Conf. on Water Resources, Hydraulics & Hydrology (WHH '09)

Expert Lectures

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Dr. N. Ramakrishnan Director, AMPRI, Bhopal	26.07.2007	Metal Foam: Processes & Applications
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Dr. Dipankar Banerjee Distinguish Scientist Chief Controller R&D (AMS) DRDO, New Delhi	26.09.2007	Technology and the Battle-Field
Prof. K. Narasimhan, Dept. of Met. Engg. & Mat. Sci., IIT Mumbai	25.01.2008	Hydroforming
Dr. Balakrishnan, Scientific Officer G, BARC, Mumbai	19.03.2008	Miniature testing techniques for evaluation of structural materials
Mr. L. Pugazhenthy, Executive Director India Lead and Zinc Development Association and Vice-President & Chairman, Non-ferrous Division, IIM, Kolkata	05.05.2008	Indian Non-ferrous metal industries unleashing its time potential
Durgesh Joshi, Asstt. Prof. Department of Mechanical Engineering SGSITS, Indore	24.06.2008	Simulation of casting solidification
Prof. S.P. Garg, IREDA Chair Emeritus Professor, IIT Delhi	11.07.2008	Energy scenario with special reference to issues, policies, sustainability, security and material aspects
Prof. K.K. Shukla, Dept. of Applied Mechanics, MNNIT, Allahabad	26.08.2008	Smart Composites
Dr. Anish Upadhyaya, Associate Professor, Dept. of Materials & Metallurgical Engg., IIT, Kanpur	23.10.2008	Advances in Powder Metallurgy Microwave Sintering of Materials
Prof. K. L. Chopra, Ex-Director, IIT, Kharagpur	12.01.2009	Nano Science & Nano Technology Demystified

Expert Lectures

Speaker	Date	Topic
Dr. Har Prasad, Ex GM, BHEL,Hyderabad	20.01.2009	Case Studies in Rotating Electrical Machines: Tribological Aspects
Dr. Rajendra Srivastava, Hokkaido University, Japan	21.01.2009	Catalysis is the basis of Innovation in Materials Science
Dr. K. G. Satyanarayana, F.I.E. Visiting Professor, Dept. of Quimica, Centro Politecnico, Jardim Botanico, Universidade Federal Do Parana. BRASIL	27.02.2009	Research in Materials Science at Universidade Federal Do Parana (UFPR), Brasil
Dr. T. S. Waraich, Occupational Health and Safety Officer, Ministry of Labour, Government of Canada.	05.03.2009	Occupational Health and Safety
Mr. Ravi D. Sharma, M.Sc. (Oxford), M. Sc. (Toranto), Consultant Ministry of Environment, Government of Canada	05.03.2009	Environmental Standards

Staff News

Higher Education

Name	Design -Ation	Degree /Diploma	Discipline	University/Institution
Mr. R K Chouhan	TO C	M. Tech.	(Foundation Engineering)	MANIT, Bhopal-2008
Mr. M. K. Ban	TO	M. Sc.	(Ecology & Environment)	Sikkim Manipal, University- 2009
Dr. P. Ashokan	Sc. E-II	Ph.D.	Environmental Engineering	Indian Institute Of Technology (IIT), Powai, Mumbai- 2007
Mr. Pavan Srivastva	Protocol Officer	PG Diploma	Intellectual Property Rights	Indira Gandhi National Open University (IGNOU), New Delhi -2007

Transfers

1. Mr. Girish Chand, SO (F&A) transferred from NISCAIR, New Delhi
2. Dr. B. Chakradhar, Scientist EII transferred to NEERI Center, Hyderabad
3. Mr. R.C. Wase, Stores & Purchase Officer (SPO) transferred to NEERI, Nagpur
4. Mr. Rajesh Rana, Tech. Gr. III (2) transferred to CRRI, New Delhi
5. Dr. C. Padmakar, Technical Officer, transferred to NEERI, Nagpur
6. Mr. H.N. Bhargaw, Scientist E I transferred from CSIO, Chandigarh

Superannuation

1. Mr. B. Kujur, Sr. Technical Officer superannuated on May 31, 2007.
2. Dr. K. Basu, Scientist G, superannuated on September 30, 2007.
3. Mr. K .K. S. Gautam, Scientist F, superannuated on November 30, 2007.
4. Dr. R. N. Yadav, Scientist G, superannuated on December 31, 2007.
5. Mr. L.C. Mohan, Scientist F, superannuated on September 30, 2008
6. Mr. R.K. Kalra, Technical Officer, superannuated on October 31, 2008

