THE ALUMINIUM INDUSTRY IN INDIA

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Abstract

In spite of large deposits of good grade bauxite and potential power sources, the price of aluminium in India is the highest in the world which is attributed to small overall production. In view of the scarcity of copper, lead, zinc, tin, nickel, etc., replacement of these metals by aluminium has been stressed. Multifarious applications of aluminium and its alloys have been mentioned and their advantages indicated.

SINCE India is particularly blessed with large deposits of good grade bauxite and since her power potential is enormous, it would be logical to assume that aluminium would be made to play as important a part in the development of the country as steel. Unfortunately, however, while the Indian consumer pays the lowest price in the world for his steel, he pays about the highest price in the world for his aluminium. All the grandiose ideas about developing industrial uses of aluminium are ultimately abandoned or postponed till the price structure falls in line with the other major aluminium-consuming countries. The greatest anomaly, however, is in the fact that at present while other industrial non-ferrous metals such as copper, zinc, lead, tin and nickel could be bought in India at near about the world prices, aluminium sells on the average at about 35 per cent higher than world prices. The so-called poor man's metal is, therefore, costlier to Indian consumers than any other industrial metal. A proper appreciation of the relative roles of the different metals for industrial uses does not appear to have been made vis-à-vis the industrial potential of the country and its resources to allow such stark discrimination in the price of aluminium.

Since the achievement of independence the country naturally desires to be as much self-sufficient as possible so far as her basic raw material needs are concerned. Metals being the prime base for the development of engineering industries, it is natural that more attention should be paid to their development and indigenous production, leaving the utilization industries to look after themselves. Unfortunately our progress during the past seven years in this direction is far from commendable and has not gone much beyond paper planning at least so far as non-ferrous metals are concerned.

It is no secret that our material resources in copper, lead, zinc, tin, nickel, etc., are very meagre and the only non-ferrous metal which could, to a large measure, replace the above metals as well as steel is aluminium along with its medium and high strength alloys. It is in the interest of the country, therefore, for the State so to contrive matters as to discourage the use of metals not produced or not likely to be produced indigenously and to encourage the use of such metals as could be produced in abundance. This has not only not been done, but, as mentioned above, the policy of the State has gone towards discouraging the use of aluminium for industrial applications by imposing heavy duties on its imports in order to protect indigenous high cost production.

In any industry the interests of the consumers and producers are bound to conflict. The producer would want as high a price for his product as possible, while the consumer would naturally want to pay as little as possible. However, it is when the cost of production of a commodity in a country is higher than the imported product and when the State steps in for sound reasons to protect the indigenous industry that the real conflict between consumer and producer interests develops.

At this stage it may be worthwhile giving a picture of the development of the aluminium

industry up to date. Before the last war no aluminium was produced in the country, the average imports in all forms being about 3000 tons per annum. A revenue duty of 30 per cent *ad valorem* was levied on imported material which was mostly circles for the manufacture of pots and pans. Just before the war, two different companies, viz. the Indian Aluminium Co. and the Aluminium Corporation of India, were registered with the intention of producing aluminium in the country.

The first ingot was cast by both the producers during the war and production purchased by the Government on cost plus profit basis. The producers were, however, guaranteed protection after the war subject to due examination of costs, etc., by the tariff authorities.

During the latter part of the war and for some period thereafter, the Government ran a ' pool ' system by which the consumer paid an average pooled price between imported metal and indigenous cost. Immediately after the war following the general policy of making raw materials available to the industry as cheaply as possible, the revenue duties on copper, lead, zinc, tin, nickel, etc., were removed, but the duty on aluminium was retained. The question of protection to the aluminium industry was referred to the then Tariff Board which, after examination of the cost structure, recommended, among other things, conversion of the revenue duty into a protective duty and also imposed additional specific duties over a period of three years. The amounts to be realized from the specific duties were to be paid to the indigenous producers as subsidy at different rates. After devaluation of the rupee the case was again examined by the Tariff Board and finally both the specific duties and subsidies were discontinued while the protective duty, which now is $31\frac{1}{2}$ per cent, was retained.

The most important factor contributing to the high cost of production in India was attributed by the Tariff Board to the small production units which between them produce only 3000 tons of ingot per year. Both the Indian producers have plans for expansion of their present plants, but any real large-scale production can only take place if there is enough industrial outlet for the metal. Various estimates of likely consumption were made by different authorities but never realized because of the high cost of the metal to the consumer. Aluminium, therefore, was condemned to remain a ' kitchen ' metal except for the efforts of a few pioneers who are trying to develop industrial uses of the metal and its alloys against heavy odds.

Aluminium and its alloys are put to a variety of uses and there is no industry either basic or subsidiary which cannot use aluminium for various applications. The bulk of the metal is consumed in such industries as electrical, structural, road, rail, marine and air transport, packaging and building and architecture. The advantages of using aluminium alloys for transport vehicles is obvious in that the dead weight of the vehicle is reduced resulting in considerable economy in operating costs. The life of the vehicle is also considerably increased.

