# WELCOME ADDRESS

**PROF. V. A. ALTEKAR**
Director,
National Metallurgical Laboratory Jamshedpur

Kedar Pandeji, distinguished delegates to the Symposium, distinguished guests, Ladies and Gentlemen.

It is my pleasant duty to extend to you all a very warm and hearty welcome to this inaugural function of the Symposium on 'Science and Technology of Sponge Iron and its Conversion to Steel' organised by the National Metallurgical Laboratory.

The sponge iron that we are going to talk of for the next three days, is a way to steel and steel is or has become a way of life. Steel is a symbol of strength and prosperity. It is a mark of prestige as well as progress. It is the focus of aspirations of millions of people in the developing countries. And yet there is a tremendous unsatisfied hunger for steel in many parts of the world.

The vagaries of nature in geographical distribution of raw materials required by the conventional integrated steel plants, make it impracticable to put up such steel plants in many parts of the world. In our own country, one feasibility study which was recently made public revealed that if we were to reject the basic principle of locating our steel industry according to the geographical considerations, then such projects are not likely to be economically feasible. The report concluded that even if the proposed steel plant were to run at 100% of its installed capacity, it would incur an annual loss of Rs. 600 millions. And yet the aspirations of people of large areas all over the world have to be met if not by conventional approach, by some other way.

Sponge iron is one such way which offers a solution to this problem. In India, there are many good deposits of iron ores all over the country We have been exporting good quality iron ore in millions of tons every year and yet our own aspirations for steel manufacture remain unfulfilled But unfortunately, our deposits of metallurgical coking coal are restricted to only one location. These coals are having high ash content and poor washability. The coke ash averages 24-26% and has restricted the furnace productivity while increasing the cost of operation year after year.

Add to all these, the increasing cost of money which is seldom talked about from platforms such as this. The cost of money in India for integrated steel plant is increasing year after year, some of our steel plants which were put up in the middle fifties had required an investment of roughly Rs. 3000 per annual tonne of installed capacity. The cost of money based on this investment comes to roughly Rs. 450 per tonne of steel. For many of the structural steels, this is just about 40 to 50% of the controlled price of steel in this country. This is the cost that one can ill-afford in a developing country. One cannot be led away by grandiose concepts of mammoth steel plants requiring billions of dollars, mostly in hard foreign currency.

The way shown by the direct reduction technology is an answer to many of the problems stated here. Some of the recent steel plants based on the sponge iron route have indicated much lower capital requirements. The most recent one in West Germany at Hamburg is costing as little as 450 DM per annual tonne of the rated capacity of the plant. Similar plant in this country would bring down the cost of steel production by 200-300 rupees per ton of steel on account of the cost of money alone. Such steel plants can be located in smaller and manageable units at a number of centers all over the country. This will partly meet not only the local market demands and reduce the transport cost, but will also meet the rising aspirations of the people.

Taking all these factors into account, we thought it was most appropriate and timely to hold a Symposium on Sponge Iron to discuss its most uptodate status. We have a tradition of inviting the best talents in concerned disciplines, that could be induced to come to India from all over the country and abroad. We have organised similar International Seminars in the past. We, therefore, invited all concerned in India and abroad to participate in this Symposium. I am glad to inform you that we have obtained an

