ISSN 0972-4265

A Quarterly Inhouse Bulletin

NML NEWS

Vol. X January 2003 No. 1

CSIR Diamond Jubilee Celebrations

The day-long CSIR Diamond Jubilee celebrations at National Metallurgical Laboratory included, besides the inaugural function, an exhibition depicting CSIR since its inception (1942) and an Open Day for the school children and general public. The function was inaugurated by the Chief Guest, Shri B. Muthuraman, Managing Director, Tata Steel by lighting the lamp in a traditional way in the NML auditorium. The occasion was attended by eminent scientists, local entrepreneurs, school students, special invitees and the press.

Delivering his welcome address, Prof. S.P. Mehrotra, Director, NML said, "During the last 60 years of its existence, CSIR has grown as an open and transparent organisation dedicated to the use of science and technology as an agent of national development. The 40's were the period of institution building and over two-third of the CSIR laboratories were established during this period. These laboratories provided to the indigenous industries, the backup support in metrology, standardisation, testing, analysis and supply of trained scientific manpower. The 50's could be termed as a period of consultation and finding of specialised institutions like Industrial toxicology, ores, technologists will be invited to give lectures on topics of

Contd. on page-2

NML Scientist bags

CSIR YOUNG SCIENTIST AWARD

Dr. K.K. Sahu, Scientist receiving the award from Hon'ble Prime Minister, Shri Atal Bihari Vajpayee

Dr. Kamala Kanta Sahu, a scientist working in Non-Ferrous Division of National Metallurgical Laboratory, Jamshedpur has won the CSIR Young Scientist Award-2002 in Engineering Sciences. Hon'ble Prime Minister, Shri Atal Bihari Vajpayee gave away the Award along with a momento to Dr. Sahu at the CSIR Diamond Jubilee Celebration Inaugural Function on 26th September 2002 held at Vigyan Bhawan, New Delhi. Several dignitaries including Hon'ble Union Minister for Science & Technology, Human Resource Development and Ocean Development, Dr. Murli Manohar Joshi and Hon'ble Minister of State for Science & Technology, Shri Bachi Singh Rawat, Director General-CSIR, Dr. R.A. Mashelkar and many others attended the function.

Dr. Kamala Kanta Sahu (born 22-05-1967 at Nidhubani, Dist. Balasore, Orissa) did his B.Sc. (Hons), M.Sc and Ph.D. (Chemistry) from Utkal University. He

Contd. on page -16

from page 1 :

CSIR Diamond Jubilee Celebrations

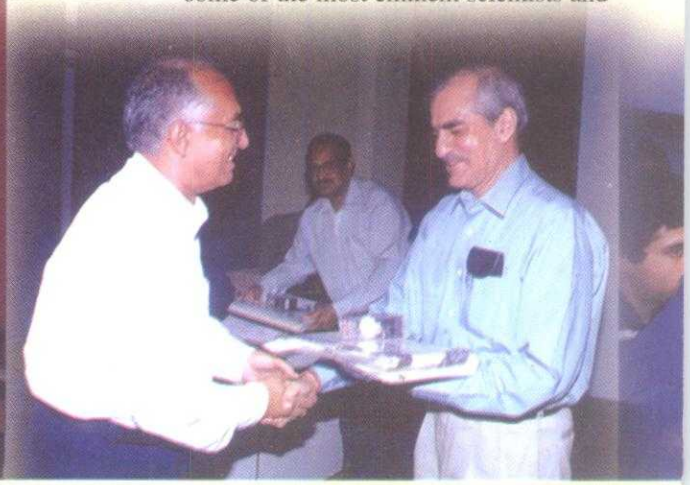
Structural engineering etc. came into existence The beginning of the 70's and 80's saw the Indian industries and CSIR attaining technical maturity. The CSIR laboratories had by then moved into the stage of development of indigenous technologies for pesticides, electronics, instrumentation, glass and ceramics, metals and alloys and building materials. By 90's the industry also realised the importance of research and development and set up in-house R&D Units. Linkages were established between national laboratories and R & D Units for technological co-operation."

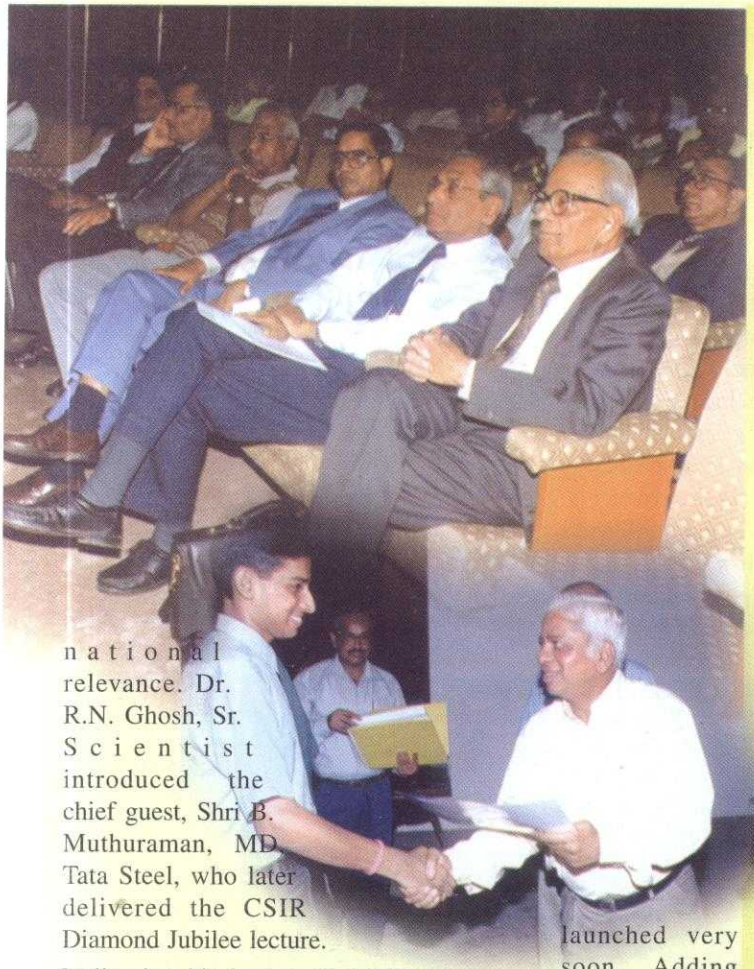
Further Prof. Mehrotra said, 'Today CSIR is a well knit, co-ordinated action oriented network of 38 research laboratories which cover the whole gamut of research and development activity ranging from micro-electronics to metallurgy; plant industrial machinery, chemicals to molecular biology. CSIR assists industries in development and up-dating import substitution, cost reduction, energy conservation, waste utilisation, pollution control, repair and maintenance and troubleshooting.

Inaugural Function: Shri B. Muthuraman, Managing Director, Tata Steel, lighting the lamp. On his left, Prof. S.P. Mehrotra, Director, NML and Dr. R.N. Ghosh, Sr. Scientist.

CSIR carries out research of value not only to the industry but also to other sectors of the economy such as agriculture, health, power, utility, mining etc. It also interacts very closely with departments and agencies concerned with science and technology including environment, ocean development, space, defence and atomic energy. Referring to the ocean policy statement of the Government of India, he said that opportunities would arise in the exploration and management of our ocean wealth. The major programme in this industry is deep sea, wet mining to harvest poly-metallic nodules from the Central Indian Ocean. Highlighting the R&D programmes of NML, Prof. S.P. Mehrotra said that the objectives of NML include fostering fundamental and applied metallurgical research and to serve as a sample station for carrying out research and development work in indigenous ores, minerals, refractories, ferrous and non-ferrous metals and alloys. Besides undertaking the research sponsored by the industry and the government agencies, the laboratory also conducted in-house research in relevant and emerging areas to keep itself abreast of the developments in the areas of metallurgy and material science. It has been consistently producing a large number of technical publications in reputed journals and filing patents embodying new results with a potential of industrial exploitation. The efforts of the distinguished staff of the laboratory were recognised by receiving various prestigious awards and honours such as the Young Scientist Award, National Young Metallurgists Award, Medals of the Materials Research Society of India, Young Engineering Award and several others in the field of Minerals, Metals and Material corrosion, Chemical engineering and Environmental protection by our scientists.

Prof. Mehrotra added that during the Diamond Jubilee Year of CSIR, NML has planned several activities, which include seminars, workshops, science quizzes and Diamond Jubilee Lecture series in which some of the most eminent scientists and



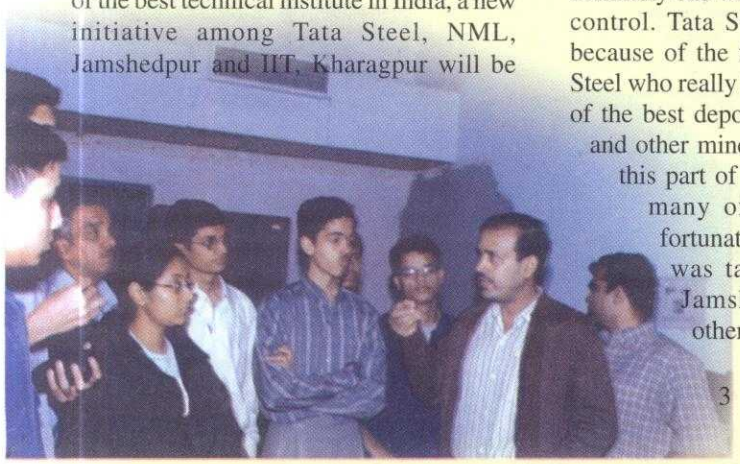


national relevance. Dr. R.N. Ghosh, Sr. Scientist introduced the chief guest, Shri B. Muthuraman, MD, Tata Steel, who later delivered the CSIR Diamond Jubilee lecture.

