Ferro Alloy Industries in the Liberalised Economy
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Status of Ferrosilicon and Pig Iron Production by Electric Smelting under the Liberalized Economy

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ABSTRACT

Without adequate power infrastructure and demand from the steel industry, liberalization for the ferroalloy industry in general and ferrosilicon in particular can spell doom. The entry of many small producers has saddled the country with surplus installed capacity. Unless demand increases rapidly and cheap owner is available from either NTPC or captive power generation, FeSi production by electric smelting is not viable. Compulsion to generate cheap captive power and export for survival is great. Whereas the fate of electric pig iron was sealed long ago when tariff increases rendered the product unaffordable by the foundries necessitating imports. With the emergence mini–blast furnaces in the liberalized economy, revival of electric pig iron is no where in sight.

Keywords : Ferro silicon, Pig iron, Liberalization, Electric smelting.

INTRODUCTION

Liberalization in commercial terms means concessions and relaxation of Government rules that can stimulate growth to meet rising demands. But when growth has already taken place and installed capacities have outstripped demand, then liberalization can spell doom. Ferroalloy industries in general, and ferrosilicon or, for that matter, electric pig iron in particular are confronted with such a gloomy counter productive prospect. When growth of steel lags behind the growth of ferroalloys, the industry is destablised, especially when infrastructural backup such as power is poor, both in terms of inadequate supply and high tariff. It is, therefore, pertinent that this workshop addresses the impact of liberalization on continuous process, power intensive ferroalloy industries.

Ferroalloy Scenario in 1980's

It is well known that the growth of the ferroalloy industry is inextricably linked to the growth of the steel industry. Therefore, when hopes were raised that steel would grow at a rapid rate to reach 50–75 million tonnes by the turn of the century, major ferroally producers responded. By 1970, there were about five producers smelting ferromanganese with an installed capacity of 300 kt and three producers smelting ferrosilicon with installed capacities at 120 kt. In the 1980s, two more entrants joined the core group of FeSi producers in the private sector. Names of all these ferroalloy producers with installed capacities in the country are given in Table 1.

Table 1 : Major FeMn and FeSi producers in 1980s

Company	Capacity, kt/yr	
	FeMn	FeSi
Private Sector		
Universal Ferro Alloy (UNIFERO)	30	—
Universal Ferro Alloy (UNIFERO) —EOU	45	—
Khandelwal Ferroalloy (KFA)	30	—
Ferroalloy Corporation (FACOR)	37	6
Dandelli Ferroalloys (DFA)	12	—
Jaypore Sugar Ltd. (JSL)	18	1
Tata Iron and Steel Co. (TISCO)	36	1
Indian Metal & Ferroalloy (IMFA)	—	20
Nav Bharat Ferroalloy (NBFA)	—	20
Sandur Manganese & Iron Ores (SMIORE)	30	24
VBC — Ferroalloys (VBC–FA)	—	10
Andhra Pradesh Carbide (APC)	—	10
Ispat Ferroally (IFA)	—	10
Total	238	100
Public Sector		
Vishveswaraiah Iron & Steel Ltd. (VISL)	2	20
Maharashtra Electrosmelt Ltd. (MEL)	65	—
Total	67	20
Private and Public Sector	305	120

TISCO in the private sector, VISL and MEL in the public sector were all captive producers of FeMn. In fact, the first 33 MVA Elkem furnace at MEL was designed to produce electric pig iron for its own steel making programme. Since the pig casting machine was not envisaged, the liquid pig iron was teemed into ingot molds, soon to discover that stripping and breaking the pencil ingots became impractical. Further, because the downstream facilities did not fructify, and the very concept of steel making was abandoned, the furnace was converted to FeMn for supply to SAIL. Today, two 33 MVA furnaces are smelting FeMn with an installed capacity of 100 kt per year. Perhaps, this heralded 'broadbanding', a term that came to stay in the liberalized economy.

By this time the yearly production capacity of Mn alloys had moved from 300 kt to 400 kt while the demand moved from 160 kt to over 230 kt. On the other hand, FeSi capacity moved up from 120 kt in the 1970s to 150 kt in the 1980s while the respective demand moved from 60 kt to 70 kt. Clearly, while FeSi capacity increased by 25%, the demand lagged at 17%.

Demand–Supply Equilibrium

Although the installed capacity in the country was twice the demand, actual supply invariable matched the demand, thanks to power cuts imposed by the State Electricity Boards. Thus, a production glut situation did not last for more than a few months. Rarely was there need to drastically drop prices due to over production nor was there a need to raise prices due to underproduction. Despite 50% capacity utilisation, the supply of FeMn and FeSi was regulated.

But soon this fine equilibrium between demand the supply was disturbed by the false notion that FeSi was making huge profits when production dropped by virtue of power cuts or even production cutbacks. Not realising that this was a temporary phenomenon and that the major industries had also to bear the burden of interest rates on long term loans during lean periods the smaller new entrants rushed on to the scene.

LIBERALIZATION

Once the floodgates of liberalization were opened by the Steel Ministry during the late 1980s, the ferroalloy scenario underwent a dramatic change. A series of policy initiatives were announced in quick succession. Firstly, producers were allowed to enhance their licensed capacities by 25%, initially with proof of production in the previous three years. This was later relaxed to automatic enhancement. Secondly, broadbanding was introduced. This meant that the industry could produce different alloys within the same group such as silicon metal/ferrosilicon, ferromanganese/silicomanganese. Later, this concept was extended to include any ferroalloy within lincensed capacity. Finally, the need for obtaining an industrial licence itself was dispensed off.