Resignation

Dr. U. Bhaskar, Scientist E-I, resigned on October 10, 2008

Retirement

Dr. N. Ramakrishnan, Director, AMPRI, on June, 2008

Staff as on April 2009

Dr. Anil K. Gupta
Director

Group IV

Dr. Navin Chandra	Sc. G
Dr. A.H. Yegneswaran	Sc. G
Dr. Navin Chand	Sc. G
Dr. C.B. Raju	Sc. G
Mr. P.D. Ekbote	Sc. G
Dr. A.K. Jha	Sc. F
Dr. S.P. Narayan	Sc. F
Mr. R.S. Solanki	Sc. F
Dr. S. Das	Sc. F
Dr. O.P. Modi	Sc. F
Dr. J.P. Barnwal	Sc. F
Dr (Ms) Mohini Saxena	Sc. F
Dr. B.K. Prasad	Sc. F
Dr. M.S. Yadav	Sc. F
Dr. S.S. Amritphale	Sc. F
Mr. K.K. Kaul	Sc. E-II
Dr. A.K.Gupta	Sc. E-II
Dr. (Ms) Rupa Dasgupta	Sc. E-II
Dr. S.A.R. Hashmi	Sc. E-II
Dr. R.K. Morchhale	Sc. E-II
Dr. (Ms) Swati Lahiri	Sc. E-II
Dr. Murari Prasad	Sc. E-II
Dr. R. K. Rawlley	Sc. E-II
Dr. S.K. Sanghi	Sc. E-II
Dr. I. B. Singh	Sc. E-II
Dr. P. Asokan	Sc. E-II
Dr. D.P. Mondal	Sc. E-II
Dr. A.K. Majumdar	Sc. E-II
Mr. A.K. Singh	Sc. E-I
Mr. S.P. Pathak	Sc. E-I
Mr. S. Shrimanth	Sc. E-I
Mr. R.S. Ahirwar	Sc. E-I
Dr. J.P. Shukla	Sc. E-I
Dr. K. K. Pathak	Sc. E-I
Dr. Raghuvanshi Ram	Sc. E-I
Mr. Mohd Akram Khan	Sc. E-I
Mr. Manish Mudgal	Sc. E-I
Dr. (Ms) Deepti Mishra	Sc. E-I
Mr. H.N. Bhargaw	Sc. E-I
Mrs. Alka Meshram	Sc. C
Mr. Sanjeev Saxena	Sc. C
Mr. S. Murali	Sc. C
Mr. S.S. Waghmare	Sc. C
Dr. M.J. Nandan	Sc. C
Mr. Sanjay K. Panthi	Sc. B
Mr. Meraj Ahmed	Sc. B
Mr. M. D. Goel	Sc. B
Mr. Gaurav K. Gupta	Sc. B

Group III

Mr. N. Saha	TO C
Dr.(Mrs.) Anita Bhushan	TO C
Mr. R.K. Chauhan	TO C
Mr. P. Banerjee	TO C
Mr. M. Chandra	TO C
Dr. Ajay Naik	TO C
Dr. J.P. Pandey	TO C
Mr. H.N. Rao	TO C
Dr. E. Peters	TO C
Dr.(Mrs.) V.S. Gowri	TO C
Mr. T.S.V.C. Rao	TO C
Mr. A. Kulshreshta	TO C
Mr. R. K. Soni	TO B
Mr. M.K. Jain	TO B
Mr. M.K. Ban	TO B
Mr. A. A. Bakhsh	TO B
Dr. (Mrs.) P. Padmakaran	TO B
Mr. K.K. Rao	TO B
Mrs. S. Gamad	STA
Mr. O. Chaurasia	JTA

Group I

Mr. R.D. Kushwaha	Technician
Mr. B.L. Pradhan	Technician
Mr. L.N. Mehra	Technician
Mr. L.N. Sahu	Technician
Mr. S.K. Batham	Technician
Mr. S.K. Raikwar	Technician
Mr. N.S. Jadav	Technician
Mr. Indraj Yadav	Technician
Mr. Devilal Rathore	Technician
Mr. Anil Gond	Technician