Delivering his lecture Shri Muthuraman expressed his happiness over participating in NML's function of the CSIR Diamond Jubilee Celebration. He said "Over the last, more than 50 years, Tata Steel had a wonderful association with the National Metallurgical Laboratory and it is fortunate for both the institutions that they are situated side by side, I recall Tata Steel getting greatly benefited at early as several mineral beneficiation studies were done, with the help of National Metallurgical Laboratory, such as washing plants at Noamundi and at the Jharia coal washeries and several other works that we have done together". He reiterated, "Tata Steel being one of the most outstanding companies in India and in the world, NML being an outstanding laboratory and IIT, Kharagpur being one of the best technical institute in India, a new initiative among Tata Steel, NML, Jamshedpur and IIT, Kharagpur will be launched very soon. Adding that this will be beneficial to the steel industry as a whole, Shri Muthuraman pointed out that there are four important characteristics which steel companies should follow in order to be successful. These are: control on raw materials, cost leadership, technology management and awareness about the development in the steel industry all over the world.

"By control I don't merely mean possessing raw materials, or having mining definitely one way to ensure that you have control. Tata Steel has been fortunate because of the founding fathers of Tata Steel who really took over the leads, some of the best deposits of iron-ore and coal and other minerals that are available in this part of the country. And I think many of us in Tata Steel are fortunate today that this decision was taken 100 years ago by Jamshedji Tata and several others who followed him and worked with him. But, apart from owning raw materials, it is important to have control on raw materials," he specified.

"The second important characteristics for a steel company to be successful is cost leadership because what is going to happen in the world is that the steel prices are not going to go up, steel prices are going to go down." "Here is the area where I think technologists, researchers, academic institutions can play a vital part". Shri Muthuraman stressed on "Cost Leadership" by citing examples from Tata Steel itself. He said, "Tata Steel has two sinter plants. One, which is very old, and one, which is just 10-12 years. Between the two sinter plants, we have combined capacity of 2.45 million tonnes and from that last year we produced 4 million tonnes .



BIRTH OF CSIR

World War I (1914-18)

1902 The British Government constituted Board of Scientific Advice to co-ordinate activities of various scientific and technical departments

1911 Creation of Indian Research Fund Association

1918 Indian Industrial Commission observed - "India with its wealth in raw materials has found it in the past easier to buy than to manufacture the articles required for its amenities of life. The war has shown, however, that it is desirable to be less dependent on European countries for manufactured goods, and India, like other countries, has been compelled during the last four years to improvise for the time being, while laying plans for industrial development in future."

1933 "Nature" Editor Sir Richard Gregory on his India visit observed Lack of Industrial Research in the existing colonial set-up.

1934 Govt. created 'Industrial Intelligence & Research Bureau' for information collection & dissemination

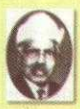
World War II (1939-45)

1938 Group of Calcutta based Indian Scientists headed by Prof. Meghnad Saha mobilised and set-up National Planning Committee and Pandit Nehru as the chairman.

1940 Realisation the need for development of Indian Industry and creation of the Board of Scientific & Industrial Research at Calcutta with Prof. S. S. Bhatnagar, Head Chemical Lab. of Punjab University, Lahore as the Director under Dept. of Commerce at the premises of the Govt. Test House at Alipore in Calcutta.

1941 Setting-up of Industrial Research Utilization Committee

1942 Creation of Council of Scientific & Industrial Research (CSIR) and registration under Society Act of 1860; shifting of CSIR from Calcutta to Delhi at Delhi University Campus and finally to its present building at Rafi Marg in 1953.



CSIR MANDATE (1942)

- Promotion, guidance and co-ordination of scientific and industrial research in India;
- Establishment or development of institutions and assistance to departments of existing institutions for study of problems concerning particular industries;
- Establishment and award of research studentships and fellowships;
- Utilization of the results of researches conducted under the CSIR for the development of industries in the country;
- Establishment, maintenance and management of laboratories, institutes and organizations to further scientific and industrial research;
- Collection and dissemination of information in regard to research and industry;
- Publication of scientific papers and journals.

Shri B. Muthuraman delivering CSIR Diamond Jubilee Lecture

"Last year we made 360 thousand tonnes and this year we are planning 400 thousand tonnes and I am sure in the very near future we will make half a million tonnes from the wire rod mill. So, there is a searching mind and there is small little improvements both in processes and products and certain methods of working that are fundamental and important for the success of steel companies to make sure that the capital productivity, the money that you have spent on your assets is used usefully and there is an area, I believe and several of these areas and several of these operating parameters, several control parameters in the plant, I think the academic institutions should produce more out of the given time or a given capacity."

The third important thing for competitiveness is the technology management, he added stating that "Tata Steel is today one of most modern companies in the world." He stressed that steel industry is not one where you can afford to make too many mistakes. Too many mistakes can prove extremely costly and there are companies, which have closed down. Finally it was the LD process which is believed to have turned Tata Steel Company into the correct direction. Similarly, we went on for stamp sizing technology a few years ago and we have built one battery after another in terms of stamp sizing technology and that is something which is giving us a very big comparative advantage over any other company, any other steel company in the world. So, it is very important not necessarily to be the most up-to-date but to go for the technology, which suits local conditions. Elaborating on the local condition, he added, "We have got high phosphorous raw materials, high phosphorous iron ore but we still manage to make low phosphorous steels for the automobile industry, through innovative technology.

Shri Muthuraman further added, "Irrespective of what your company makes, whether your company is making steel or automobiles or software or a telecom, the processes that goes into a manager's mind, the processes that goes into an executive's mind or a scientist's mind are the same but only the product is different. The processes are not different. It is just because steel is a few thousand years old and telecom is just a few hundred years old and software is just a few years old. It doesn't mean that the mental processes become old. So, there is something fundamental that we all need to think". Also, it is our duty to create interest, a renewed interest in the minds of youngsters, the students and the IITians and other college students to re-create interest in fundamental aspects of life."

Regarding awareness about steel companies all over the world, Shri Muthuraman recalled a conversation that he had with a consultant in London just about 10 years ago, while asking him what is wrong with the Steel Industry. The consultant answered, "Look metal industry is by nature so traditional in the manner in which it organises itself and we are finding it extremely difficult to extricate from the normal traditional thinking. You know iron and steel companies are no exception. They have got all traditional organisational structure, usual thinking." This incident changed and his views, said Shri Muthuraman, and he planned to think in terms of engineering processes, putting IT systems into work, be market oriented, brand their products. "We stopped thinking that we are merely a steel company. We started thinking that we are a company that needs to work on modern lines. So, we started looking at our business processes, re-engineering our business processes" he added. Shri Girish Chopra, COA proposed the vote of thanks

NML CELEBRATES FOUNDATION DAY

The National Metallurgical Laboratory, Jamshedpur celebrated its fifty-second Foundation Day on 26th November, 2002 along with its continuing celebrations of the CSIR Diamond Jubilee Year. In addition to the CSIR Diamond Jubilee Lecture on "Non-destructive Evaluation in Science & Technology" by the Chief Guest Dr. Placid Rodrigues, Chairman, Recruitment and Assessment Centre, DRDO, the one-day programme comprised 'Open Day' with live demonstration for the students, entrepreneurs and other visitors. science quiz contest for the students and presentation of NML Foundation Awards.

Presenting the Annual Report, Prof. S.P. Mehrotra, Director, NML, in his welcome address gave an overview of the activities and achievements of the laboratory. Prof. Mehrotra thanked Shri P. Parvathisem, Chairman and other members of the NML Research Council for their support to the NML's R&D programmes.

Delivering his lecture, Dr. Rodrigues initially spoke about the applications of non-destructive techniques in the field of medicine and physiology, like - x-ray, sonography and ultrasound techniques. As a word of caution, he added that human beings should not be over exposed to x-rays as it can cause genetic defects while elaborating on nondestructive applications.

He said that one should avoid defects in engineering components. If the defect is not taken care of at the right time it may lead to fracture. The range of the defect varies and the rectification of the defect depends upon quality control assessment level. Even if there is a defect which is not accepted according to the quality assessment programme, still sometimes one has to make an evaluation of the fitness tolerability for specific purpose and see that in future the past fracture is avoided.

