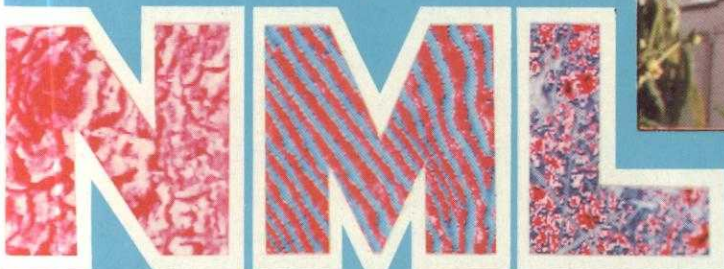


A Monthly Inhouse Bulletin



NEWS

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No.1

NML Jamshedpur celebrates

Foundation Day for the first time

The National Metallurgical Laboratory, Jamshedpur celebrated its Foundation Day with a day long programme on 26th November, 1993 for the first time ever since its inception in 1950. The laboratory, organised an open day for the local School and college students. This enabled the student community at Jamshedpur a better exposure to the latest Research & Development work pursued at NML. To mark the occasion the laboratory installed two Awards for

achieving excellence in R&D by the NML scientists. Shri K.C. Mehra, Sr. Executive Director (Operation), TATA Steel attended the Foundation Day function as a chief guest and gave away the prestigious awards.

Prof. P. Ramachandra Rao, Director, NML in his welcome address gave an overview of NML's development since inception and also achievements of the laboratory over last forty three years.

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MESSAGE



After a significant lapse of time, **NML News Bulletin** is being launched again. Information plays a key role in every sphere of our activities and even more so in the changed scenario where CSIR laboratories have to generate a significant part of their budget through sponsored research. I am sure that NML News Bulletin will considerably bridge the information gap and bring the user industries and the laboratory closer. It would also provide an adequate exposure to the achievements of our scientific and supporting staff.

I wish the effort all success.

(P. Ramachandra Rao)
DIRECTOR



Sri K.C. Mehra, Chief Guest releasing the laboratory's Annual Report 1992-93

Know-how for Calorising of Steel Transferred

M/s. Tube Products of India, Madras has proposed to set up an industry based on NML Jamshedpur's know-how on calorised steel and to this effect, an agreement was signed. The technical manual for the process was handed over by Prof. P. Ramachandra Rao, Director, NML Jamshedpur to M/s Tube Products of India, Madras on November 8, 1993.



MoU for transfer of calorising technology being signed

The process of diffusion coating of aluminium is known as 'calorising'. Calorised steels - an iron aluminium surface alloy specifically engineered, have good resistance to sulphurous atmosphere and high temperature oxidation. The calorised steels developed at NML were tested in PDIL, Sindri at Laboratory scale. The product also successfully underwent trial run at catalyst, Sulphuric acid manufacturing plant of FACT, Cochin and at the sour crude distillation unit for naphthenic acid attack at Indian Institute of Petroleum Dehra Dun. NML's calorised steel i.e. Aluminium Diffusion Treated Steel (ADTS), exhibited better performance in all the tests compared to commonly used carbon steel.

The corrosion losses due to the usage of plain carbon steel tubes in different heat exchanger tubes in sulphuric acid/SO₂/SO₃ environment, petroleum refineries, coal

gasification and liquidification plants, ethylene pyrolysis sulphuric acid plants, furnace parts, annealing retorts, heat treating fixtures, launching tubes, furnace curtains etc. alone amount to few crores of rupees annually. The present demand in the country is met with import only. Alonised tubes are imported from ALON INMC, USA. NML's calorised steel (ADTS) has shown 100% better performance and competitive when it is compared with the imported ones (ALCON). It has been estimated that for a plant with production capacity of 30,000 running meters of tubes of 50 mm ID basis, the cost comes to Rs 60.00 lakhs with Return on Investment 51% at a break even point of 52%.

The NML scientists involved in this know-how development were : Dr. A.N. Mukherjee, Mr. T.L. Sharma and Dr. P. Prabhakaram (Retd.)

purification of tungsten ores of India, and (3) Component Integrity Evaluation Programme (CIEP). All these projects are of national importance.

Processing of polymetallic sea nodules for the recovery of valuable metals

NML has developed a process which consists of Reduction-Roast, Ammoniacal Leaching, Solvent Extraction and Electrowinning (RR-AL-SX-EW) to recover copper, nickel and cobalt. The project is funded by the department of Ocean Development and will decide on the choice of technology for scale up from 100 kg of nodules per day to a level of 2 tonnes/day, also subsequently the semicommercial demonstration plant to extract Cu, Ni, Co and Mn from the sea nodules.

Scientists from six different divisions were actively involved. During this period, the existing facilities were augmented and modified to treat the sea nodules. The process parameters for sample preparation, grinding and pelletisation were optimised. Based on the bench-scale data (1 kg. batch), the process was scaled up to a level of 100 kg nodules per day. Three campaigns on 100 kg/day were conducted. The overall recovery of copper and nickel metals were 85% each and that of cobalt was 40%, against 50% achieved during the bench scale operation.

