NML news

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NATIONAL METALLURGICAL LABORATORY JAMSHEDPUR, INDIA

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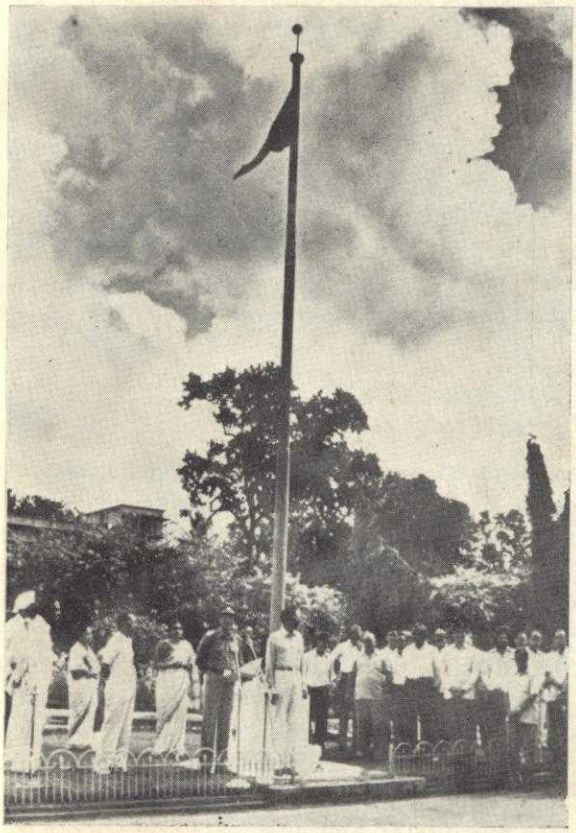
INDEPENDENCE DAY CELEBRATIONS AT NML

The Independence Day was celebrated with enthusiasm. Prof. S. Banerjee, Director hoisted the National Flag in the presence of a large gathering of staff members and their families. In his address, Prof. Banerjee exhorted the staff to contribute their best towards the functioning of the laboratory which alone, he said, would help achieve excellent R&D results. To mark the occasion a colourful programme of sports, yoga demonstration, music and dance was organised. Earlier, Mrs. Sujata Banerjee hoisted the National Flag at the NML Flats, Agrico as well as NML Colony, Tuiladungri, and distributed sweets to children.



Prof. S. Banerjee hoisting the National Flag on Independence Day.

RESEARCH APPRAISAL & PUBLICATION COMMITTEE MEETING

The 3rd meeting of the Research Appraisal & Publication Committee was held on 4th August, 1987. Proposals were presented for taking up new exploratory projects. The following four proposals were approved.

Silica sand quality improvement programme for foundries

The programme envisages to upgrade locally available river sand for use in foundries. Currently high grade silica sand has to be transported over long distances at a considerable cost. The objective of this project is to employ suitable mineral beneficiation techniques to improve the sand quality with respect to its refractoriness and size classification.

Development of Alumina Graphite Refractories

Alumina graphite refractories are finding greater use in continuous casting of steel at present in India. These refractories give improved lining life due to better corrosion and spalling resistance. Potential applications of these refractories are in slide gate systems, electric arc furnace and pouring pad of torpedo ladles. During 1985-86 India's requirements of alumina-graphite refractories was 137 tons. It is expected that this requirement will increase upto 2405 tons per annum by 1990.

Aluminium-Transition metal (Rare Earth) alloys

Aluminium-Transition metal systems have a good potential for high temperature applications. How-

ever owing to the very limited solid solubility of the transition element in aluminium, the ingot route does not produce a satisfactory material. Rapid solidification process (RSP) on the other hand, provides a means of extending the range of solid solubility of the transition elements in aluminium. Improvement in strength could thus be obtained through the formation of very fine and uniform dispersion of metastable phases by suitable thermomechanical treatment. This project is aimed at studying the Aluminium-Transition metal (Rare Earth) alloys by melt spinning technique with the help of the new Melt Spinner acquired by the Laboratory.