Dr. Rodrigues pointed out that for a non-destructive evaluation, it is better to get image rather than a signal as the latter has to be interpreted. And this is where lies the importance of computer visualisation and computer aided designs. He emphasized that the ultimate aim of any endeavour in engineering science is to reduce total life-cycle cost and in the context of non-destructive evaluation, one has to be concerned not only about the material conditions when the material is going into service but how the degradation takes place while in service and the consequent failure models and the risk involved due to the degradation. Infact, in conventional manufacturing, based on this approach one will either accept or reject a component but in modern scientific approach one shall obtain a feedback and do intelligent control of the process to get the right quality so that there is no rejection of materials as well as the system. This is the concept of "Intelligent Processing of Materials where again non-destructive sensor is going to be used" he added. Sri R L Paswan Dy. Fin. Adviser proposed the vote of thanks.

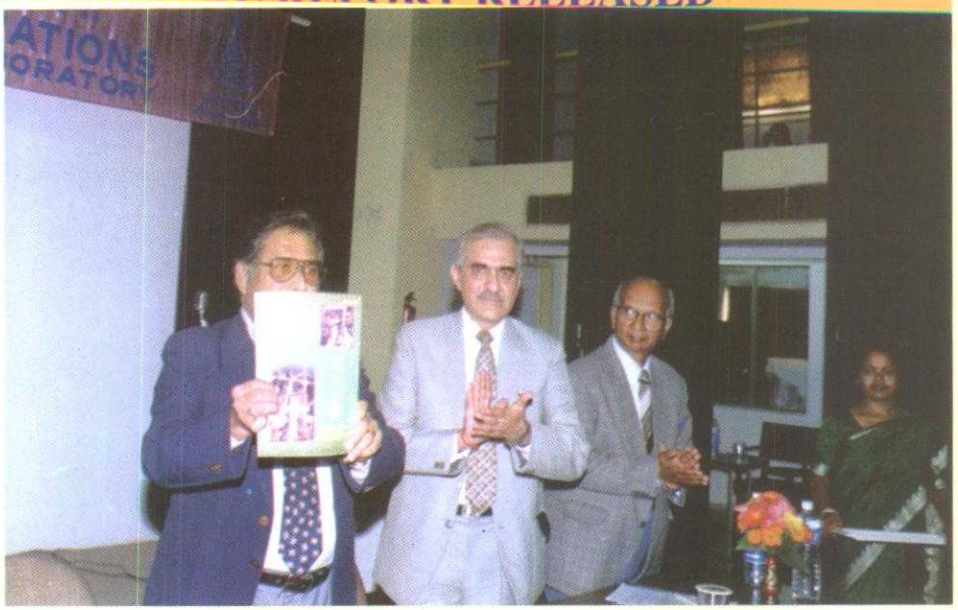
Dr. Placid Rodrigues, Chairman, Recruitment & Assessment Centre, DRDO, New Delhi, lighting the ceremonial lamp. On his left Prof. S.P. Mehrotra, Director, NML

A glimpse of the Foundation Day Celebrations

LABORATORY ANNUAL REPORT RELEASED

Dr. Placid Rodrigues, Chairman, R&A Centre, DRDO formally released the Laboratory's Annual Report for the year 2001-02 at the function organised for celebrating Laboratory 52nd Foundation Day on 26th November 2002. As mentioned in the report, the R&D programmes of NML, Jamshedpur, are broadly grouped as three important drivers of growth.

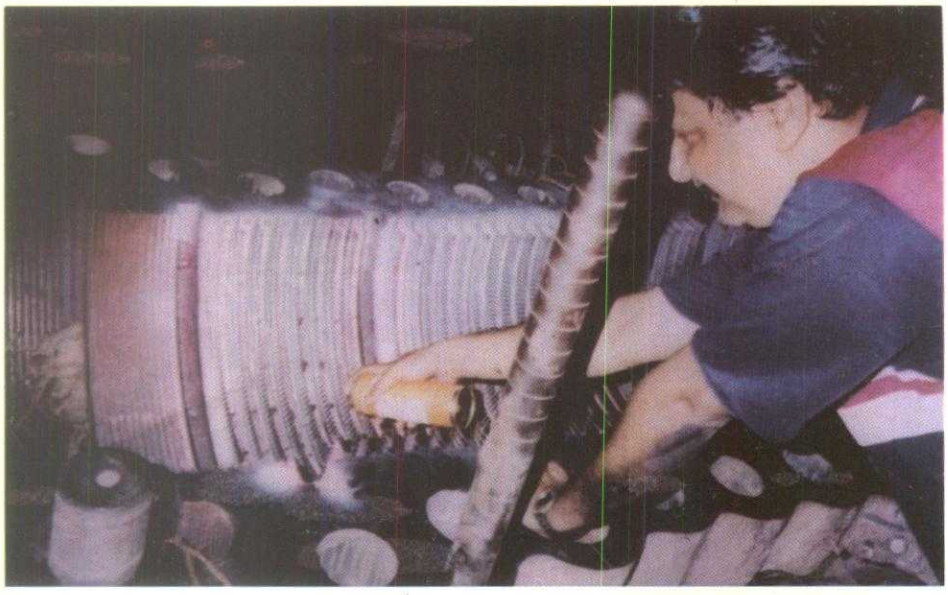
The first is the laboratory's Component Integrity Evaluation Programme (CIEP). The emphasis of this programme, of late, has been on the estimation and extension of life for critical engineering components, mainly in the core industrial, Air Force and Railways sector; and on understanding the causes of failure, which is likely to result in conservation of material and energy; reduced down time and safety of the engineering components. The projects completed during 2001-02 include: Remaining life assessment of primary reformer tubes of Vijaipur Plant, for M/s National Fertiliser Ltd.; Investigation of metallurgical conditions and estimation of residual life of FPUDI column, for M/s Bharat Petroleum Corporation Ltd; Failure analysis of wheels, for M/s Research Design & Standard Organisation; Failure analysis of condenser leaky tube, for M/s Ahmedabad Electricity Co. Ltd; Stress rupture test for boiler tubes, for M/s Central Power Research Institute; RLA studies, for 2x67 MW units 3&4 of BALCO captive TPP, Korba, for M/s MECON Ltd; Investigations on fracture behaviour of welded pipes, for M/s Offshore Testing & Inspection; Analysis of radiation coils of USC cracking furnaces for RLA, for M/s Reliance Industries Ltd; Failure analysis of API 5Lx46 grade ERW pipes for high pressure cross country transportation of petroleum product for M/s Indian Oil Corp. Ltd; Failure analysis of helical spring of coke oven batteries for M/s Otto India Pvt. Ltd; Creep rupture and fatigue properties of IN625 alloy steel, for M/s GE India Technology Centre Pvt. Ltd; Failure analysis of lock washer in internal device assembly of high pressure compressor rotor in aeroengine, for M/s Indian Air Force; Identification of materials in track machine components, for M/s South Eastern Railway; Metallurgical examination of broken rail pieces and other items at accident site at Sarai Banjara, for M/s Northern Railway. And the ongoing sponsored projects during the period included those for:M/s Walchandnagar Industries Ltd; M/s Indian Air Force; M/s ALSTOM Power Boilers Ltd; M/s Thermax Babcokck & Wilcox Ltd.; M/s Tata Power; M/s Reliance Industries Ltd; M/s BARC; and M/s IGCAR, Kalpakkam.



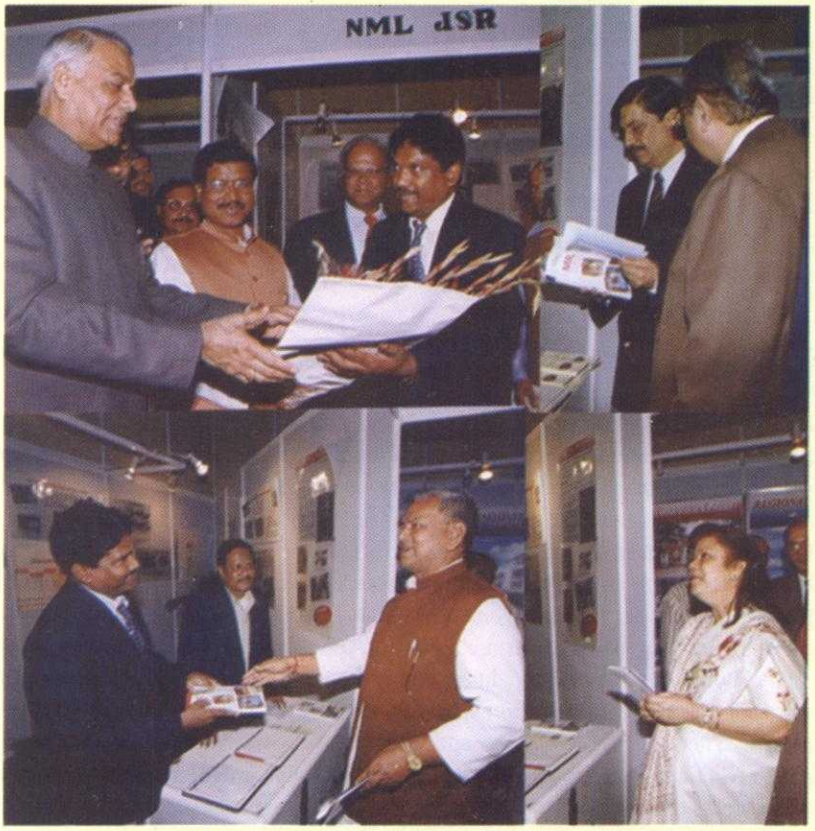
Dr. Placid Rodrigues releasing the Laboratory's Annual Report 2001-02. On his left, Prof. S.P. Mehrotra, Director, NML and Shri Premchand, Sr. Scientist, NML.

