

Towards self-sufficiency in copper

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Growing Demand for Copper

Reaching self-sufficiency in our requirements of so important a basic material as copper is an ideal which is worth striving for. When the per capita consumption of copper in different countries of the world is analysed, it is seen that India occupies the lowest position with a per capita consumption of only 0.16 kg as against 15 kg which is the per capita consumption in advanced countries like U.S.A., U.K., Japan and Germany. Even with such a low consumption, India's requirement of copper metal is placed at over 1,00,000 tonnes in 1978-79, and about 1,60,000 tonnes by the end of the Sixth Plan (1983). It was originally estimated that indigenous production would reach a level of 40,000 tonnes by 1978-79. Actual production, however, has fallen far short of this target and has remained around 29,000 tonnes.

Without adequate supply of copper, electric power cannot be generated and as a consequence, the entire industrial development of the country will be affected. The solution to this problem is therefore urgent. Adequate resources of the metal have to be identified; targets set should be realistic and steps should be taken to reduce the burden of imports.

Identification of Resources

Twenty years ago it had almost been taken for granted that India had no adequate reserves of copper and had to look for imports in substantial quantities to meet her needs. Fortunately the position has now changed for the better. Although no major deposits of the dimension of the porphyry copper occurrences of S. W. United States, the Andes belt of S. America or the Rhodesian belt of S. Africa have been discovered, yet, a significant number of comparatively smaller deposits have been identified at a number of places in the country. We are now in a position to entertain the hope that near self-sufficiency can be attained by a proper and judicious exploitation of the resources now identified.

Indigenous Production of Metal

Presently all the copper produced in India comes from the two group of mines operated by the Hindustan Copper Limited: the Indian Copper Complex at Ghatsila, Bihar and the Khetri Copper Complex in Rajasthan. Production in Bihar comes from mines located at Mosaboni, Rakha and Surda in the Singhbhum copper belt. Production of wirebar copper from the smelter and refinery at Ghatsila has averaged 14,000 tonnes per year.

The Khetri Copper Complex in Rajasthan consists of three mines at Khetri, Kolihan and Chandmari. Over a million tonnes of ore are treated at the Khetri concentrator plant. Metal production from this complex is around 14,000 tonnes although the smelter at Khetri is designed for a production of 30,000 tonnes. Both the concentrator plant and the smelter are working at a third of their intended capacity, *as sufficient quantity of ore has not been forthcoming from the captive mines.* To make good the shortage, concentrates are being imported from outside the country.

The combined output of the two smelters at Ghatsila and Khetri is around 29,000 tonnes, although the installed capacity is 46,000 tonnes. The difficulties faced in mine

and smelter operation is sure to be overcome in due course and the two units together can be expected to produce 45,000 tonnes.

Malanjkhand, a major Project on hand

Hindustan Copper Ltd. have on hand another major project in Malanjkhand, Madhya Pradesh, where ore reserve to the extent of 63 million tonnes of a grade of 1.3% Cu has been estimated. It is proposed to undertake open pit mining and produce concentrates initially to feed the smelter at Khetri. An additional production of 24,000 tonnes of copper is anticipated from this source by the end of the Sixth Plan period (1983).

Trends in Production and Consumption

Table I indicates the trends in production and imports of copper during the ten year period ending 1977. Indigenous production has stabilised around 29,000 tonnes while demand for the metal is steadily rising.

	TABLE I (all figures are in 000 metric tonnes)										
	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
Domestic Production of Refined Copper	8.9	9.3	9.8	9.3	9.6	10.5	11.7	11.8	15.5	28.0	29.0
Domestic Copper Scrap	7.0	7.0	8.0	9.0	9.0	9.0	9.0	8.8	3.0	9.0	10.0
Imports	33.4	25.4	40.9	45.6	52.1	49.3	50.4	34.9	19.9	29.0	35.0
Imports of Copper Scrap & Brass Scrap	—	—	—	—	—	—	—	—	1.2	7.6	10.0
Total Consumption	47.3	39.7	56.4	61.2	68.0	66.1	68.4	52.3	41.8	68.2	78.0

Course of action to meet the situation

The emphasis of our planners, so far, has been directed towards the development of large projects like the Khetri Copper Complex in Rajasthan, the Mosaboni-Rakha Complex in Bihar, and the Malanjkhand Complex in Madhya Pradesh. Hardly any attention appears to have been bestowed on the development of the smaller properties. The small and medium sized deposits are larger in number and more evenly distributed.

Need for developing smaller deposits

There is a tendency to reject small projects as uneconomical. Advanced countries have no doubt taken to large scale operations through gradual development of suitable technological skill. In a country like India where capital is scarce, adequate technological skill is lying dormant for want of opportunity, self reliance and self-sufficiency can be best achieved from small beginnings and growing in stature and importance gradually. Those who have followed the growth of Khetri know that large projects require enormous capital, sophisticated methods and machines and take a very long time to reach a stage of full production. Attempting in a big way with borrowed money and know-how is no answer to the problem. It is inevitable that preference should be shown initially to capital-saving and employment-generating projects. Rapid development of our mineral resources is best achieved, not through giant projects requiring massive dependence on foreign aid and equipment, but through indigenous effort, indigenous design and problem-solving capability.