(To be continued in the next issues)

R & D Highlights: 1992-93

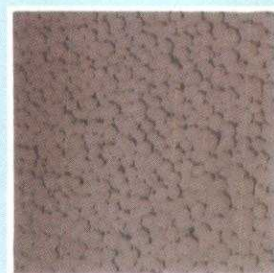
The mandate for NML is to (i) pursue excellence in research in the preparation and properties of engineering materials, (ii) develop know-how for gainful utilization of natural resources of the country, (iii) develop linkage with the user organisation and utilise the expertise generated, and (iv) apply the results of research for the benefit of the society. With the present change in the economic policy and greater emphasis on generating extra budgetary resources, efforts have been intensified towards the market oriented R&D as well as technology transfer and information dissemination. Promotional strategies have been adopted with a focus on NML's facilities and capabilities.

Thrust Area Projects :

NML made considerable progress with regards to its three major Thrust Area Projects, namely : (1) Processing of polymetallic sea nodules for the recovery of valuable metals. (2) Beneficiation and



Sea nodules

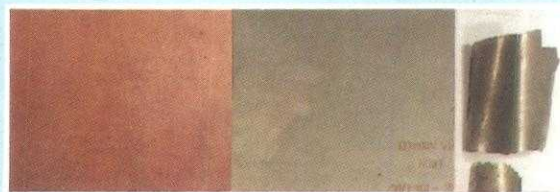


Pallets from sea nodules

Copper

Nickel

Cobalt



Metals extracted from sea nodules in the laboratory

Foundation Day

(Contd...from Page-1)

V.A. Altekar Award for Best Technology

This award is instituted in honour of late Prof.V.A.Altekar, former Director. This year the award has been conferred on Shri Swapan Kumar Das (PL), Shri K.N.Gupta, Shri K.C.Ray and Shri B.K.Mitra, scientists, for their work on *Fly Ash Based Wear Resistant Ceramics*. These ceramics are extremely dense, hard and impenetrable, having superior resistance to abrasion & erosion and can extensively be used for lining purposes in material handling plants. Use of this material reduces maintenance costs and increases life of the components 8-10 times. Besides, this technology is most environment friendly as it utilises fly ash - an air pollutant, puts value into it and finds a superior use for it. The technology has already been transferred to a local entrepreneur and large number of enquiries were under processing stage.

Dr.B.R.Nijhawan Award for Best Technical Paper

This award is instituted in honour of the dynamic Director of the laboratory during its formative years. In this maiden year it has been conferred on Dr.Raghubir Singh and Prof. S.Banerjee for their paper entitled "Resisting stress of a low alloy ferritic steel after creep exposure in service" published in *Acta Metall.Mater* (1992) 40: 2607-16. The findings of the paper have significant bearings on creep life prediction of engineering components.

Laboratory's Annual Report 1992-93 was also formally released by the chief guest.

NML Scientist participates in Asia-Pacific Workshop



Dr. Inder Singh

Dr.Inder Singh, Scientist and Head, Corrosion Protection Division of NML, Jamshedpur participated in the Asia-Pacific Workshop on "Evaluation of Metals and Alloys under different Environments" held in Bandung, Indonesia during November 14-19, 1993. The visit was sponsored by the Japan International Science and Technology Exchange Centre, Japan. Dr. Singh was made Chairman for a Session relating to electrochemical studies for evaluation of materials. Dr.Singh also presented a paper entitled "Evaluation of Metals and Alloys in both industrial and marine atmospheres".

Technical Lectures Organised

- o Some cupola on the production of Fe - C alloy casting-Science & Technology by Prof. A.Zhukov, IIT, Kharagpur (02.12.93)
- o Characterization of iron ore sinters and study of their degradation characteristics at low temperature reduction by Dr.V.Seshadri, UFMG, Brazil (07.12.93)
- o Eh-pH diagram and EH measurements in hydrometallurgy by Prof. K.A. Natarajan, IISc., Bangalore (13.12.93)
- o Biomineral Technology by Prof. K.A.Natarajan, IISc., Bangalore (14.12.93)
- o Fatigue crack growth behaviour of Ti-Aluminides at Electro temperatures by Prof. B.K.Parida, NAL, Bangalore (22.12.93)
- o Short crack growth studies under aircraft spectrum loading by Dr.Raghu Prakash, NAL, Bangalore (22.12.93)
- o Synthesis of nanocomposites by Prof. K. Chattopadhyay, IISc., Bangalore (23.12.93)
- o A Semi-quantitative approach to alloy systematics by S. Raju, IGCAR, Kalpakkam (24.12.93)

Best Poster by NML Scientists

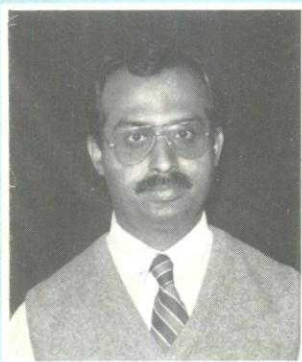
The poster on the topic "Software for simulation of HAZ diagrams for steel" authored by Ms Mita Tarafdar, Shri A.S.Kumar, Dr.K.M.Godiwalla and Dr.R.N. Ghosh, Scientists, was adjudged as one of the best pre-sentation at the Annual Technical Meeting of the Indian Institute of Metals held during November 1993 at Hyderabad as a part of National Metallurgists' Day celebrations.