The second driver of growth in NML pertains to maximizing blast furnace productivity with Indian iron ore, with the financial support of Ministry of Steel, Government of India, under the Steel Development Fund scheme and extraction of magnesium from indigenous raw material, under the sponsorship of Ministry of Mines, Government of India. NML, jointly with SAIL and Tata Steel, intends to develop a knowledge base for characterizing the process dynamics of the blast furnace operations and hot metal quality. Other collaborators in this project include IIT(K), IIT(B), IIT(M), IIT(KGP); and MECON, and RDCIS SAIL, Ranchi. The project on magnesium extraction involves setting up of a pilot plant for production of 100kg per day magnesium using indigenous ore to exploit the emerging market for the auto majors such as Ford, BWM, Hundai, *etc.*

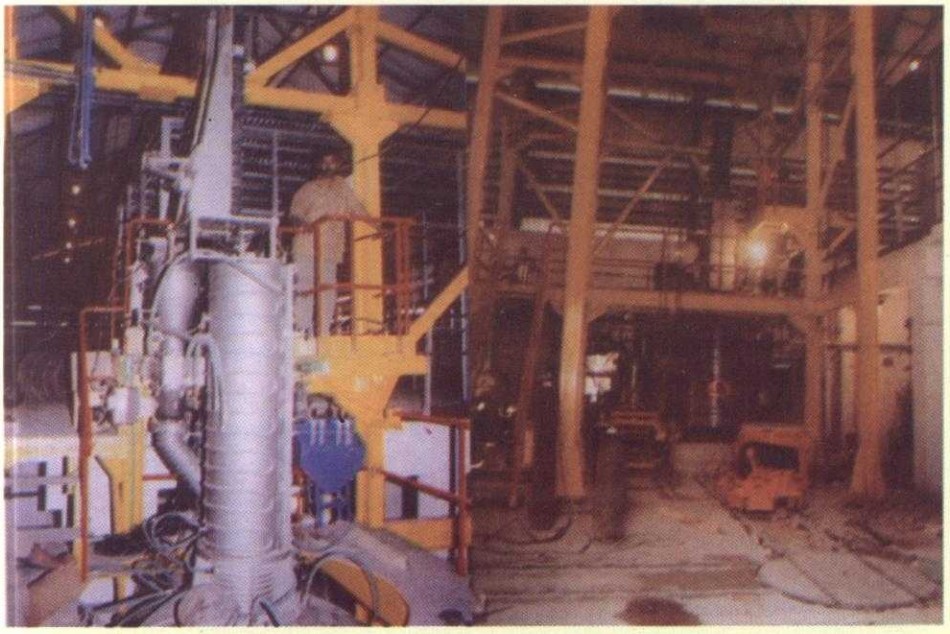
The third driver of growth has been contract R&D comprising grant-in-aid projects, sponsored and collaborative projects,



Scientist working at power plant site.



Shri Y. Sinha, the then Finance Minister (now Minister of External Affairs); Shri Babulal Marandi, Chief Minister, and Shri Pravat Kumar, Governor, Jharkhand, along with other dignitaries visiting the NML Stall at India International Trade Fair 2001, New Delhi.



Magnesium Pilot Plant at NML

technical services and consultancy projects from various government agencies, public and private industries. The laboratory with the financial support of DST, New Delhi, has undertaken a large number of projects in its diversification pursuit. The scope and expanse of research in these projects is quite varied from synthesis and characterization of AIN-SiC composites to thermochemical modelling and simulation studies for energy optimisation and quality control in ferro alloys production using submerged arc furnace; from comparative geology, minerology, geochemistry and origin of apatite ores of Indian iron ore series (W.Bengal) and Fedorovskaya Formation (South Yakutis, Russia) to micromagnetic study of ferromagnetic materials; from investigation on the suitability of non-edible rural vegetable oils in mould/core making and preparation of resins to development of low silver brazing alloy for joining metal/ceramic, from dephosphorization of high carbon liquid ferromanganese to improvement of the properties of cast aluminium alloys by application of electric or magnetic fields during solidification; from synthesis and sintering of titanium diboride for industrial application to reduction of hydrogen entry and consequent hydrogen embrittlement in steel substrate by ion implantation.

NML, in its endeavour to overcoming crisis of Agra foundry industries following the Honourable Supreme Court's directives on the eco-friendly production of foundry grade iron, developed and put up in collaboration with Tata Korf Engineering Ltd., a Tata Group of Companies, environmentally benign and energy efficient cokeless cupola for foundry grade iron, to save Taj Mahal and neighbouring historical monuments. The technology is intended to cater to the needs of not only Agra foundries but also of several other foundries across the country.

Besides, the laboratory has contributed to the ferrous and non-ferrous industries in several ways, including corrosion protection of the materials. It has developed criteria for the suitability of rebars for use by the sponsor M/s Sardar Sarovar Narmada Nigam Ltd. Gujarat; a process for extraction of zinc from Ganesh Himal Zinc-Lead ore of Nepal, under the sponsorship of MECON, Ranchi; and a flow sheet for beneficiation of low-grade chromite ore, under the sponsorship of M/s. Orissa Mining Corporation, Bhubaneswar.

NML, with its bench scale and pilot plant facilities, has successfully completed several other interesting projects, e.g. melt spinning of Nd-Fe-B alloy, under the sponsorship of Thapar Centre for Industrial R&D, Patiala; Performance evaluation of epoxy coated vis-à-vis TMT CRS rebars embedded in concrete, under the sponsorship of Tata Steel, and Beneficiation study of quartz and feldspar generated during mining of mica under the sponsorship of M/s Development of Mineral Resources and Technology Upgradation Fund, Hyderabad.

In addition to the above projects, NML has carried out projects sponsored by various government agencies and ministries in

industrial and space sectors. Support was extended by the Ministry of Tribal Affairs, New Delhi, for Exploration of value addition to vegetable oils (sal & kusum) available in minor forest areas for industrial applications; Ministry of Environment and Forests, New Delhi, for life assessment study for steel sector; Aeronautical Development Agency, Bangalore, for studies on thermal characterisation of LCA brake disc; Indian Space Research Organisation, Bangalore, for biomimetic synthesis of inorganic materials under microgravity.

Some international collaborations with Russia, under the ILPT programme, have also been successfully handled. The projects under these programmes relate to synthesis and sintering of titanium diboride for industrial application. Studies on development of floatation reagents for processing of complex, Study on controlled adsorption of the surfactants and polymers on oxidic mineral systems for enhanced beneficiation of iron ores in their sub-sieve range.

NML has recently undertaken the diagnostic study to help rehabilitate the sick units in Jharkhand, which are involved in processing and extraction of metals, minerals and materials.

The laboratory is also pursuing a programme to improve the performance of existing Small Scale Industry (SSI) units by developing/strengthening skills and technical competence of the entrepreneurs and senior executives of the small enterprises, in collaboration with Small Industries Development Bank of India (SIDBI)

NML's Intellectual Property Assets grew during 2001-02 with 96 research publications in national/international journals, 10 Indian and 7 international patents and 2 copyrights, 50 renewed patents applications and 81 papers in various seminars. The External Cash Flow (ECF) of the laboratory amounted to Rs. 52.8 million. NML scientists bagged many prestigious awards. These include National Technology Day awards, IEEE best paper award, LERIG best paper award, THERMANS best paper award, Peravadhanulu best paper award and IIM Best Paper Awards.

NML Foundation Day Awards

V.A. Altekar Award for Best Technology

Instituted in the honour of late Prof. V. Altekar, a former NML Director, this award for the year 2002 was conferred on Dr. S. Prabhakar and his team comprising of Dr. G. Bhaskar Raju, Dr.S. Prabhakar, Dr. S. Subba Rao and Shri T.V.K.Das of NML Madras Centre, for developing "Indigenous Technology for an Automated Floatation Column"

B.R. Nijhawan Award for Best Technical Paper

Instituted in honour of Dr. B.R.Nijhawan, who was Director of NML during its formative years, this award was conferred on Dr. L.C. Pathak and his team comprising Dr. D. Bandyopadhyay, Dr. S. Srikanth, Dr. S.K. Das and Prof. P. Ramachandra Rao for their paper entitled *" Effect of heating rates on the synthesis of Al_2O_3 SiC composites by the self propagating high temperature synthesis technique"* published in **J. Am. Cer. Soc. (2001) 84.** Various aspects of *in-situ* formation of Al_2O_3 SIC composites have been studied by investigating the thermal analysis (TG/DTA) of powder mixture (4 Al, 3 SiO_2, 3C) and pellets in an argon atmosphere at different heating rates. Both the reaction initiation and peak temperatures are found to increase with the heating rates. At lower heating rates, the powder samples do not reveal any exothermic peak possibly due to poor reactivity and sluggish exothermic reaction. Appearance of the exothermic peaks in the DTA plots after melting of aluminium indicates reduction of silica by liquid aluminium. Conversion of aluminium is found to decrease marginally with increase in heating rates. The apparent activation energy of the process compares well with the inter diffusion activation energy of silicon and oxygen, indicating that oxygen diffusion in Si formed at the reaction front may be the rate-controlling factor for this SHS process. From the SEM studies it appears that the formation of SiC whisker is through liquid phase mass transfer.