Resource utilisation

The total drill-indicated reserves of copper ore are estimated at 360 m tonnes averaging 1% copper. Exploration is continuing and new deposits are being discovered. This by itself is not a happy position. The distressing fact is that exploitation is not keeping pace with exploration, with the result that reserves have remained mostly on paper. Resource utilisation is an important factor in economic development. The capacity to produce what the nation needs has to be continuously increased. It has to be recognised that making use of a mineral is as important as finding it. Prosperity comes only through utilisation of mineral resources. Income will grow as the raw material is progressively transformed and utilised.

Time taken for development of small projects

Given adequate resources, it normally takes two to three years to develop a mine, at least in two levels, and determine the size and shape of the ore body. During this period, it will also be possible to test bulk samples of the ore to determine its beneficiation and metallurgical characteristics and based on that information, to design a plant of suitable size to ensure maximum exploitation of the deposit. It is anticipated that a sum of Rs. 500 lakhs will be required for developing a moderate sized mine producing 500 tonnes per day and for putting up a concentrator plant. A unit of this size will be in a position to produce 6000 to 10,000 tonnes of copper concentrate per year, depending upon the grade of the ore treated.

Chitradurga Copper—An example of development of a small deposit

In this context the steps taken by the Karnataka Government in developing comparatively smaller deposits of copper in that State is worthy of study.

A small property at Ingaldhal near Chitradurga, where surface drilling to shallow depths had indicated a deposit of about one million tonnes of ore ranging in grade from 1.5 to 2.0% copper, was selected for development. It took about four years to develop the mine in three levels and block out two lakh tonnes of fully proved reserves ready for mining. A decision was taken to put up a concentrator plant in 1972 and, within a year, a concentrator plant capable of treating 250 tonnes a day was erected and commissioned. The unit is now producing 2500 tonnes of concentrate per year and, with certain improvements, production could be stepped up to 4000 tonnes. The total investment on this project is Rs. 300 lakhs.

The State Government has also initiated action on opening up two more projects on the same lines.

Develop prospects close to smelters

It should be emphasized that there are a number of copper prospects, especially in the States of Rajasthan and Bihar, which are close to the existing smelters at Khetri and Ghatsila. No time should be lost in developing these mines and start producing concentrates. As it is, there is enough existing smelter capacity to take care of all the concentrates produced during the next few years, but increased capacity will then be required. In this connection recent developments in recovery of copper by means other than smelting (i.e., by hydrometallurgy) indicate that the present necessity of relying on expensive large capacity centrally located smelters is likely to be very much reduced in the relatively near future. This will be of considerable importance in exploiting all deposits and particularly those situated at great distances from smelters.

As long as the country faces a situation of resorting to imports of copper valued at Rs. 50 to Rs. 60 crores annually, any attempt whether big or small, to reduce the drain should be welcome.

Assured price for the concentrates

What is required is an assured price for the concentrates which would make the operations financially viable. With a correct appreciation of the problem of the small operator, and with certain amount of patronage and protection in the initial years from Government, it is possible to contribute significantly to the production of copper and reach self-sufficiency by stages.

Self-sufficiency as a goal

The road to self sufficiency in respect of copper, therefore, lies in bringing to a stage of production the number of small and medium sized deposits of copper and producing concentrates to feed centrally located smelters. Technological solutions adopted by other countries may not be the right answer to solving our problems. A large population, high percentage of unemployment, comparative lack of technical skill for want of opportunity, require a different approach. Problems do not get solved by attempting in a big way through borrowed money and skills. Full use of the available resources in men and material has to be attempted. By so doing, the goal for reaching self-sufficiency can be reached faster. Speedy development and exploitation of smaller deposits, especially those located close to the existing concentrator and smelters, should be taken on hand. Demand for copper within the country is expected to grow at a faster rate than hitherto. It should also be remembered that prices of copper metal will not continue to remain at a low level. Already prices are showing a tendency to rise. If immediate steps are not taken for developing all the available resources, both big and small, the gap between demand and indigenous supply will steadily grow and create serious problems for the country.

Self-sufficiency by 1991—A Realisable Goal

Because of the comfortable foreign exchange reserve, Government may be thinking of allowing liberal imports of copper. This will be a retrograde step and will put back the clock. In that event, the goal of self sufficiency will recede farther and farther. It is, therefore, not a wise policy to postpone investment decisions on the development of indigenous resources of copper and place too much reliance on imports of copper metal and copper scrap. Lack of investment for long term growth will lead to serious shortages in the coming years

Table II projects the growth rate for copper consumption, supply and imports :

TABLE II	(in 000's of M.T.)			
	1978	1980	1983	1985
Domestic consumption	88	115	160	180
Domestic supply	31	46	74	86
Balance to be met through imports	57	69	86	94

It is clear that dependence on imports will continue to grow in spite of efforts at improving domestic production and supply. There should, therefore, be no slackening of efforts in bringing all known prospects of copper, both big and small, into a stage of production if we are to reach self sufficiency in copper by 1991.

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