Group II

Mr. A. H. Khan	Technician
Mr. U.M. Lakra	Technician
Mr. R.K. Kosthi	Technician
Mr. R.K. Gurjar	Technician
Mr. A. Yadav	Technician
Mr. Md. Rafique	Technician
Mr. M. L. Gurjar	Technician
Mr. A. Ullah	Technician
Mr. P.N. Patil	Technician
Mr. B. Patil	Technician
Mr. D. K. Singh	Technician
Mr. R.C. Malvi	Technician
Mr. G. S. Yadav	Technician
Mr. A. Saxena	Technician
Mr. A.K. Asati	Technician
Mr. S.K. Suryavanshi	Technician
Mrs. S.Pal	Technician
Mr. R. Kishore	Technician

Administration

Mr. S.K. Gupta	COA
Mr. A.P. Rao	F&AO
Mr. P. K. Shrivastava	Protocol Officer
Mr. Surender Kumar	SO (General)
Mr. S. Majumdar	SO (General)
Mr. D.P. Singh	SO (S&P)
Mr. P. K. Sinha	SO (F&A)
Mr. G. Chand	SO (F&A)
Mrs. S. Soman	Private Secretary
Mrs. M. Surendran	Private Secretary
Mr. B. Divakar	Security Officer
Mr. A. K. Jain	SO(General)
Dr. (Mrs.) M. Dubey	Sr. Hindi Translater
Mr. N. Vishwanathan	Sr. Steno
Mrs. S. Vijayan	Sr. Steno
Mr. D.M. Chilbule	Assistant (S&P) Gr.I
Mr. P.K. Satyanesan	Assistant (General) Gr.I
Mr. J. Kujur	Assistant (General) Gr.I
Mr. S. Vinodia	Assistant (F&A) Gr.I
Mrs. A. Vinodia	Assistant (General) Gr.I
Mr. N.K. Pethari	Assistant (General) Gr.I
Mrs. A. Daniel	Receptionist (Isol.Post)
Mr. H. Singh	Assistant (G) Gr.II
Mr. V. Shrivastava	Assistant (G) Gr.II
Mr. S. Bhawsar	Jr. Hindi Translator
Mr. G. K. Dhakad	Jr. Steno
Mr. V. Nathiley	Assistant (S&P) Gr.II
Mrs. T. Rangari	Record Keeper
Mr. K.P. Tripathi	Jr. Security Guard
Mr. R.N. Pradhan	Jr. Security Guard
Mr. B. Gurung	Jr. Security Guard
Mr. D. Prasad	Tea & Coffee Maker
Mr. Dayaram	Safaiwala
Mr. R.C. Pillai	Chowkidar
Mrs. A. Golait	Peon

Memorable Occasions

Inauguration of Rural Gallery

During X Five Year Plan CSIR has prepared a plan for its orientation towards rural development programs and brought out a focused program called "Rural Action Program" (RAP). The program is largely concentrated on the effective dissemination modes of prominent rural technologies by setting up of five permanent rural galleries. It was then decided that Advanced Materials and Processes Research Institute (AMPRI), Bhopal will establish one such gallery and subsequently this may be repeated at other centers with suitable modifications.

AMPRI, Bhopal has completed the task of setting up the Rural Gallery. The design of the gallery includes 5 theme showcases and 14 individual laboratory showcases. The theme showcases are the places where collective technological models of different laboratories were placed based on various themes viz., Naural Fibers, Leather, Ceramics and Handicrafts, Food Technologies, Medicinal and Aromatic Plants. The individual showcases hold prominent rural technology products/models of 14 CSIR laboratories.

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Saranjamshala The CSIR Rural Gallery was inaugurated by Prof. V.L. Chopra, Member (S&T), Planning Commission, Govt. of India in the presence of Dr. Samir K. Brahmachari, Director General, CSIR on March 28, 2008

Laying of Foundation Stone for New Building

Prof. Samir K. Brahmachari, Director General, CSIR, New Delhi has laid the foundation stone for the upcoming new building in the premises of AMPRI, Bhopal on Mach. 28, 2008.