Dr. L.C. Pathak, Scientist receiving the Nijhawan Award for best technical paper.

Distinguished Services Award

Shri Santosh Kumar Pramanik, Tech. Asst. of Electrical Engineering Division and Shri V.P. Singh, Tech. Asst. of Materials Characterisation Division were awarded the Distinguished Services Award for their outstanding services to the laboratory.

Shri S.K. Parmanik (L) and Shri V.P. Singh (R) receiving the Distinguished Services Award

National Seminar on

Resurgence of Metallic Materials - the Current Scenario

A National Seminar on "Resurgence of Metallic Materials - the Current Scenario" [ROMM-2002] was held at NML, Jamshedpur during 24-25 October, 2002 in collaboration with The Institution of Engineers (India), Jamshedpur Chapter & Materials Research Society of India, Jamshedpur Chapter. The theme of the seminar was of immense significance to metallurgical industries and research institutes. Metals and alloys face potential threats from plastics, rubber and ceramics as candidate material for many engineering applications. The main aim of the seminar was to emphasize how by innovations in process and product design the metallurgical community could face this challenge.The seminar formed a part of Golden Jubilee celebration of the Jamshedpur centre of Institution of Engineers (India) and the Diamond Jubilee of the Council of Scientific and Industrial Research (CSIR).

The seminar mainly focused on resurgence of metals with several developments such as recycling, recovery of metals from wastes, extraction of metals from leaner ores etc. With the advent of the industrial revolution and emergence of techniques of production in large quantities, metal has ruled the materials world in terms of tonnage used, and the range of applications. During the last two decades of the last century, however, opinion gained ground that for many of the new applications requiring special properties, such as high temperature behaviour, wear resistance, stiffness, resistance to extreme corrosion conditions etc., metallic materials were no match for the emerging non metallic materials. A large number of delegates from engineering industries and research institutions from all over the country participated.

In appreciation of the distinguished services rendered in the field of Metallurgy and Materials Science, the Institution of Engineers (India), Jamshedpur Local Centre conferred the distinguished Metallurgist/ Materials Scientist Award to: Prof. S.P. Mehrotra, Director, NML, Jamshedpur, Dr. H.S. Maiti, Director CGCRI, Kolkata, and Dr. O.N. Mohanty, Chief R&D and Scientific Services, Tata Steel, Jamshedpur

*(**Top**): Prof. P. Ramachandra Rao, Vice-Chancellor, Banaras Hindu University inaugurating the seminar in a ceremonial way. (**Middle**): At the dias- (L–R) Dr. C.S.S. Krishnan, Co-ordinator, ROMM; Shri D.P. Rathore, Chairman, the Institution of Engineers (India), Jamshedpur Local Centre, Prof. P. Ramachandra Rao, V.C. BHU; Prof. S.P. Mehrotra, Director, NML; Dr. N.R. Bandyopadhyay, Chairman, MM Division, IE(I), Kolkata and Dr. R.N. Ghosh, Sr. Scientist NML; (**Bottom**) : Prof. S.P. Mehrotra, Director, NML welcoming the dignitaries and participants of ROMM.*

*(**From Top Left**) : Declaration of Awards by Dr. N R Bandopadhyay; Prof. S P Mehrotra, Dr. H S Maiti and Dr. O N Mohanty receiving the Medals respectively*

Workshop on

Fatigue, Fracture and Integrity Assessment

A workshop on 'Fatigue, Fracture and Integrity Assessment' was organised by the National Metallurgical Laboratory, (NML), Jamshedpur during November 28-29, 2002. Many organisation working with engineering components took part in the workshop. The inaugural function was held at the laboratory's auditorium and attended by many invites other than the participants.

While welcoming the gathering, Dr. D.K. Bhattacharya, Chairman of the workshop said that in the current scenario of development in science and technology, engineering materials were continuously pushed to their limits, had to operate under more severe conditions, like stress or temperature or functionality. "Moreover, the consequences at stake-should a material fail to perform its required function, are now more serious than ever, with a far greater economic and human penalty than ever before. Rising material and operating costs also required that materials be used efficiently, to the fullest extent up to which they can provide service" he added. Dr. Bhattacharya apprised the members that the workshop was organised (i) to understand and characterise the behaviour of materials *vis-à-vis* the factors that threaten to impede or degrade their performance and design structures based on this knowledge; (ii) to monitor the behaviour of engineering materials while they are in service so that at any point of time their performance can be quantified and actions initiated to mitigate anticipated failures; and (iii) to ascertain the extent of degradation of materials and extend their usage if it is found that they are still capable of providing service.

Prof. S.P. Mehrotra, Director, NML and Chairman of the advisory committee in his address mentioned that it was possible to improve the efficiency and output from components by the introduction of new materials and also by improvement of conventional materials, in form and philosophy of usage. He added that the concept of absolutely zero failure was utopian, so it was required to rationalize the performance stability of structures through risk analysis and use of more materials than what were needed. Thus, organisation of such workshop was relevant.

The lectures were delivered by experienced and renowned faculties like Prof. Dr. Ing. E, Roos (MPA, University of Stuttgart, Germany); Dr.-Ing. G. Dobmann (Fraunhofer Institute of NDT, Saarbrucken, Germany); Mr. H.S. Kushwaha (Reactor Safety Division, BARC, Mumbai); Dr. D.S. Ramachandra Murthy (Structural Engg. Research Centre, Chennai); Prof. K.K. Ray (Indian Institute of Technology, Kharagpur); Dr. D. Bhattacharjee (Tata Steel, Jamshedpur); Dr. R.N. Ghosh, Dr. D.K Bhattacharya, Dr. S. Tarafder (NML, Jamshedpur). Apart from presentations by the invited speakers, participants also presented real life problems encountered by them. The workshop was beneficial to practising engineers engaged in design, fabrication and operation as well as research scholars and academicians who are working in various areas related to materials behaviour concerning integrity of engineering materials and components.

Two-Days Management Development Programme on
Environmental Management & Pollution Prevention

In coinciding with the U.N. World Earth Summit on Sustainable Development, held at Johannesberg, NML organized a two-day Management Development Programme on Environmental Management – Pollution Prevention Pays at NML under the sponsorship of Small Industries Development bank of India (SIDBI), Jamshedpur.

The programme was inaugurated by Shri S. Mukhopadhyay, Deputy General Manger, SIDBI, Jamshedpur. Shri A.S. Mathur, President, Usha Beltron Limited, Jamshedpur, was the Chief Guest. Prof. S.P. Mehrotra, Director, NML presided over the function. Other dignitaries include Dr. K.K. Mishra, CSIR Emeritus Scientist, Dr. C.S.S. Krishnan, Director Grade Scientist (Retd.), Prof. Madan Mohan Prasad, Head, Deptt. of Civil Engineering, RIT, Jamshedpur, Dr. M.D. Maheswari, Chief, Scientific Services, Tata Steel, and Prof. B.N. Prasad, Head, Deptt. of Mechanical Engineering, RIT. A large number of scientists, entrepreneurs, industrialists and technocrats participated in the programme.

In his Presidential Address, Prof. S.P. Mehrotra, Director, NML briefly enumerated the significant R&D achievements of NML in general and with special reference to the applications of S&T on the eco-friendly and economically viable efficient clean technologies in particular.

Chief Guest Shri A.S. Mathur, stressed the need for industrial units to take measures for preventing environmental pollution. "Apart from the individuals, industries too have to shoulder the blame for polluting the environment because they are the biggest polluters" Shri Mathur said. He also lamented that necessary gadget and devices were to be set up in the units to prevent polluting the environment.

In his inaugural address, Shri S. Mukhopadhyay, DGM, SIDBI, informed that the SIDBI intended to organize 20 such programmes in collaboration with NML, through out the country and also launch several credit schemes without collateral and third party guarantee for technology upgradation, expansion, diversification and even setting up of new units with environmental friendly technologies developed by NML/CSIR.

Dr. M.D. Maheswari, Chief, Scientific Services, Tata Steel, Prof. M.M. Prasad, Head, Civil, RIT, Prof. B.N. Prasad, Head, Mechanical, RIT, Prof. S.N. Sinha, Head, Metallurgical, RIT, Dr. C.S.S. Krishnan, Director Grade Scientist (Retd.), Dr. K.K. Mishra, Emeritus Scientist, delivered lectures during the Technical Sessions in the two-days deliberations. The other key presentations were made by Dr. Mani Kant Paswan, Prof. Deptt. of Mech. Engg., RIT, Dr. M.K. Agarwal, Prof. Deptt. of Metallurgical Engg., RIT, Dr. G. Pathak, BIT, Ranchi, Shri J.K. Manhatam, Head, National Small Industries Corporation, Jamshedpur, Shri Subhir Ganguli, Sr. Manager, MTC, Telco, Shri Chandreshwar Khan, Sr. Manager, Training Deptt., Telco, Shri S.K. Dasgupta, Environment Management Division, Tata Steel, besides several NML scientists.