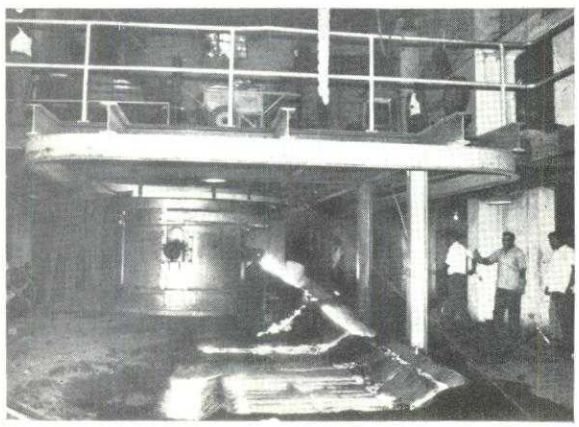
Refining of ferro-silicon—75

Steel industry requires ferro-silicon-75 with less than 0.1% aluminium, calcium less than 0.05% and titanium less than 0.05%. Pre-exploratory studies were conducted with chlorine donor in a graphite crucible and added to the melt of ferrosilicon-75. The trials were conducted in an induction furnace. The aluminium level was brought down to less than 0.21% in less than 25 minutes. An exploratory project on the topic has been approved by RAPC.

SEMI-INDUSTRIAL CAMPAIGN

Smelting of sponge iron fines in 500 KVA Submerged Arc Furnace

Large scale trials were conducted in the 500 KVA submerged arc furnace for smelting of sponge iron fines, supplied by M/s Sponge Iron India Limited, Kothagudam, AP. The campaign was inaugurated by Prof. S. Banerjee, Director on 17th July, 1987 in the Ferro-Alloy bay at NML. More than 150 scientific & technical staff members were involved in this experiment.



Smelting of pig iron in 500 KVA submerged arc furnace.

Earlier preliminary trials were conducted in a 50KVA submerged arc furnace in order (i) to standardise the charge composition—sulphur and phosphorus content in the liquid metal and basicity of slag, and (ii) to study the smelting characteristics of each fraction of fines and their composites as well as the pattern of power consumption under varying operating conditions. Making use of the results of 50 KVA smelting trials, the large scale trials were initiated primarily to produce special quality liquid iron containing low sulphur, low phosphorus and high carbon. On an average, 1 to 1.2 tonnes of sponge fines (−6mm, +3mm) were charged alongwith the required quantities of limestone and petrocoke in each tapping, producing 0.8 to 0.95 tonnes of liquid metal. Batches of about 600 Kg molten metal were successfully treated using 0.1% of pure magnesium with the help of specially designed plunger. The treatment yielded excellent SG iron.

The successful 19 days campaign came to a close on August 5, 1987.

SPONSORED PROJECTS

i) Corrosion Inhibitors for sour gas pipelines (ONGC)

The oil crude and gas containing impurities and in particular, hydrogen sulphide cause severe corrosion in the metallic pipelines carrying them. The life of pipeline is thus reduced and sometimes severe accidents are caused. To prevent these, inhibitors are added with oil, crude and gas.

NML's inhibitors which have been synthesised and tested in simulated laboratory conditions have shown some very encouraging results in controlling corrosion as well as preventing hydrogen absorption by the steels. It is expected that by the end of this year, the product can be put to test in pipelines.

ii) Development of inhibitors for oil/gas acidisation (ONGC)

Generally, oil is found in geological structures, such as limestone, dolomite or sedimentary sand stone. For the recovery of oil from these reservoirs, a process known as acidisation is used to dissolve the rock formation for releasing the oil. In the acidising process, 15-27% hydrochloric acid is injected to a depth of more than 1000 metres which results in the rise of temperature above 100°C. Under such severe conditions, the drilling pipes are corroded rapidly. In order to reduce the corrosion attack, inhibitors are generally added to the drilling pipes. The proprietory as well as imported inhibitors are sold at high prices and are also ineffective in preven-

ting corrosion as well as hydrogen absorption by steels under Indian conditions. The NML has therefore, taken up this assignment and are studying the influence of different concentrations of calcium chloride, residual acid, mineralogical composition etc., on the performance of the inhibitor.