Foundation Stone Laying Ceremony

Workshop on Sisal Fibre Technologies

A workshop on "Sisal Fiber Technologies for Sustainable Rural Employment Generation" was organized at Advanced Materials and Processes Research Institute (AMPRI), during February 22-23, 2008. Delegates from Research Organizations, NGO`s, Entrepreneurs and Industries participated in the two days workshop. Dr. P.C. Angelo of PSG College of Technology, Coimbatore, Dr. D.K. Biswas, Scientist-In charge, Sisal Research Station, Bamra and Dr. N. Ramakrishnan, Director, AMPRI has started the function by lighting the lamp. Later a book on Sisal Fiber Technologies for Sustainable Rural Employment Generation" has been released on this occasion. The book is a treatise on the available sisal fiber technologies which will be disseminated to various people/organizations working on sisal fiber. The deliberations of the workshop will be useful for creating sustainable strategies for sisal based econo

Inauguration of the Workshop

National Technology Day Celebrations

National Technology Day 2007 was celebrated on May 11, 2007 at AMPRI, Bhopal. Dr. N. Ramakrishnan, Director, AMPRI gave over view of the laboratories R & D achievements and spoke on the importance of the Technology Day celebrations. Dr. S.N. Harshe, an eminent personality and well known textile expert from ATIRA, Ahmedabad was the Chief Guest and speaker on the occasion. He spoke on "Industrial applications of Cellulose, Starch and Gum" and also described his rich experiences. His topic was highly relevant to the projects on natural fibres at AMPRI.

National Technology Day Celebrations - 2007

In the celebrations of 2008, Dr. N. Ramakrishnan, Director, AMPRI briefed about the importance of Technology Day, R&D activities of AMPRI on Advanced Light Weight Materials and Natural Fibre based products. Sh. Jacob Mani, Chief Operations Officer, Hindustan Electro Graphites Ltd. Was the chief guest of the function. He called for closer cooperation amongst industries and R&D organizations to make innovations and new technologies.

Concluding Ceremony of Silver Jubilee Year of AMPRI

AMPRI, Bhopal celebrated the concluding ceremony of its silver jubilee year along with CSIR Foundation Day on September 26, 2007. Dr. Dipanker Banerjee, Chief Controller, R&D, DRDO, New Delhi was the chief guest and Prof. K.S. Pandey, Director, MANIT, Bhopal was the Guest of Honor.

Dr. N. Ramakrishnan, Director, AMPRI presented the Director's report and highlighted the achievements of the institute. He informed that the recent name change of the laboratory from Regional Research Laboratory to Advance Materials and Processes Research Institute (AMPRI) has properly positioned the laboratory in the international materials map.

Prof. K.S. Pandey stressed on dedication and commitment of the scientists to carryout R&D effectively.

Dr. Dipanker Banerjee emphasized that the scientific profession is the only profession where in one can be free to select his own work and excitement of discovery is the greatest motivation for scientists. Further, he stressed on effective collaboration between DRDO and AMPRI on the areas of mutual interests.

An exhibition on the" R&D Achievements of AMPRI" was organized on this occasion, which was inaugurated by the chief guest Dr. Dipanker Banerjee. He also inaugurated the newly functional IT center of the institute. In-house award to the technical and scientific personnel of the institute were distributed by the chief guest.

Dr. Dipankar Banerjee, Chief Controller, R&D, DRDO, New Delhi addressing the ceremony

Seminar on 'Technologies, Opportunities and Challenges'

Advanced Materials and Processes Research Institute, Bhopal conducted a national seminar on 'Technologies, Opportunities and Challenges' on the occasion of CSIR Foundation Day celebrations on September 26, 2008. In consonance with major R&D Programme being implemented at AMPRI, theme based expert lectures by eminent academicians, scientists and technologists were conducted. The special lectures broadly covered areas of light weight metallic materials, potential of natural fibres in materials, nano-sciences and sustainable development through wastes utilization. Prof T R Ramachandran, Former Director, JN Aluminum Research and Design Centre, Nagpur, delivered lecture on opportunities and challenges in development of light alloys. Prof K Chattopadhyaya, IISc Banglore spoke on challenges in proliferation of nano technologies. Dr A K Majumder of National Institute for Research on Jute and Allied Fibres Technology, Kolkata, delivered a lecture on jute based technical textiles. Shri L Pugazhenthy, Chairman, Indian Institute of Metals, Kolkata highlighted business advantages of sustainable development, particularly in metallurgical industries.