The objective of the programme was to promote, educate and give a platform to deliberate in-depth knowledge as well as expertise on Environment Management. Nearly, 25 technical papers covering the theme such as Sustainable Development on Pollution Control, Clean Industrial Environment, Unabated Pollution, Impact of Pollution Management, Air, Water, and Noise Pollution and their Control Managements, Management of Solid Wastes from Mining and Metallurgical Industries, Productivity Improvement through systematic waste management, Processing of Wastes from Mining and Mineral based industries, Critical issues in the prevention and control of air pollution and industries, Pollution Control Legislation, etc., were deliberated during this programme and about 45 delegates, mostly from industries participated in the programme.

Workshop on Total Environmental Control Based Quality and productivity Management.

A Workshop on "Total Environmental Control Based Quality and productivity Management" [TEQPM- 2002] was held during 10-12 December, 2002. The workshop highlighted the importance of total environment control based quality and productivity management and to create awareness of environmental issues mainly among the SSI units as most of the organisations have identified the processing cost, quality of product, reliability and flexibility of technology as major factors to achieve the competitive edge. Several local firms representatives and entrepreneurs were trained during the workshop.

NML – Tata Steel Apex Committee Meeting

An Apex Committee meeting of Tata Steel and NML was held on 5th November , 2002 to review the progress of the collaborative R&D projects and also to examine the initiation of some new projects. Three new projects – (1) Fracture resistance measurement of line pipe steels. ; (2) Enhancement of process efficiency in the production of ferrochrome at FAP, Bamnipal through addition of Improved Sintered Pellets; and (3) Enhancement of process-efficiency in ferro-chrome production through modeling of the thermodynamics of the carbothermic reduction of chromite spinels were recommended to take-up. The project on Beneficiation of Ilmenite for production of Rutile was also presented and was under consideration.

The progress of the ongoing projects – (1) Increased sintered reducibility at lower RDI; (2) Process analysis of the ferro-chromium in the submerged arc furnace; (3) Recovery of Zinc from Zinc dross; and (4) Mathematical modeling of the carbonization process in coke making. From Tata Steel side Dr. T. Mukherjee, Dr. Amit Chatterjee, Dr. O.N. Mohanty, Dr. S. Ashokan, Dr. T. Venugopalan, Dr. A.K. Das, Mr. Ashok Kumar, Mr. I. Chakraborty, Mr. Bimalendra Jha, Dr. M.D. Maheshwari, Mr. P.V.T. Rao, Dr. S.K. Das, Shri S.H. Krishnan, Shri P.C. Chaudhary, Shri A.K. Mukherjee, Shri R. Battish and Shri C.B. Lunawat attended the meeting. Prof. S.P. Mehrotra, Dr. R.N. Ghosh, Dr. D.K. Biswas, Dr. S.K. Narang, Shri J.P. Srivastava, Dr. K.M. Godiwalla, Dr. S. Tarafdar, Mr. S. Ghosh, Shri S.C. Maulik, Dr. R.P. Bhagat, Dr. S.K. Das, Dr. S. Ranganathan, Dr. I. Chattoraj, Dr. D.D.N. Singh and Dr. P.N. Chaudhary participated from NML side .

Copyrights Filed

- COKESIM-1 - A Fortran code for simulation of volatile release in the coke oven by' S.K. Das and K.M. Godiwalla
  (CR-39 & 40/2002)
- COKESIM-1 - A Fortran code for prediction of variation in thermo-physical properties in the coke oven by S.K.Das and K.M.Godiwalla
  (CR-39 & 40/2002).

MoU Signed

- Studies on iron-ore beneficiation by semi-commercial column floatation for M/s SOCIEDADE DE FOMENTO
- Establishment and running of Waste Minimisation Circles for NATIONAL PRODUCTIVITY COUNCIL
- Development of Spectro Standards for plain carbon steel for PROCESS and PRODUCT DEVELOPMENT CENTRE
- Development of mathematical model for burden distribution in a blast furnace with NML/IIT Chennai/Ardee Business Services
- 2D dynamic model to simulate temperature and composition distributions inside a blast furnace with IIT-Bombay
- Softening -melting of Indian iron ore and sinters with RDCIS, SAIL.

Foreign Deputation

- Dr. K.L. Sahoo, Scientist visited United Kingdom to carry out advanced research on Manufacturing and stability of Al-based nano quasi crystals at the University of Oxford, UK for three months from 9th Sept.'02 to 8th Dec.'02 under the INSA-The Royal Society exchange programme.
- Dr. R.N. Ghosh, Sr. Scientist visited Department of Materials, Imperial College of Science Technology and Medicine, London. This formed a part of an ongoing project on Physically Based Constitutive Equations for design and life prediction at elevated temperature – modelling and validation, Engineering and Physical Sciences Research Council of UK sponsored the visit during November-December 2002.
- Dr. Sanjay Sondhi, Scientist has left for Department of Materials, Imperial College of Science, Technology and Medicine, London, under a research programme funded by DARPA. He has been working on development of model based approach for life prediction of super alloy turbine disc having bimodal distribution of precipitates. General Electric and Pratt and Whitney are also involved in this programme.

Papers Presented

- *Microalloyed steel: its enhancement in properties by thermomechanical processing-A case study,* by S.P.Chaudhuri, presented in the national seminar on Resurgence of metallic materials (ROMM-2002) held at NML Jamshedpur during 24-25 October, 2002.
- *Advanced surface engineering,* by S.K.Mishra, presented in the national seminar on Resurgence of metal and materials (ROMM) Institute of Engineers, held at NML Jamshedpur during 24-25 October, 2002.
- *Magnetic characterisation of amorphous and nanocrystalline materials*, by A. Mitra, A.K. Panda and S.K. Pal, presented in the national seminar on Resurgence of metal and materials (ROMM) Institute of Engineers, held at NML Jamshedpur during 24-25 October, 2002.
- *Two-stage leaching for recovery of metals from anode slime,* by J.Hait, R.K. Jana, V. Kumar and S.K. Sanyal, presented in the 56th ATM, IIM, Baroda during 14-17, November, 2002.
- *Synthesis of nickel and copper powders by hydrogen reduction from aqueous solutions,* by A. Agarwal, V. Kumar, B.D. Pandey and D. Bagchi, presented in the 56th ATM, IIM Baroda, during 14-17 November, 2002.
- *A study on the solidification behaviour of LM-6 Al-Si alloy with electric current,* by Dr. Anjan Prodhan, presented at the Indian Institute of Metals: 56th. Annual Technical Meeting during 14 - 17 November, 2002.
- *Emerging Approaches in the Prevention and Control of Environmental Pollution from Iron & Steel Industries*, by Amitava Bandopadhyay, M. C. Goswami and K. K. Singh, presented at the All India Seminar on Pollution Management in Chemical, Ceramic, Metallurgical and Mining Industries: Emerging Trends and Challenges, held at Rourkela during 15-16 Nov. 2002.
- *Electrodeposited Ni-B alloy films: Preparation and characteristics,* by

K.Krishnaveni, T.S.N. Sankara Narayana and S.K. Seshadri, presented in the International Conference-Interfinish 2002, held at New Delhi during 20-22 November, 2002.