INSTALLATION OF SOPHISTICATED EQUIPMENT

Direct Reading Emission Spectrometer (SHIMADZU, GVM-1014P)

This instrument has been installed which has both 'Spark' as well as 'Inductively Coupled Plasma' as excitation sources.

The equipment consists of :
An excitation source unit, spectrometer, a read-out unit and a data processing unit, which converts a measured value into percentagewise element contents, with the help of built-in software.

The instrument is capable of analysing many elements from trace to major levels with both speed and accuracy.

TECHNICAL LECTURE

Dr. S. Chattopadhyay, Scientist-NML delivered a lecture on,'ESP-Some Novel Applications'on 27.7.87.

Dr. O. N. Mohanty, Scientist was invited by the National Productivity Council, New Delhi to deliver a talk on 'Residual Stress and Its Importance on the Quality Assurance of Welded Structures' on 28.7.87.

VISITORS

1. Mr. Douglas Hartwich and Mr. J. F. Cole, from U. S. Consulate, visited our Laboratory on 18th May, 1987 in connection with collaboration in Indo-US projects.

2. Mr. V.K.Ahuja, General Manager(LOG),Oil and Natural Gas Commission, visited on 11th June, 1987 and had discussion with the scientists regarding taking up of interactive collaborative projects.

3. A 30 member team of senior Professors and Principals from various Technical Institutions of the country visited on 11th June, 1987.

4. A group of 12 pre-final year students of metallurgy from Bengal Engineering College, Howrah visited the laboratory on 16th June, 1987 as a part of their vacational training programme. On this occasion Dr. O.N. Mohanty, Deputy Director gave a talk for acquainting the students with the activities of NML.

5. A group of eight M. Tech. Students from National Institute of Foundry & Forge Technology visited on 3rd July, 1987.

6. A group of 28 B. E. (Met) students of the Met. Engg. Dept., University of Roorkee visited NML on 9th June, 1987.

7. A demonstration on, 'Determination of Fracture Toughness' was given on 9th July, 1987 at NML to five participants from the National Institute of Foundry Forge Technology, Ranchi.

PUBLICATIONS

1. 'Reduction of iron ore under rising temperature and fluctuating temperature conditions' —Swatantra Prakash and Hema Shanker Ray. Thermochimica Acta, 1987, 111, 143-66.

2. 'Immersion plating of Tin and its alloys on steel wires'—S.K. Narang. Presented at the Annual Technical Meeting, 87, Electrochemical Society of India, Bangalore on July 16-17, 1987. Dr. S. K. Narang also chaired the Technical Session V on 17.7.87.

3. Effect of metallic cations on the corrosion and hydrogen absorption of cold rolled mild steel in inhibited sulphuric acid —Inder Singh and M. N. Singh. Corrosion, 1987, 43(7), 425.

4. 'Commercial production of magnesium chemicals from industrial waste dust and fines'—Swatantra Prakash, K. N. Gupta. Chemical Engineering World, 1987, 22(1), 39-42.

WE WELCOME THEM AND WISH THEM A FRUITFUL STAY AT NML...

Shri D. N. Sarkar, Store & Purchase Officer, Shri D. K. Mishra Scientist C; Shri Tarun Kumar Saha, J. T. A. ; Smt. Jaya P. Swaminathan, J. R. F.

Sarvashri Shyamlal, Harbhajan Singh, Desa Singh, H. P. Gope, S. S. Mohanty, S. K. Bhattacharjee, as Helper.

Sarvashri Birsa Toppo, S. K. Mohanty, Biswanath Shaw, Sri Ram, Daljeet Singh, Baidyanath Singh, as Watchmen.

Sarvashri G. Dharma Rao, Harpal Singh, Md. Naycemuddin Ansari, K. P. Krishnan and Smt. Dalbir Kaur, as Peon.

WE CONGRATULATE THEM ON THEIR PROMOTION...