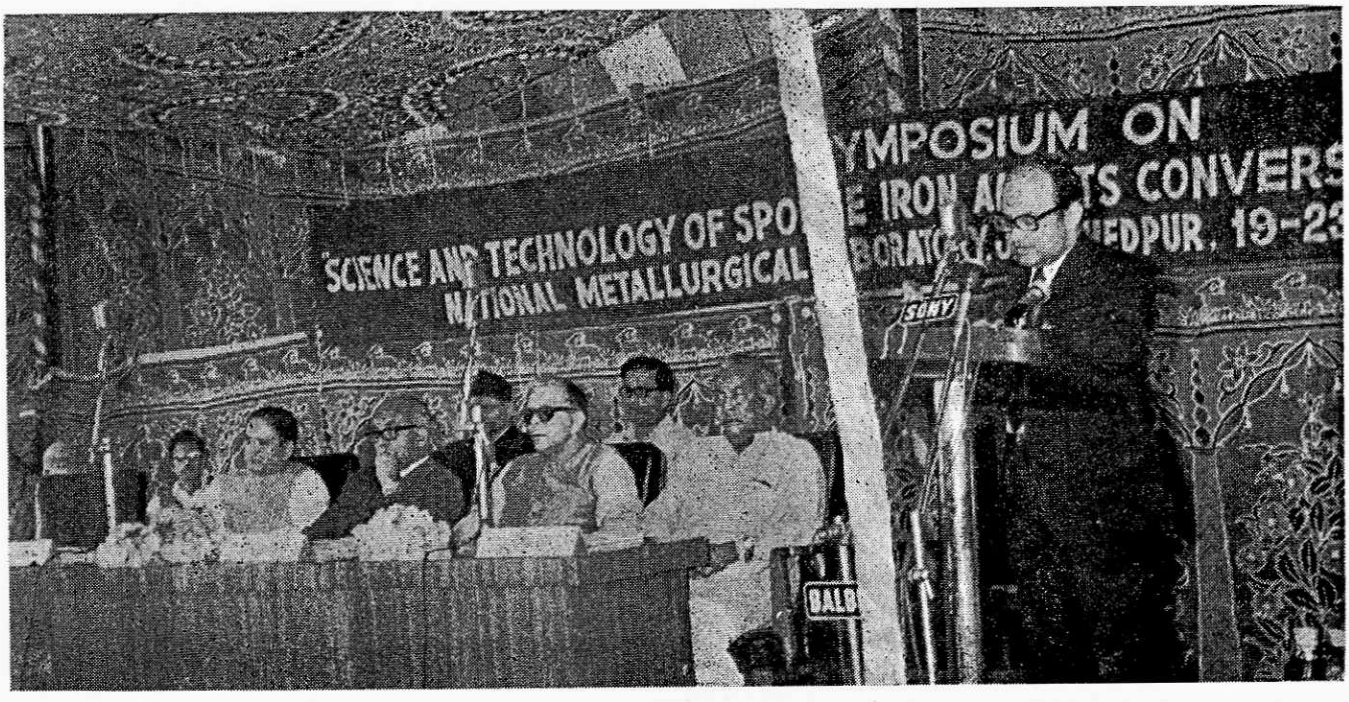
overwhelming response from experts from abroad and a record response from interested persons and experts from this country as well. We are here, about 300 delegates including the foreign ones—a record for this Laboratory for all years.

I would like to briefly acquaint you with the efforts that we have been making in this Laboratory for the past 2½ years in developing appropriate technologies for sponge iron. Taking into account that India is richly endowed with non-coking coals we have developed two processes based on this solid reductant. A rotary kiln process has been developed in a pilot plant, which is capable of producing upto 4 tons of sponge iron per day. This facility has been developed and used over the past two years, during which period, we have produced hundreds of tons of sponge iron. We have melted the sponge iron into steel and we are now poised for industrial scale melting trials with a 100 ton lot of sponge iron in a local foundry. We are also developing a vertical shaft furnace technique for the manufacture of sponge iron using non-coking coal, and in this also we have had very good technical success.

A third process is based on naphtha. We had started work on this process when naphtha was abundantly available in the country. However, in the meantime, due to the shortage in the fertilizer production, the Government took a decision to allocate all the available naphtha for production of fertilizers. In spite of this decision we have not only continued our work on this process, but have further progressed from batch scale to a continuous vertical reactor. This approach also has given us very encouraging results

Many may wonder why we have intensified our efforts to develop the naphtha based process in spite of naphtha shortage and non-availability. A word in explanation seems to be necessary. Firstly, we are basing our strategy on the optimism that although we have no naphtha available for sponge iron today, our vigorous oil-exploration programmes may lead to significant and sizeable resources in the near future. In such a case, a ready— "off-the-shelf" technology could be made available for immediate exploitation. Secondly, even in the immediate future, it is conceivable that a project could be located suitably on the Western coast, where locally available iron ores could be converted into sponge iron by naphtha imported from surplus areas in the middle east, and the resultant sponge iron exported at profit and at increased gains in hard currency. Whereas we are exporting today raw iron ore at about 10 dollars per ton, it would be possible for us to offer sponge iron instead, at 35 to 40 dollars per ton which have been the ruling prices in the international market.