- *Electroless Ni-P/Ni-B duplex coatings: Preparation and evaluation of corrosion resistance,* by M. Mathiselvan, B. Sivasankaran and T.S.N. Sankara Narayana, presented in the International Conference-Interfinish 2002, held at New Delhi during 20-22 November, 2002.
- *Effect of cathode materials on the phosphatability and corrosion resistance of mild steel,* by M. Arthanareeswari, K. Ravichandran, T.S.N. Sankara Narayanan and S. Rajeswari, presented in the International Conference- Interfinish-2002 held at New Delhi during 20-22 November, 2002.
- *Crichtonite lava flows,* by R. Ramasamy, V. Vasanthamohan, P. Periakali, D.S. Rao and L.G. Gwalani, presented in the National Seminar on Mineral Exploration and Management Current Status and Future Trends, Mineralogical Society of India held near Samavarvadakari Village, Thirunelvel district, Tamilnadu during 21-22 November, 2002
- *Mineral exploration and management current status and future trends,* by R. Ramasamy, V. Vasanthamohan, P. Periakali, D.S. Rao and L.G.Gwalani, presented at the Mineralogical Society of India during 21-22 November, 2002.
- *Electrochemical generation of the Fenton's reagent: Application to the degradation of o-chlorophenol,* by G. Mangesh, N.Rajendran and T.S.N. Sankara Narayanan, presented in the Seventh International Symposium on Advances in Electrochemical Science and Technology-ISAEST-VII, SAEST held at Chennai during 27-29 Nov. 2002.
- *Corrosion behaviour of Al-Mg-Si alloys in different media-some observations,* by A.K. Bhattamishra, presented at the National Convention on Corrosion and East Asia Pacific Regional Conference held at Goa during 28-30 November, 2002
- *Corrosion resistant electrodeposited zinc coating from zinc-dross,* by M.N. Singh, presented at the National Convention on Corrosion and East Asia Pacific Regional Conference held at Goa during 28-30 November, 2002
- *Effect of deformation on sensitization-desensitization behaviour of stainless steels,* by Raghuvir Singh, P.K. Dey, A.Kumar and I. Chattoraj, presented in the National Convention on Corrosion (CORCON-2002) (East Pacific regional Conference, organised by NACE International, India Section held at Goa during 28-30 November, 2002.
- *Studies on compacted graphite iron formation, without using deno duliser,* by R.K.Minj, A.K.Vaish and Rama Krishna, presented and published in proceedings of IIF seminar, Jamshedpur chapter during 29-30 November, 2002.
- *Treatment of AI-Si alloy with current,* by Dr. Anjan Prodhan, presented at The Institute of Indian Foundrymen, Jamshedpur Chapter during 29-30 November, 2002
- *Pollution mitigation in foundries- a case study,* by S.P.Chaudhuri, presented in the seminar on Conceptual changes in foundry for excellence, organised by IIF Jamshedpur Chapter during 29-30 November, 2002.
- *Prospects of Mineral Based Refractory, Glass & Ceramic Industries in Jharkhand,* by P. Bhattacharyya, R. Singh & J.P. Srivastava, presented in the 66th Annual Session of Indian Ceramic Society held at Kolkata during 7-9 December 2002.
- *Mathematical modelling revolution in materials processing operation,* by S K Das (Invited talk), presented at the International Conference on Industrial Mathematics (ICIWIM -2002) held at IIT, Bombay during 7-9 Dec. 2002
- *Hard ceramics and their composites by SHS processing,* by S.K. Mishra (Invited speaker), presented at the 66th Annual AGM of Indian Ceramic society and seminar on Scientific research & Industrial development in glass and ceramics held at Kolkata during 7-9 December 2002.
- *Industrial air pollution monitoring & its control techniques,* by S.P. Chaudhuri, presented in TEQPM-2002 held at IDTR, Jamshedpur during 13-14 December, 2002
- *Mathematical modelling and computer simulation in iron and steel making - a glimpse,* by S. K. Das, K. M. Godiwalla, R. P. Goel and D. Bandyopadhyay, (Invited paper) presented at the National

Laboratory - Industry Interaction

NML Organises R&D - Industry Interaction Meet to pave the way for industrialisation

seminar on Computer Applications in Metallurgy (CAM), held at BIT, Sindri during 21-22 December, 2002.

- *Flow simulation in a continuous casting tundish with a vortex suppression device*, by K.M. Godiwalla, C.S.S. Krishnan and S.K. Sinha, presented at the ISTAM Congress held at IIT Guwahati during 23-26 Dec. 2002.

Papers Published

Bhattacharjee S., Chakravarty S., Dredge V., Bhattacharyya G. and Maity S. (2002). Removal of arsenic from groundwater using low cost ferruginous manganese ore. Water Research, **36**, pp. 625-632.

Das Samar, Ghosh A., Chatterjee S. and Rao R.P. (2002). Evolution of microstructure in an ultra-low carbon Cu bearing HSLA forging. Scandinavian Jour. of Metallurgy, **31**, pp. 272-280.

Das Gautam, Ghosh Chowdhury S, Kumar Ray Ashok, Das Swapan and Bhattacharya D.K. (2002). Investigation on the failure of super-heater tube. Engg. Failure Analysis, **9**, pp. 563-570

Jha M.K., Kumar V. and Singh R.J. (2002). Solvent extraction of zinc from chloride solutions. Solvent Extraction and Ion Exchange, **20**(3), pp. 389-405.

Kumar Sanjay, Singh K.K. and Ramachandra Rao P. (2002). The effect of fly ash additions on the mechanical properties of procelainised stone ware tiles. Jour. of Material, **36**, pp. 5917-5922.

Mishra (Pathak) S.K., Das S., and Ranganathan S. (2002). TEM study on HSLA steel. Materials Science Engineering A, **323** (1-2), pp. 285-292.

Mohanta K. Manoj., Ritesh Ranjan and Srivastava S.C. (2002). SChemical analysis of $BaSO_4$ in barite bearing concentrates and beneficiation products by wavelength dispersive X-ray fluorescence spectrometry. Journal of Metallurgy and Materials Science, **44**(4), pp. 185-190.

Narasimhan B.R. V., Prabhakr S., Manohar P. and Gnanam F.D. (2002). Synthesis of gamma ferric oxide by direct thermal decomposition of ferrous carbonate. Materials Letters, **52**, pp. 295-300.

Parashar S.S., Basu D.K. and Banerjee M.K. (2002). Role of additives in the phosphating bath. Journal of Metallurgy and Materials Science, **44**(4), pp. 191-201.

Pathak L.C., Mishra S.K. and Srikanth S. (2002). Effect of sintering characteristics of YBCO-Agx superconductors under argon atmosphere. Jour. of Materials Research, **17**(4). Pp. 1426-1438.

Prasad Sanjay. (2002). Preparation of copper powder from the waste copper solution by the process of cementation. Journal of Metallurgy and Materials Science, **44**(4), pp. 217-221.

Ranganathan S., Pathak S. and Das S. (2002).Precipitation in a high strength low alloy steel-A TEM study. Mat. Sc. Engg. A, A**323** (12), pp.285-292.

Rao D.S. Murty G.V.S., Rao K.V., Das D. and Chintalapudi S.N. (2002). Alteration characteristics of bleach placer illemenite from the Chatrapur coast, Orissa, India. Jour. Of Applied Geochemistry, **4** (1), pp. 47-59.

Rath C., Sahu K.K., Anand S., Das R.P., Kulkarni S.D., Das S.K. and Mishra N.C. (2002). Cation distribution dependent particle size, lattice parameters and magnetic properties of MnZn ferrites. Jour. Applied Physics, **91** (4), pp. 2211-2215.

Ray A.K. Tiwari Y.N., Chaudhuri S., Ranganath V.R., Sivaprasad S., Roy P.K., Das G., Ghosh Chowdhury S., Kumar P. and Ghosh R.N. (2002). Remaining life assessment of service-exposed reheater and super-heater tubes in a boiler of a thermal power plant. High Temperature Materials and Processes, (UK), **21,** (1-2), pp. 109-121.

Quality Management Programme

Prof. S P Mehrotra Director releases the ISO 9001: 2000 AQM

Ray A.K., Tiwari Y.N., Sahu J.K., Swaminathan J., Sinha S.K., Ghosh Choudhury S., Das G., Roy P.K., Das H.K., Murthy G.V.S., Kumar P., Chaudhuri S. and Ghosh R.N. (2002). Residual life estimation of service exposed reheater tubes in a boiler of thermal power plant. Jour. of the Mechanical Behaviour of Materials, (UK), **13**(2), pp. 73-89.

Ray A.K., Tiwari Y.N., Sinha R.K., Sinha S.K., Singh R. and Chaudhuri S.2002.Remnant life assessment of service-exposed pendant super-heater tubes of stage 4 in a boiler of a thermal power plant Engineering Failure Analysis, (UK), **9**(1), p. 82.

Sahoo K.L., Chattoraj Mousumi Sinhababu S.K. and Ghosh Sukomal. (2002). Mohua oil - A push for excellence as a potential binder and a source for resin preparation. Jour. of Indian Institute of Foundry, pp. 319-322.

Vaish A.K. and Minj R.K. (2002). Significance of burden distribution in the performance of a blast furance. Journal of Metallurgy and Materials Science, **44**(4), pp. 167-183.

Vaish A.K. and Goswami N.G. (2002). Environmental degradation in an integrated steel plants: specific measures for its sustainable growth. Journal of Metallurgy and Materials Science, **44**(4), pp. 203-216.

Vijaykumar T.V., Bhaskar Raju G, Prabhakar S. (2002). Adsorption of oleic acid at sillimanite/water interface. Jour. Colloid and Interface Science, **247**(2), pp. 275-281.

Talks Delivered

- Dr. S.P.Chaudhuri, Scientist delivered a talk on "Noise pollution and its control", invited by Institution of Engineers (I), Jamshedpur chapter at NML, Jamshedpur on October 3, 2002

- S. K. Mishra, Scientist, delivered a talk (invited speaker) on "Hard ceramics and their composites by SHS processing" at the 66th Annual AGM of Indian Ceramic Society and seminar on "Scientific research & Industrial development in glass and ceramics" held at Kolkata on December 8, 2002.

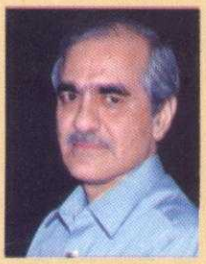
- Dr. R.P. Bhagat, Scientist delivered an invited talk on "Polymers in fine particle processing" in the International Seminar on Frontiers of Polymer Science and Engineering (MACRO-2002) organised by The Society for Polymer Science, India Kharagpur & Calcutta Chapters at IIT Kharagpur during 9-11 December, 2002

- Ratnakar Singh, Scientist delivered an invited talk on "ISO 9000 Certification-Why & How" in Two days Management Development Programme on Total Environment Quality Management & Total Productivity Management (TEQPM-2002) for the medium/small/tiny sector held at IDTR, Adityapur, Jamshedpur during December 13-14, 2002

- Dr. Sanjay Kumar, Scientist delivered a talk on "Potential of steel plant wastes for the development of value added products" in the Management Development Programme on Total Environmental Quality Management and Total Productivity Management (TEQPM-2002), organised jointly by NML, SIDBI and ASIA (Adityapur Small Scale Industries Association) held at IDTR during 13-14 December, 2002

- Dr. S. Prabhakar, Scientist delivered a technical lecture on "Beneficiation of mineral fines by column and electro-column and electro-flotation techniques and Flotation techniques in the treatment of industrial wastewater" held at Gulbarga University, Gulbarga on December 23, 2002.