Shri N. Chakraborty, Scientist F,

Sarvashri T. V. K. Das, R. Gopalakrishnan, D. K. Basu, Z. H. Khan, A. K. Giri, Grade - III (1) to Grade-III(2).

Sarvashri B. N. Sharma, P. K. Ghosh, Doodh Nath, Yogendra Lal, N. G. Kar, Mukhtar Roy, V. K. Malhotra, S. B. Roy, Grade-II(3) to Grade-II(4).

Shri B. R. V. Narasimhan, Grade-II(3) to Group-III(1).

Sarvashri Jagannath Singh, A. L. Chatterjee, Mangta Singh, S. S. Thakur, M. R. P. Singh, Bhuku Lal, H. S. Patra, Gopal Singh, P. C. Paul, Nago Ram, Bimal Bui, R. N. Dubey, U. N. Thakur, Vijay Pal Singh, Gugul Sinha, Hiralal, Lokeswar Prasad, J. Murmu, S. K. Pramanik, Channu Prasad, S. P. Sharma, S. K. Modak, Ramanand Sah, Mahabir Ojha, A. C. Dutta, S. M. Barua, Grade-II (1) to Grade-II(2).

Shri H. B. Prasad, Grade-I(3) to I(4).

Sarvashri Chhabhi Ram Singh, Hardev Singh, Grade I(2) to Grade-I(3).

Sarvashri Kisto Behra, R. B. Sen, Sashi Jha, Gopal Mohan Behra, Md. Moinuddin, K. S. Trivedi, Chhabi Nath Singh, D. P. Yadav, Ganesh Sharma and Smt. Manoo, Grade-I(1) to I(2).

Sarvashri Jagdish Singh, Md. Sirajuddin, H. K. Panda as Head Laboratory Supervisor.

SOCIO-CULTURAL & SPORTS FRONT

Well done Manoj Sharma

Shri Manoj Kumar Sharma S/o Shri T. L. Sharma, Scientist, has been awarded a citation as PRESIDENT'S SCOUT, by the President of India.

The NML News extends warmest felicitations to Master Manoj.

Blood Donation

We are proud of our colleague Shri N. N. Ganguly, Scientist, Analytical Chemistry Division, who has donated blood 16 times till June, 1987 in the Jamshedpur Blood Bank. Shri Ganguly was awarded Silver medal recently for his valuable contribution towards saving human lives.

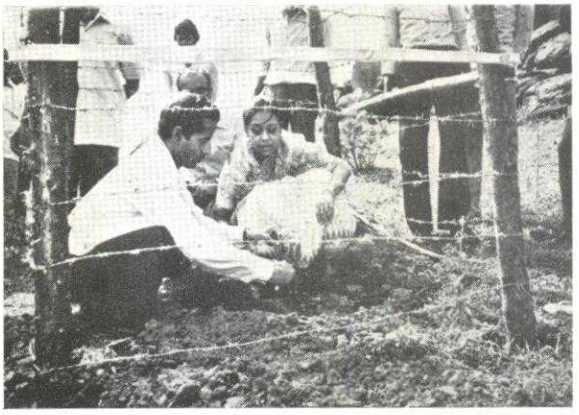
We take this opportunity to appeal to our colleagues to come forward for blood donations in large numbers.

Obituary

It is our misfortune to lose our colleague Shri Mukhlal, Mistry (FPTD), who passed away on 1st Aug. 1987. We pray to the Almighty to grant everlasting peace to the departed Soul.

VANAMAHOTSAV AT NML COLONIES

The Laboratory celebrated the Vanamahotsav on 9th Aug, 1987. A number of saplings were planted in the NML colonies at Agrico and Tuiladungri. Prof. Banerjee invited the young children of the two colonies to adopt one plant each and to nurture them. On the Independence Day on 15.8.87, another ceremony was held in which the plants were named after their young caretakers.



Mrs. Sujata Banerjee Planting a Sapling at NML flats, Agrico.

Dance recital during Independence Day Celebrations.

Editors : Dr. O. N. Mohanty, Dr. K. M. Godiwala, M. L. Sharma. Published by National Metallurgical Laboratory.
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