

NON-FERROUS METALS IN INDIA (*)

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The past two decades have witnessed a multifold increase in the production of metals in India which are basic to any venture for industrialisation of a country. Basic industries have thus been established and the production capacity achieved for iron and steel and aluminium amounts to a considerable increase achieved in few countries in such a short time.

Aluminium:

Aluminium production in India during the last decade has seen a phenomenal growth and the present installed capacity of its production stands at over 1,17,000 tonnes/annum.

Demand

In 1967 the consumption of aluminium in India was 1,30,000 tonnes and is expected to increase to 1,55,000 tonnes in 1968/69, 2,65,000 tonnes by 1973/74 and to 4,15,000 tonnes by 1978/79. The total metal availability is expected to be 1,49,000 tonnes by 1968/69 and is likely to increase to 3,61,000 tonnes by 1973/74.

Magnesium:

The National Metallurgical Laboratory has developed suitable process know-how at Laboratory and pilot plant scale for the production of magnesium metal from indigenous dolomite ore through silico-thermal reduction process. Based on the intensive research investigations the National Metallurgical Laboratory team of scientists is now engaged in setting up a semi-commercial plant for the manufacture of 250 tonnes per annum of magnesium metal (the capacity can be expanded to 500 tonnes per annum on the later date) at Jamshedpur, without borrowing any technical foreign know-how. The plant is under active installation and will go into production by 1970. This plant will meet, to considerable extent, the requirements of magnesium metal of the country.

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Copper

Recently much thought has been given for assessment of the country's requirements of non-ferrous metals. Using the end-use method - assuming that priority industries will work at the full rated capacity, the planning sub-group of the Ministry of Mines & Metals has concluded that demand for 1969-70 will be of the order of 97,669 tonnes of copper and will go up to 1,27,726 tonnes/annually by 1973-74. Assuming a growth rate of 10% for each year after 1965-66 (when demand for copper was 58,000 tonnes) the demand figures arrived at for 1969-70 are 84,918 tonnes and for 1973-74 the demand will rise to 1,24,328 tonnes/annum.

Zinc

Demand of zinc by the end use method is estimated at 1,86,000 tonnes/annum by 1973-74, and on the growth rate basis of 10% per annum on demand of zinc in 1967-68 (of 80,000 tonnes) would be 1,41,725 tonnes in 1973-74 rising to 2,25,000 tonnes per annum by end of Fifth Five Year Plan in 1978-79.

Lead

Based on detailed data collected on its end uses the demand for lead has been worked out at 1,02,534 tonnes per annum by 1973-74. On the basis of assumed growth rate of 10% on the consumption level during 1966-67 (50,000 tonnes) the demand is estimated at 66,550 tonnes in 1969-70 and will rise to 97,430 tonnes in 1973-74.

Cadmium

The demand for 1969-70 based on end use method -which may be taken as feasible, demand being relatively small- is estimated at 78.5 tonnes and 95 tonnes for 1969-70 and 1973-74; whilst the production as a bye-product from existing zinc smelters would be about 150 tonnes in 1969-70 and about 260 tonnes in 1973-74. There would therefore be a surplus in these years which could be gainfully exported.

Antimony

Antimony concentrates are imported and the local demand of antimony metal is met by the only producer in Bombay with a production capacity of about 1000 tonnes/annum. The capacity is proposed to be expanded to 1500 tonnes/annum by 1970-71. The demand of antimony metal is approximately 1000 tonnes/annum and will rise to 1200/1300 tonnes by 1970-71 and to 1500/1600 tonnes/annum by 1973-74. Thus the refinery after expansion will be able to meet the country's requirements.

Tin

Tin is so far not manufactured in the country but small quantities of secondary tin metal is recovered from tin scrap. Tin occurrences have been reported in Hazaribagh and Ranchi districts of Bihar as also in some locations in Gujarat, Mysore and Rajasthan but none of these are yet assessed as workable deposits. In the circumstances it is imperative that suitable incentives should be given for collection and processing of tinsplate scrap for secondary tin metal recovery in order to tap this vital growing indigenous source of tin metal.