AWARDS / HONOURS



SAIL Gold Medal-2002

Prof. S.P. Mehrotra, Director, NML has been awarded SAIL Gold Medal - 2002 of Indian Institute of Metals for Best Technical Paper

Deokaran Award for Glass

Shri S.K. Malaviya, Scientist, along with Dr. N.G. Dongre and Prof. P. Ramachandra Rao (jointly) have been awarded the Deokaran Award for Glass 2000 for the best paper *Prakasa Stambhanabhinda Lauha of Maharshi Bhardwaja* published in Indian J. History Science, **33**(4), 273-280 1998 of Indian Ceramic Society, Calcutta. The award was presented during the Inaugural Function of the Society's 66th Session held on 7 December, 2002, held at Calcutta.

Best Paper Award

- Ms. Rita Ghosh and Dr. D.D.N. Singh (jointly) received the IIT Madras Best Paper Award for the technical paper entitled *Role of Fluorine in accelerating corrosion and pitting of steel in concrete environments,* which was presented at the 4th National Symposium Research Scholars on Metals & Materials during 27-28 September, 2002, held at IIT, Madras.

- Ms. Dolly Chakraborty, Dr. S. Ranganathan, NML and Prof. S.N. Sinha, NIT, received the Best Paper award on '*Role of Fluorine*' presented at the 4th National Symposium Research Scholars on Metals & Materials during 27-28 September, 2002, held at IIT, Madras.

Recognition

Dr. K.K. Singh, has been Elected as (i) Council Member of Indian Ceramic Society from Eastern Zone and (ii) Fellow Member of the Council of Indian, Institute of Ceramics for the years 2003 and 2004.

MRSI Young Scientist Award

Dr. Jui Chakraborty, Quick Hire Fellow at the National Metallurgical Laboratory won the Young Scientist Award of Materials Research Society of India, Kolkata Chapter for the year 2001-02. Dr. Chakraborty (born 15-07-1967) did her B.Sc. (Hons.) and M.Sc. (Chemistry) from Indian Institute of Technology, Kharagpur and Ph.D. (Chemistry) from Regional Engineering College, Rourkela. Dr. Chakraborty received this coveted Award for her work in Biomimetic synthesis of inorganic materials. The conventional physical and chemical routes of nano-materials synthesis in materials science does not always suffice the need of the hour due to several limitations like expenses, high energy consumption or particle agglomeration and poor yield. So, one has to find out an alternative route for the advanced materials synthesis. Since the evolution of life, Mother Nature has produced numerous advanced materials like bone, shells, teeth or bio-sensors in migratory birds and animals. All of these materials have a highly controlled morphological features in terms of particle size, shape and distribution which is the secret of the exotic properties of these materials. The underlying principle is the *in-situ* mineralisation of the inorganic crystals in the biopolymer matrices of the natural organisms. Motivated with this simple synthesis route in nature at the cost of minimum energy expenses, Dr. Chakraborty made an attempt to replicate the method in synthetic system and this method is termed as biomimetic synthesis. In the present method, the oriented magnetite nanoparticles alike to the natural magnetic sensor in magnetotactic bacteria as a magnetic sensor material, agglomeration free, uniformly distributed magnetite particles in the size range of 5-10nm for enhancement of MRI contrast in medicine and acicular maghemite particles in the size range of 200-300 nm for magnetic memory storage were synthesized.

NML PERKS UP TECHNOLOGY

National Metallurgical Laboratory has received a proposal from Department of Ocean Development (DOD), Government of India to scale up its technology for the recovery of cobalt, nickel and copper from polymetallic sea nodules. The Rs. 3.81 crore project would go a long way in saving forex worth Rs. 500 crore per annum for the country that imports its entire cobalt and nickel requirement. The laboratory has been a part of the country's vision of establishing a commercial plant for nickel, cobalt and copper by 2010.A process is being developed to extract these metals from polymetallic nodules found at a depth of 5km on the sea bed. The laboratory developed a process route for the extraction of metals from the nodules following reduction roasting-ammonia leaching-solvent extraction-electro-winning and have set up a successful pilot plant with a capacity of 100kg nodule per day. The objective of this project is to scale up the process to enhance the recovery of metals and increase the capacity from 100 kg per day to 500 kg per day.

Contd. from page 1 :

CSIR Young Scientist Award

joined RRL, Bhubaneswar as Research Associate and worked there for three years (1994-97). Before joining NML, Dr. Sahu had been working at NICOMET Industrial Ltd., Goa as an Assistant Manager & Head, R & D and Process Control.

Dr. K.K. Sahu received this coveted Award for his significant contribution in the field of material synthesis and development of innovative process technology for efficient extraction and recovery of metals as value added products. Subsequent to his doctoral work he has been actively involved in the area of process metallurgy. His major field of interest is solvent extraction, hydrothermal synthesis for preparation of materials of high purity and development of clean and efficient processes for metal extraction. Dr. Sahu was instrumental in developing defined grades of hematite and nanosize manganese zinc ferrites of very uniform size, shape and magnetic properties, which have wide applications in the electronic industries.

He has also made noteworthy contribution in development of extraction processes of non-ferrous metals from different ores, residues and waste.

News Capsules

- The Inter-Departmental Football Tournament was organised on 7th September, 2002 at Agrico CD & SW Football ground. Altogether four teams had participated. The captains for A, B, C and D teams were Dr. Indranil Chattoraj, Shri Tulsi Mukhi, Shri Jai Ram Singh and Dr. Goutam Das respectively. Dr. I. Chattoraj's team were adjudged winners whereas Dr. Goutam Das's were the runners-up. Shri R.C. Behera, was the referee for the Tournament. Shri B.A. Lakra and Shri Jabdu Bhui were linesmen.
- S.S.B.M Tournament was organised by SPB, CSIR and hosted by IIP, Dehradun during 25-27 October, 2002.

  - The Cricket Team consisting of Shri Manoj Humane, Shri Amber Tirkey, Shri R.K.Sharma, Dr. Sanjay Kumar, Md. Salim Ansari, Shri Manish Sharma, Shri Bhupeshwar Mahato, Shri Santosh Mukhi, Shri Tulsi Mukhi, Shri Jaipal Khujur and Shri Hemant Das, participated from NML side and won a match with CGCRI, Kolkata.

  - The NML volley ball team comprises of Shri Birendra Kumar, Manoj Kumar Runda, K.P. Prabhakaran, H.S. Tirkey, D. Murmu, I.Raju Rao and Pankaj Kumar. Shri R.C. Behera went as Manager. The team won a match with INSDOC, New Delhi.
- A Blood Donation Camp was organised by the NML Staff Club on 18th December, 2002 in the NML Auditorium under the supervision of the staff of Jamshedpur Blood Bank.

Wishing a Happy Retired Life ...

Mr. A.K. Panda, SPA III; Mr. Yogendra Lal, Gr. II (4); Mr. Sumilan Pal, Gr. III(4); Md. Usman, Gr.I (4); Mr. D.S. Sharma, Gr.III (6); Mr. R.K.Mahanti, Sct.EI; Mr. Harbans Singh, Gr.II (3); Mr. Kishori Lal, Scr. F; Mr. B.C. Bhagat, Tech. Officer E1; Mr. M.R.S. Giri, Asst. (G); Mr. J.B. Singh, Gr. II (4), Mr. K.V. Rao (G); Mr. B.S. Munda, Gr. II (4) ; Mr. S.C. Dey, JSA; Mr. M. Sharma, SPA III; Mr. S.K. Sen, Sct. C.

Jharkhand Udyog Mela - 2002

A View of NML stall

NML participated at the Jharkhand Udyog Mela held at Morabadi Maidan,. Ranchi during November 15-20, 2002. The Mela was organised by Chotanagpur Chamber of Commerce on the occasion of the second anniversary of the formation of Jharkhand state and to showcase the entire gamut of Industrial activities in the state. NML's stall was the centre of attraction for the improvements in mineral based industries.

The various technologies were displayed through exhibits, brochures and handbooks. Lots of entrepreneurs and businessmen visited the stall and interacted with NML representatives.

EDITED & PRODUCED BY DR. N.G. GOSWAMI, HEAD, INFORMATION MANAGEMENT AND BUSINESS PROMOTION UNIT, NML
PUBLISHED BY DIRECTOR, NATIONAL METALLURGICAL LABORATORY, JAMSHEDPUR - 831 007, INDIA
Phone : +910657 2271715, 2271709-14, E-mail : director@nmlindia.org, Website : www.nmlindia.org
Printed at Steel City Press, Jamshedpur - 831 001, Ph.: 2439861