In addition to AMPRI scientists and staff, the seminar attracted participation of representatives from CSIR labs, local industries, Universities and institutes. Professor K I Vasu, former Director, CECRI Karaikudi chaired the inaugural session.

CSIR Foundation Day Celebrations

Shri L. Pughazenthy, Executive Director, India Lead Zinc Development Association and Chairman, Indian Institute of Metals (IIM) was the Chief Guest and Prof. K.I. Vasu, former Director, CECRI, Karaikudi and former Vice-Chancellor Madurai Kamraj University and Founder, Swadeshi Science Movement presided over the function. In his address, Shri Pughazenthy, while highlighting the Indian R&D scenario, said that scientific community should now go near to the industry and consumers. A tremendous amount of marketing sense is the need of the hour, he said. He underlined India's industrial and economic growth. He mentioned that India is going to be a very economically aggressive country and that is where the role of scientists becomes important. He highlighted the crucial role of the two visionaries: Pt. Jawaharlal Nehru and Dr Shanti Swarup Bhatnagar, at whose initiative the large network of research centers came into being across the country. Prof. K.I. Vasu dwelt upon India's traditional wisdom and the wonderful history of technology, development, particularly in the domain of metallurgy. He expressed confidence that Indian scientific community would respond to the challenges in the new global settings.

Dr Navin Chandra, Acting Director, AMPRI, welcomed the guests and other dignitaries and highlighted the achievements of CSIR and AMPRI, Bhopal. On this occasion inhouse awards of excellence were given away. Dr K. Basu, Dr R.N. Yadav and Shri K.K.S. Gautam were felicitated for retiring on superannuation. CSIR studentship was given to Master Shubhranshu Barnwal and Master Argha Mondal for securing admission in IITs. Prizes for IIM Quiz were also given to school children. Mementoes were given to staff members on completion of 25 years of service in CSIR. As part of the celebrations, an exhibition on the activities of AMPRI was also put on display on 25 September 2008. It was inaugurated by Dr P.K. Verma, Director General, M.P. Council of Science and Technology, Bhopal. Speaking on the occasion, Dr Verma exhorted the scientific community to work on projects and schemes aimed at regional development. Emphasizing the need for research cooperation among various institutes, he said that high science can provide solutions to problems of masses. He lauded the contributions of CSIR and AMPRI.

A large number of students from various schools and colleges, entrepreneurs an general public visited the exhibition and took keen interest in the displayed technologies relating to natural fibre, Light weight metals, MEMS, Minerals Processing, Environment and Nano Materials, Metal Matrix Composites, Industrial Waste Utilization for various applications and Modeling based studies.

Young Researchers Technical Posters Presentation

AMPRI Bhopal organized the first one day seminar of technical poster presentation by young researchers on Dec. 16, 2008. The presentation was exclusively for project assistants/ research fellows/ interns of AMPRI Bhopal and 45 papers were selected for poster presentation. This session provided a unique opportunity to promote scientific activities carried out by the young researchers.

Technical Poster Presentation by Young Researchers

दो दिवसीय कार्यशाला

भारत सरकार की राजभाषा नीति को कार्यान्वित करने के चरण में एम्प्री, भोपाल में दिनांक 02 अगस्त 2007 को हिन्दी माध्यम में वैज्ञानिक कार्यशाला का आयोजन किया गया। इस कार्यशाला में वैज्ञानिकों डॉ. एस.पी नारायण एवं श्री रघुवंशी राम द्वारा उनके अनुसंधान एवं विकास कार्यों से संबंधित शोध पत्र प्रस्तुत किए गए।

हिन्दी दिवस समारोह

प्रगत पदार्थ तथा प्रक्रम अनुसंधान संस्थान (एम्प्री) में 14 सितम्बर 2007 को हिन्दी दिवस समारोह संपन्न हुआ। इस अवसर पर प्रतिष्ठित कवि एवं आलोचक डॉ. कमला प्रसाद मुख्य अतिथि के रूप में उपस्थित थे। इस अवसर पर मुख्य अतिथि ने स्टाफ सदस्यों को संबोधित करते हुए कहा कि हिन्दी दिवस हमारे लिए आत्म निरीक्षण का अवसर है।

