Ferro Alloy Industries in the Liberalised Economy
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Economic Liberalization – A Stumbling Block in the Commercialization of Indigenous Calcium Silicide Technology

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ABSTRACT

Indian ferro alloy industry is passing through one of its worst periods by the process of economic liberalization. Its production in our country is coming down mainly due to inadequate indigenous demand, non-availability of exports and high power cost as compared to other competing countries. The indigenous calcium silicide technology developed at National Metallurgical Laboratory, Jamshedpur could not be commercialized on account of the new economic liberalization policy of Government of India.

Keywords : Indigenous technology , Calcium silicide, Economic liberalization, Ferro alloy industry.

INTRODUCTION

Presently, the Indian ferro alloy industry is passing through one of its worst periods. The reason for its growth until the recent whirlwind of change was self–sufficiency combined with protection from competition by limiting new production units and restricting imports. But these props are now being withdrawn, cut down or replaced, and the ferro alloy industry has to meet the challenge. No doubt despite the emerging and existing difficulties and the recession in the steel industry as well as the shortage and price of power, the bulk ferro alloy industry has managed fairly well all these days and is exporting some of the bulk ferro alloys such as charge chrome, ferro chrome, silico manganese and ferro manganese. In near future even units in small scale sector may pose a significant threat to the larger established producers since their output is increasing day by day.

The technical know–how of the process of production of calcium silicide is presently restricted to a few advanced countries only, and the entire demand of calcium silicide in our country is met by imports at about 2000 tonnes per annum.

It was thought that the indigenous production of calcium silicide shall be able to save considerable amount of foreign exchange. In view of this fact National Metallurgical Laboratory carried out several investigations to develop technology for producing standard grade calcium silicide making use of indigenous raw materials in its pilot scale 500 KVA submerged arc furnace adopting different process routes. With its consistent efforts, it has perfected the technology for the production of standard grade calcium silicide with a view to transfer it to Indian Industries to save foreign exchange.

DEVELOPMENT OF CALCIUM SILICIDE TECHNOLOGY

Industrially calcium silicide is produced adopting two processes calcium carbide process and quick lime process. In calcium carbide process, the reduction of silica with carbon takes place in the presence of calcium carbide. The charge mix consists of quartzite, calcium carbide and a mixture of coke and charcoal, while in quick lime process, calcium silicide is produced in a single stage, omitting the production of calcium carbide. This process requires a very precise proportioning of the charge. The charge mix consists of quartzite, calcined lime and reductant namely charcoal. The least shortage of the reducing agent intensifies the formation of slag from CaO and SiO_2, and when it is in excess, the depth of immersion electrodes into the charge is reduced very quickly, causing an intensive evaporation of calcium and silicon and cooling of many parts of the furnace. This inturn causes the accumulation of carbides of calcium and silicon. The quick lime process is preferred compared to calcium carbide process since it is more efficient. National Metallurgical Laboratory carried out several smelting campaigns for the production of calcium silicide adopting different processes making use of indigenous raw materials in its pilot scale 500 KVA submerged arc furnace. Invariably multigrade calcium silicon alloys are produced in real practice. The production of lower grade calcium silicon alloys [Ca $\leq$ 20%] can be minimized by precise control of raw material quality and smelting parameters. The use of lancing tubes also increases the iron content in the alloy, thereby decreasing the percentage of calcium in the product. With raw materials of specified composition and using arcing method for the opening of tap hole, calcium silicide of 30% Ca grade could be produced continuously. A small amount of lower grade calcium silicon alloys, if produced during the smelting operation, can be used in foundries for inoculation of cast iron to alter the morphology of graphite.

ECONOMIC VIABILITY OF THE TECHNOLOGY

The raw materials required for the production of calcium silicide are indigenously available at reasonable cost. However, the cost of power required for

smelting accounts about 50% of the total cost of the product. The total cost comprising of capital cost, raw materials and operation cost and manpower cost is considerably lower than the imported cost and the return on investment works out to be more than 35%.

Planning for Commercial Trial at VISL, Bhadravati

National Metallurgical Laboratory successfully demonstrated the indigenous technology as a part of TATA–NML interactive programme and optimized various smelting parameters. This investigation was financially supported by TATA STEEL during 1991. In the subsequent years, NML and TATA STEEL decided to conduct large scale trials jointly in a commercial scale submerged arc furnace at VISL, Bhadravati. After discussing various techno–economic aspects of this project among the representatives of NML, TATA STEEL, SAIL [RDCIS] and VISL, Bhadravati, it was decided to demonstrate this technology in one of the industrial scale submerged arc furnaces at VISL, Bhadravati making use of indigenous raw materials by conducting 45 day smelting compaign. It was also agreed upon that the major expenses of this commercial compaign shall be met by TATA STEEL.

Impact of New Economic Liberalization Policy

The new economic liberalization policy of Government of India has hit hard ferro alloy industry rather than helping it in its growth. It has permitted duty free imports of raw materials for the production of ferro alloys for export. Under this, the steel industry can import scrap, coke, limestone and additives like ferro alloys, aluminium, petroleum coke and refractories duty free. It is obvious that under this arrangement steel producers will import as much as ferro alloy as possible. The liberalization also means that new ferro alloy producers can start up at their will. In near future there is likelihood that new steel plants will install facilities for producing ferro-alloys along with their own captive power plants. Also the customs duty has been reduced (i) on ferro alloys except ferro nickel and ferro molybdenum from the existing 50% to 30% in 1994 and (ii) on ferro nickel and ferro molybdenum from the existing 30% to 20%.

It is well known that ferro alloys is a power intensive industry and uses power as a raw material. Power tariff in India is high compared to the power tariff available to competitors in other parts of the world. This high power tariff discourages any production of ferro alloys even for export. As a result several ferro alloy producers propose to set up their own captive power plants to ensure power supply to their units at reasonable rates though they will have to incur huge capital

costs. Thus several ferro alloy producers have reduced their production due to high power cost and non–availability of exports. Under these prevailing circumstances TATA STEEL continued to import calcium silicide from abroad with ease at lower rates and has gone back from its decision to invest for commercial trials at VISL, Bhadravati. Further under VABAL scheme excessive imports of ferro alloys is possible and Indian ferro alloy producers feel uncompetitive due to the "aggresive" entry of the commonwealth states (CIS) countries in the global market with large quantities of cheaper alloys.

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CONCLUSION

The new economic liberalization policy has jeopardised the commercialization of the indigenous developed technology National Metallurgical Laboratory shall continue its efforts to search some sponsor for commercializing this well proven technology either at India or abroad.