I would now like to take the opportunity to introduce some of our distinguished foreign dele-




**Prof. V. A. Altekar, Director, National Metallurgical Laboratory, welcoming the delegates.**

gates who have taken the trouble of joining us here. They are specialists in their own fields and have much to contribute. I will now announce them countrywise, and will request them that when their name is called out, they may please stand up so that we may be able to see them all.

**From Australia :**

Mr. J. F. Moyle, Manager, Planning Steel Division, Broken Hill Proprietary Co. Ltd., Melbourne.

**From Arab Republic of Egypt. :**

Dr. Said Y. Ezz, Professor of Metallurgy, Faculty of Engineering, Cairo University, Cairo.

Dr. Eng. M. W. Salem, Research Director, Egyptian Iron and Steel Co. Ltd., Cairo.

Dr. Ing. Ahmed M. Eid, Research & Production Manager, Egyptian General Organisation for Met. Industries, Cairo.

Dr. Samir Taher, Chairman & Mg. Director, Delta Steel Mill Co., Cairo.

Engineer Kamel Maksoud, General Director, General Organization for Industrialisation, Cairo.

**From Bulgaria :**

Mr. A. A. Hristov, Bulgarian Embassy, New Delhi.

**From France :**

Mr. J. Astier, Director, IRSID, Maizieres-les-Metz.

**From Federal Republic of Germany :**

Dr. Walter Maschlanka, Korf-Stahl A. G., Baden Baden.

Dr. Kurt Meyer, Mg. Director, LURGI Chemie und Huettentechnik GmbH, 6 Frankfurt/Main.

Dr. Ing. H. D. Pantke, Mg. Director, Thyssen Purofer GmbH, Oberhausen.

Dipl. Ing. Gunter Post, LURGI Chemie und Huttentechnik GmbH, Frankfurt/Main.

Mr. Vollrath Von Randow, Resident Director, LURGI India Ltd., New Delhi.

Mr. Habib Ahmed Siddiqi, Group Chief, Dept. of Metallurgy, Gutehoffnungshuette Sterkrade G, Oberhausen.

Prof. Dr. A. Boettcher, University of Aachen, Aachen.

**From Hungary :**

Dr. Vishyovszky Laszlo, Budapest XI, Bartok Bela.

Mr. L. Gaidosh, K. G. Factory, Hungary.

**From Iraq :**

Dr. I. A. Sharif, Head, Metallurgical Industries Section, Iraqi Ministry of Planning, Bagdad.

Mr. G. Ali Fariq, Engineer in the Industrial Department in the Iraqi Ministry of Planning, Bagdad.

**Fram Japan :**

Mr. Ato Miyabe, Representative Liaison Office of Nisshow-Iwai Co. Ltd., Jamshedpur.

Mr. Shintaro Tabata, Executive Director, The Iron and Steel Institute of Japan, Tokyo.

**From Nepal :**

Mr. P. B. Malla, Himal Iron & Steel P. Ltd., Kathmandu.

Mr. Mahendra Narsingha Rana, Director (Acting), Bureau of Mines, Kathmandu.

**From Norway :**

Mr. Hans Chr. Andersen, Manager, Metallurgical Department, Elkem-Spigerverket A/S, Oslo.

Mr. Sverre Gylseth, M/s. Elkem Spigerverket A/S, Oslo.

**From Thailand :**

Dr. Kasem Balajiva, Research Director, Applied Scientific Research Corpn. of Thailand, Bangkok.

**From U. K. :**

Mr. A. F. Cassidy, Asst. Education Adviser, Office of the Deputy British High Commission, Calcutta.

**From U. S. A. :**

Mr. B. Hammarskod, Midrex Division of Midland-Ross Corpn., Ohio.

**From UNIDO, Vienna**

Mr. Christo Popov, Metallurgical Industries Section, UNIDO.

With these introductions, let me conclude my welcome address by again extending to you all a very hearty welcome. I hope that all the participating delegates will find the stay amongst us comfortable and also stimulating and challenging. I hope that the three days of the deliberations that you will all participate in, will result in very fruitful conclusions.