आगे उन्होंने कहा कि देश में समेकित शब्दावली की और ज्यादा आवश्यकता है क्योंकि अंग्रेजी का एक ही पारिभाषिक शब्द अलग–अलग क्षेत्रों में अलग–अगल हिन्दी में प्रयुक्त होता है। समारोह के प्रारम्भ में एम्प्री के निदेशक श्रेणी वैज्ञानिक डॉ. कुनाल बासु ने मुख्य अतिथि का पुष्प गुच्छ से स्वागत कर स्वागत भाषण दिया और प्रशासन नियंत्रक श्री सुनील कुमार गुप्ता ने अतिथि परिचय प्रदान किया। इस अवसर पर हिन्दी पत्रिका सोपान का विमोचन भी मुख्य अतिथि के द्वारा किया गया। मुख्य अतिथि द्वारा हिन्दी सप्ताह के अन्तर्गत सम्पन्न विभिन्न प्रतियोगिताओं में विजयी रहे प्रतिभागियों और हिन्दी में सर्वाधिक कार्य करने वाले स्टाफ सदस्यों को पुरस्कृत भी किया गया।

एम्प्री, भोपाल में नवंबर 2007 को एक दिवसीय हिन्दी कार्यशाला का आयोजन किया गया। इस कार्यशाला में वैज्ञानिक विषयों पर प्रतिभागी वैज्ञानिक एवं तकनीकी स्टाफ द्वारा हिन्दी में दो शोध पत्र प्रस्तुत किये गये। इस अवसर पर मुख्य अतिथि के रूप में विद्वान वक्ता श्री जी.. गोस्वामी, पूर्व प्रबंधक, कार्पोरेट कार्यालय, भेल द्वारा स्टाफ सदस्यों को व्याख्यान मार्गदर्शन भी दिया गया।

कार्यशाला के शुभारंभ अवसर पर श्री गोंस्वामी द्वारा ''परिवर्तित व्यावसायिक परिदृश्य और हिन्दी'' पर रूचिकर व्याख्यान दिया गया। उक्त व्याख्यान के पश्चात श्री मनीष मुदगल, वैज्ञानिक अपने हिन्दी शोध पत्र प्रस्तुत किये गये। शोध पत्र प्रस्तुति के पश्चात द्वितीय सत्र में श्री गोस्वामी द्वारा ''तकनीकी शब्दावली का विकास'' पर सारगर्भित और प्रभावशाली व्याख्यान दिया गया।

हिन्दी कार्यशाला

दिनांक 13 एवं 14 मार्च 2008 को एम्प्री में दो दिवसीय हिन्दी कार्यशाला का आयोजन किया गया। प्रतिदिन दो सत्रो में आयोजित इस कार्यशाला में एम्प्री के वैज्ञानिक, तकनीकी और प्रशासनिक स्टाफ सदस्यों में प्रतिभागिता की।

कार्यशाला के अतिथि वक्ता डॉ. पूरनलाल, व. हिन्दी अधिकारी, सी.एस.आई.आर. मुख्यालय थे। इस अवसर पर अतिथि वक्ता द्वारा भारत सरकार की राजभाषा नीति, संसदीय राजभाषा समिति, तकनीकी शब्दावली पर केन्द्रित थी जिसमें स्टाफ सदस्यों को प्रारूपण आदि का अभ्यास भी कराया गया।

प्रगत पदार्थ तथा प्रक्रम अनुसंधान संस्थान (एम्प्री), भोपाल 14 सितम्बर 08 को हिन्दी दिवस समारोह का आयोजन किया गया। समारोह के मुख्य अतिथि भोपाल के वरिष्ठ साहित्यकार एवं आई.जी. श्री पवन कुमार जैन, आर.पी.एस मुख्य अतिथि थे। मुख्य अतिथि ने अपने उद्‌बोधन में कहा कि हिन्दी भाषा देश में ज्ञान–विज्ञान प्रसारित करने का सशक्त माध्यम है और कार्यालयों में इसका प्रयोग जन–जन के लिए लाभकारी होगा।
ठस अवसर पर मुख्य अतिथि ने संस्थान मे ंचलाये गये हिन्दी सप्ताह में विजयी रहे प्रतिभागियों को भी पुरस्कृत किया। इस अवसर पर संस्थान की हिन्दी पत्रिका 'सोपान' का विमोचन भी किया गया।