Aluminium alloy extruded sections or sometimes even folded sections for structural work with aluminium alloy panelling, are used for the construction of bus bodies, railway coaches, trailers, trucks, etc. Several hundred passenger bodies made with light alloy extruded sections and panelling throughout are now operating in India and many of the major body-builders and State transport organizations have put on the road such bodies built to the design of Aluminium Hindustan Ltd. Aluminium tankers for the distribution of petroleum products are also becoming popular in India and the A.P.V. Engineering Co. of Calcutta have pioneered this development. Not very long ago, fifty open and fifty closed goods wagons were made in aluminium by the firms forming the Railway Wagon Panel, as an experimental measure.

The advantages of using aluminium alloys for marine craft are manifold. It is practicable to reduce the weight of many ships' structures to under half their weight in steel by using light alloys which are at the same time highly corrosion resistant and extremely durable under sea-water conditions. The use of aluminium for lifeboats, barges and other small vessels has been well established and the E.C.A.F.E. Commission on Inland Navigation have stressed the importance of using aluminium barges for river navigation in India. Apart from other considerations, the main advantage is the shallow draft of vessels made in aluminium, enabling the rivers being navigated all throughout the year instead of seasonal navigation.

In India the development in the marine field is rather slow, but firms like the India General Navigation & Railway Co., the Hooghly Docking & Engineering Co., Shaparia Dock & Steel Co., the A.P.V. Engineering Co. Ltd., etc., have pioneered the manufacture of light-alloy lifeboats, dinghies, etc., and are planning to build an experimental light-alloy barge for river navigation.

In the electrical industry, steel-cored aluminium has become standard for high tension transmission lines while for low tension distribution systems all-aluminium conductors are fast replacing copper throughout the world. The economy in the first cost without losing any efficiency of operation by using aluminium for low tension distribution system is quite considerable and the scope for this application in India is certainly very large.

Large quantities of aluminium foil are used for all types of packaging such as tea, cigarettes, food, etc., while paper-backed aluminium foil is used for containers including containers for petroleum oils. Coloured foil is very popular in India for decorative purposes. Venesta Ltd. of Kamarhati, Calcutta, now produce almost all the foil required for India.

So far as building and architecture are concerned, several prefabricated houses in aluminium have been designed. The most popular design in Bengal and Assam, however, is the steel-framed aluminium strip construction designed and made by Gresham & Craven of India Ltd., Calcutta. Such structures are put to innumerable uses as residential quarters, hospitals, schools, workshops, etc.

For storage of foodgrains, aluminium bins are most suitable as they give complete protection to the grain and are now being introduced in India by the Indian Aluminium Company.

The architectural uses of aluminium are many and varied; shop and other windows, staircases, decorative panelling, etc., of various designs are made in aluminium, giving beautiful effects. Cafeterias and restaurants also make use of aluminium for decoration and utility purposes. Since aluminium can be anodized and dyed, giving it very pleasant colours, the architectural possibilities of aluminium both for internal decoration and for household articles of everyday use are immense.

So far as structural engineering is concerned, aluminium alloys are being used in U.K., U.S.A. and Canada for making bridges, hangars, workshops, hothouses, etc. The life of some of the old bridges could be considerably extended by replacing the present decks with aluminium alloy decks.

Aluminium founding is both an art and a science. The Aluminium Manufacturing Co. Ltd. of Dum Dum, Calcutta, have been founding aluminium and its alloys in India for the last three decades and have complete equipment for pressure die casting, gravity die casting and sand casting. Innumerable types of light-alloy castings are being manufactured for the automotive, electrical, cotton and jute mills and railways and other industries. There seems little doubt that more and more tonnage of aluminium will in future be required for light-alloy castings as the industrial tempo of the country increases. The A.M. Co. Ltd. also carry out a great deal of sheet metal work of special quality for tea and rubber gardens as well as for other industries.

The above brief account of the special applications of aluminium as well as the fabricating potentiality in India goes to show that some interest is being taken in the development of industrial uses of aluminium in the country. Such development as has taken place, however, is too slow and mostly experimental and hardly touches the fringe of the potentiality of light alloys for industrial applications. The major difficulty, as stated earlier, is the high cost of the metal in India. Given metal at world prices, the pioneer work of several concerns in introducing industrial application will take root, making light alloys a major factor in the development of India.

At present even though aluminium may be advantageous for a particular application, the consumer is shy of paying the very high first cost of light alloys. Even the various government and quasi-government departments, who are themselves large consumers of metal, find it difficult to specify light alloys for their requirements because of the high cost.

Aluminium primarily is a defence industry and it is but proper that every citizen contributes towards his country's defence rather than make only the consumers of the products of that particular industry bear all the burden. The only proper and equitable method of protecting the primary producers of the metal, therefore, should be by direct subsidies from the general revenues rather than by protective duties which hamper the development of the industry by making the commodity too costly for the consumers.