Presidential Address

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The ferro-alloy industry forms the backbone of the iron and steel industry of the world. Ferro-alloys are added in the manufacture of mild steel as well as alloy, tool, stainless and other special steels. The production of ferro-alloys in India commenced some forty years ago when the first blast furnace was installed by M/s Tisco at Joda for the production of ferro-manganese. Subsequently M/s VISL started production of ferro-silicon by setting up two 1500 KVA submerged arc furnaces. With the development of steel industry, the demand for ferro-alloys has increased and today there are more than twelve producers of ferro-alloys using electro-thermal smelting, with total installed capacity of over 500,000 tonnes for all types of ferro-alloys.

However, along with this development, the ferro-alloy industry has also suffered a set-back during the last decade. The main reasons for this set-back are as follows—

Non-availability of high grade lumpy ore :

The production of tonnage ferro-alloys depends on the availability of proper quality of raw-materials (lumpy form) and adequate electrical energy. Our country is blessed with vast resources of some specific raw-materials such as quartzite, manganese, chromite, ilmenite, vanadium-bearing ores, dolomite and others. Consumption of these raw-materials has increased as the demand of standard grade ferro-alloys has gone up and as a result the ore reserves have depleted and the fines now available, require proper beneficiation and/or agglomeration before utilization for ferro-alloy production. Besides, we also have the problem of non-availability of raw-materials for some of the more critical and strategic ferro-alloys such as ferro-molybdenum, ferro-tungsten, ferro-niobium, ferro nickel and others.

Power cuts and non-uniform power tariff rates :

Since the ferro-alloy industry is highly power intensive, the poor power supply position is bound to adversely affect the healthy growth of this industry. Power cuts generally vary from 15% to 100% in different States. Most of the plants are running only at 50% of their rated capacity or even lower. Different tariff rates

for power in different States also create anomalies in production costs and several industrial units are in considerable disadvantage as compared to other units which are enjoying the benefit of lower tariffs.

High production costs :

The production costs of ferro-alloys depend mainly on :—

i) Cost of raw-materials delivered at the site,
ii) Power costs and
iii) Labour costs

As transportation costs and power tariffs in India are amongst the highest in the world (Rs. 0.40 per KWH as compared to Rs. 0.09 in other industrially advanced countries), the Indian ferro-alloy industry is finding it difficult to compete in world markets with other advanced countries.

Waste heat utilization and atmospheric pollution :

It is estimated that about 450 MW of energy is required by the ferro-alloy industries for the total present installed capacity of 500.000 tonnes. Out of this about 400 MW of energy goes as waste through furnace gases and the sensible heat of the slag. If waste heat boilers and turbo generators are used, about 100 MW of electric power can easily be generated which can be utilized for drying, preheating and prereduction of raw-materials to bring down tbe power input. While abroad some of the recent developments have established the recovery of waste heat or electric power generation from gases on industrial scale, the adoption of the same to furnaces in India which are of smaller size will require considerable indepth study.

The increasing awareness of society for the need of cleaner environments and related government regulations necessitate efficient pollution control. Pollution control systems involve huge financial investment which at times may even exceed plant investment itself.

New technological developments in steel-making process :

New technological advancements in steel-making processes have reduced the consumption of ferro-alloys required per tonne of steel. For example the present consumption rate of ferro-manganese has come down from 18 kg to 10 kg per ton of steel. This has further aggravated the demand crisis in the ferro-alloy industry.

World-wide recession in steel industry :

The demand of ferro-alloys is closely dependent on the production of iron and steel. World steel production has suffered set backs since 1980. The production went down from a level of 746.6 million tonnes in 1979 to 696.2 million tonnes in 1982. Due to this recession in steel production, the ferro-alloy industry has suffered a correspondingly severe crisis. World production of ferro-alloys (excluding socialist countries) has dropped from 9.97 million tonnes in 1979 to 6.41 million tonnes in 1982.

Future prospects :

Future prospects of the ferro-alloy industry depend on the growth of the steel industry in the country. For various reasons growth in the production of steel has not been achieved to anticipated level as compared to other countries In the world. However, the expansion and modernisation of integrated steel plants and commissioning of new units at Visakhapatnam and at Salem, likely to create new markets for ferro-alloys.

Emphasis should also be laid on raw-material preparation, so as to improve upon the consumption of energy, generation of fumes and slag losses. Briquetting and sintering are some such alternatives.

Methods should be adopted for waste heat utilisation and also certain modifications in existing plant equipment which would facilitate production of quality ferro-alloys at competitive prices.

R&D work in the development of new processes like plasma smelting should be considered. Such processes will not only solve the problem of fines and low grade materials but will result in considerable savings in energy.

With regard to uninterrupted power supply, efforts should be made for setting up captive power generator units as some plants have already done.

R&D work is alo needed to search for newer sources of energy such as bio-gas, ocean energy, magnetohydro-dynamics, geothermal energy etc. which will relieve to some extent the strain in energy crisis.

The world trend of building larger and more highly automated furnaces for production of ferro-alloys should be adopted in India also. This will permit pretreatment of raw-materials, use of top gases and control of the overall fuel economy.

The first Symposium on Ferro-Alloy Industry in India was organised by the National Metallurgical Laboratory in the year 1962, when the late Sir Jehangir Ghandy delivered the opening address. The Symposium focussed the importance and growth of this industry in India. At that time a 500 KVA submerged arc furnace which was the first of its kind in India, was added to the pilot plant facilities of NML for evaluation of various raw-materiais for the production of ferro-alloys by electrothermal smelting. NML took a lead also in developing the know-how for the production of low-carbon ferro-alloys by the aluminothermic route. These included ferro-tungsten, ferro-molybdenum, ferro-titanium, ferro-vanadium, ferro-boron, ferro-sllico-zirconium and others. It is gratifying to note that some of the main producers of these ferro-alloys are licencees of NML. The recent trials at VISL for the utilization of vanadiferous titano-magnetite ore for production of vanadium rich slag and low silicon pig iron are a unique example of collaborative efforts between a R&D institution and the industry. Yet another process developed and transferred to the industry is for the recovery of vanadium pentoxide from vanadium-bearing sludges of alumina plants. Vanadium pentoxide is again used for ferro-vanadium production.

The present Seminar which is being organised jointly by the National Metallurgical Laboratory and the Iron & Steel Division of IIM will focus on the problems and the prospects of the ferro-alloy industry in India. It is, therefore, both timely and important that NML has taken the initiative in organising this Seminar after over two decades to discuss the various problems being facecd by the ferro-alloy industry today.