Import substitution

Considerable substitution of copper by aluminium has taken place already in the electrical industry. ACSR and AAC overhead conductors only are being produced without use of copper in this field. Since 1965 all underground cables and VIR and PVC cables have been substituted by aluminium. A number of motor manufacturers (upto 30 H.P. only) have switched over to die cast aluminium rotors in place of rotors with copper strips; lamp caps are now being manufactured only in aluminium strips. Considerable degree of substitution of copper has been made with production of aluminium bus bars.

In coinage alloys copper and nickel have been replaced upto 1-5 paise coins. Efforts to make aluminium base bearing alloys suitable to replace bronze bearings are making headway. Allocation of copper and zinc has been stopped for manufacture of building hardware like door, window, fittings etc. No allocations are being made of these metals for manufacture of household utensils either.

Lead sheathing in cables has been replaced by PVC sheathing upto 1.1 kV cables and will be achieved upto 11 kV from July 1969.

Zinc substitution by aluminising of ACSR core wires has been under examination and has been recommended by the Development Council for Non-ferrous Metals as technically feasible and economically adaptable. Efforts to produce these ACSR aluminised core wires and steel sheets on a pilot basis are already underway. Similarly buckets and hardware can be effectively aluminised instead of galvanising has been proved and demonstrated by NML developed process.

Non-ferrous Metals Required in bulk Quantities

Copper, zinc, lead etc.

In order to augment the production of copper in the country beyond the present planned capacity necessary efforts have to be made from now on in the following directions:

The capacity planned for Khetri copper plant of the Hindustan Copper Corporation is 31,000 tonnes. The possibility of raising the capacity to 50,000 tonnes/annum should be fully explored. In this connection full assessment of the deposits in Rajasthan should be made to ascertain whether the higher production could be sustained by these deposits. India should explore the possibility of participating in the exploration of non-ferrous ores including copper, zinc, lead etc. in friendly countries including Far-east, Middle-east, Africa etc. It is felt that based on import of concentrates even on a long term contract basis may give a copper smelter only marginal foreign exchange savings benefit and hence unless we undertake equity participation in ore exploration, exploitation in prospective producer countries these imported concentrate based smelters (particularly in case of copper) may not be of much assistance to the country, especially in view of the changing market conditions regarding procurement of ore concentrates. Thus possibilities of joint ventures with developing countries should be explored and where feasible preferred.

Possibility of currently constituted smelter plants utilising small regional pockets of copper, zinc and lead ores should be looked into. Mining lease for exploitation of small deposits could be given to mine owners to expedite their exploitation.

Needless to emphasise that exploration of these minerals and assessment of located ores should be done with a high priority and early development and exploitation of the located areas should be taken in hand.

Scarcer strategic metals

The requirements of high purity (of four nines plus) metals like indium, lead, tellurium, tin and tantalum by the electronics industry could be met indigenously by setting up small scale pilot plant production at our research establishments (BARC) which could later-on perfecting the know-how, be stepped up for commercial scale production to make our country wholly self reliant in this field. However, know-how for manufacture of high purity metals, required by the electronic industry, such as antimony, arsenic, bismuth, gallium, gold, selenium, silver and zinc has already been worked out by BARC and their requirements can be met by indigenous production.

The know-how for certain metals production, to meet the requirements of defence, electronics atomic energy as per their specifications has been developed at some of our research establishments and in other cases this has to be worked out.

Where necessary such production could be started at pilot plant level in the first place. Metals like nickel, molybdenum, tungsten, could after developing suitable technology be produced and fabricated at the plant to be set up at Hyderabad for production of pure metals for electronic industry, the alloying and fabrication facility to meet required shapes and sizes could be undertaken at a centralised facility.

Recommendations have similarly been made for setting up titanium sponge pilot plant, BeO and Ba, Ta, Ge at BARC while for manufacture of Be-Cu master alloy and Ca at NML. The copper refining plants should be asked to recover Se, Te in their refineries.

Technical consultancy

Liaison with existing units and solution of their problems as also giving technical information and know-how for the non-ferrous and aluminium industries should be further strengthened through setting up a 'liaison cell' at the National Metallurgical Laboratory.