PL Thermal Sciences - ITAS Award 1993

Dr.Amitava Bandopadhyay, Scientist of the National Metallurgical Laboratory, Jamshedpur has been awarded the PL Thermal Sciences - ITAS Award 1993 instituted by Polymer Laboratories Ltd. (UK), in collaboration with Indian Thermal Analysis Society, Bombay, India for outstanding contributions in the field of Thermal Analysis.



Sri S. K. Das, Scientist (extreme left) receiving the Technology Award from Shri K. C. Mehra



Dr. A. Bandopadhyay

Dr. Bandopadhyay has contributed towards the thermal analysis with special attention of using thermo-analytical techniques in the understanding of industrially important phenomena such as (a) auto-ignition of direct reduced iron (DRI) or sponge iron leading to formulation of procedures for its safe handling, storage and transportation and (b) understanding the mechanism of strategically important engineering components including manufacture of ceramic matrix composites of near net shapes. His research on protective techniques to combat auto-ignition of DRI have also led to understanding of the effectiveness of these techniques especially under rising temperature conditions which is more akin to the actual combustion process.

E.FIAP Award to Shri B.C. Bhakat



Shri B.C. Bhakat

Shri Bhudev Ch. Bhakat, Photographic Officer, has been conferred with E.FIAP (Excellence Federation International Del' Art Photographique), a rare distinction in international photography from Belgium for his achievement in this field. Mr Bhakat has been recognized as FOUR STAR Exhibitor and maintaining place within TOP TEN Photographers of India since 1979 continuously as per WHO'S WHO of Federation of Indian Photography.

NML participates

4th Asian Mining '93

Asian Mining '93, an International Conference and Exhibition on Geology, Mining and Mineral Processing, is a part of the on-going series of events which are held every 4th/5th year. For the first time in India under the auspices of Mining, Geological and Metallurgical Institute of India and Institution of Mining and Metallurgy, UK, the 4th Asian Mining Exhibition along with an International Conference was held at Netaji Indoor Stadium from 24-28 November, 1993. Earlier three such events were held at Singapore, Manila and Kuala Lumpur. Dr. P.K. Bhattacharya and Dr. S. Subba Rao, Scientists, participated on behalf of the laboratory in the exhibition. Later on Shri N. Chakravorty and Shri S.C. Maulik, Scientists, joined them and interacted with the visitors. Other

than NML, seven more CSIR laboratories viz. CMRS & CFRI, Dhanbad; CMERI, Durgapur; CGCRI, Calcutta; RRL, Bhubaneswar and RRL, Bhopal were also participated.

The exhibition supported as a forum for exchange of idea and technologies between the mineral rich countries of Asia on one hand and the countries engaged in operations and manufacturing of mining equipments. The exhibits on display covered the latest technology in mining-opencast and underground, ancillaries and tool, slurry pumps to compressors, drills and rigs, computer systems, state-of-art mineral processing equipment, speciality reagents for processing, mine explosive chemicals etc.



NML Jamshedpur's pavilion (Extreme left : Prof. B. B. Dhar, Director CMRS, Dhanbad and President of the Organising Committee)

Industrial India Trade Fair

NML participated in the Industrial India Trade Fair organised jointly by Bengal National Chamber of Commerce & Industry and Govt. of West Bengal with technical collaboration of India Trade Promotion Organization, New Delhi at Calcutta Maidan (Near Park Street) during December 21-31, 1993. Shri T. K. Ghoshal and Dr. K. Chatterjee, Scientists attended the visitors at NML's pavilion. Information on NML's technologies and facilities were displayed. Information Folders/leaf-lets/project profiles etc. were also distributed.

STAFF NEWS

Welcome at NML.....

Sarvashri Kapil Deo Mehta, Sunil Baran Tiwary, T. K. Sivaprasad Gupta and S. Sivaprasad.

Wishing a happy retired life..

Mrs N Chakravorty, Sr. Library Officer E1 (30.11.93), Shri B. M. Dutta, Sct. E1 (31.12.93), Shri H.C. Das, Tech. Officer, MCRS Digha (31.12.93) Shri B. N. Ghosh, Tech. Officer (31.12.93), Shri G. Kurma Rao, Gr. II (3) (30.11.93).