Effect of Liberalization on FeSi

In this euphoric climate, several new small producers jumped the bandwagon to meet the anticipated growth in ferroalloy demand as a consequence of de–licensing of the steel industry up to one million tonnes. Virtually, non–exiting units mushroomed overnight especially in States offering cheap surplus power in the industrially backward areas. Madhya Pradesh and Kerala were the first to welcome small producers with open arms. Later, even the small State of Goa has followed suit. Subsidised power rates (50 p/KWh) and tax holidays (4% on selling price) were offered as immediate incentives to attract the growing number of players in the ferrosilicon field. Apparently, the smaller units were exempted from installing captive power and pollution control equipment, a precondition today for setting up any new industry. Availability of quartz and charcoal, the two principal raw materials practically in any part of the country were the other major consideration influencing the rapid migration toward the FeSi industry.

Encouraged by the attractive incentives, a large number of small entrepreneurs in the 1990s entered the bulk ferroally field by setting up units of 2– to 7–MVA capacity. At present there are nearly 50 producers in the country capable of producing one million tonnes of ferroalloys as given in Table 2. The net effect of rapid developments has saddled this country with surplus ferroalloy capacity. The expectation of growing demand from the steel industry was belied. Closure of half the ministeel plants because of stiff competition from cheap imports of steel was a major blow in the open market. Today, the demand for FeSi is barely 47%. Moreover, because of power cuts the supply apparently matches demand.

Table 2 : Installed capacity and demand in India.

Alloys	Capacity kt/year	Demand kt/year
SiMn/FeMn	550	230
Ferrosilicon	150	70
Ferrochrome	100	100
Charge Chrome (EOUs)	200	100
Total	1,000	500

Liberalization has undoubtedly heightened competition, compelling individual companies to revamp and restructure. However, the appalling state of infrastructure to supply quality power is beyond the industry's control. In a climate of globalisation, power generation in the private sector — both domestic and foreign — becomes imperative to restore the health of the industry to meet international competition and quality standards.

CAPTIVE POWER GENERATION

Installation of captive power generation facilities becomes a compulsion to fully utilise installed capacity and to make the operation viable. Some of the major ferroalloy producers have already installed such power plants, while other are seriously pursuing new hydel project in the light of privatisation of power generation as an impetus to economic growth. Newer concepts such as 'BOOM, BOOT, BOLT' are also considered with growing compulsions to export and survive. All this means is that a third party buys, owns, operates/leases and maintains/transfers the captive generating unit if land is provided at the ferroalloy plant.

It is important to note that besides shortages of power in various states, the tariff hikes from time to time have dropped productivity and rendered operations unviable. Today, in Karnataka, once a power–surplus State, the tariff has gone up to Rs. 3.66/kWh in July 1996. Even with high efficiency of energy utilisation (7700 kWh/t) the contribution becomes negative. Thus, there is a dire need to obtain cheaper power through either captive generation of NTPC (Rs. 1.60/kWh) supply to compete in the international market till demand picks up within the country. Bhutan, with cheap hydel power (Rs. 0.55/kWh) is literally sitting on top of the world with a potential to produce 15–18 kt of FeSi in its 27 MVA submerged arc furnaces supplied by Elkem, Norway. Statistically, this company alone can service one–fourth of India's present demand.

Evidently, for the FeSi market to grow and flourish, two things must happen. Firstly, cheap power from captive sources or NTPC for exports, secondly growth of demand from the steel plants and secondary steel producers. The emergence of major steel plants such as Jindal and Mukund in the Sandur–Hospet sector augurs well for the ferroalloy producers in this region. Freight differential need no longer become a locational disadvantage. According to one estimate the FeSi Demand is likely to increase to 121 kt per year by the year 2000 A.D. Whether this materialises or not, in the ultimate analysis it must be realised that ferrosilicon cannot be produced by any route other than the electric smelting route. Therefore, survival of the industry is of paramount importance in the national interest.

ELECTRIC SMELTING OF PIG IRON

In the late 1960s, there were only two companies — VISL and SMIORE both in Karnataka producing pig iron by electric smelting. The first was practically captive to its steelmaking program while SMIORE was the only company in the private sector, beside Kalinga Iron Work using a low–shaft furnace, that catered to the open market demand. These electric smelters were located in the south because of their proximity to high grade iron ore and cheap hydroelectric power. Energy rate was 4.40 paise/kWh when power cut was imposed in 1972 for the first time. With deteriorating power supply and tariff touching 31 paise/kWh in 1981, the price of foundry grade pig iron became unafforadble for the foundries.

Therefore, the foundry lobby influenced the Government to import from China and Pakistan at throw away prices, through it was tantamount to dumping. This killed the home industry, and SMIORE had to abandon production of low–phoshporous pig iron in 1983, though it was particularly well suited for the automobile industry. There were times when the quality conscious manufacturer would shop in far off Brazil to obtain an equivalent pig iron.

Sooner or later the closure of electric pig iron smelting was inevitable because of rising tariffs. The policy of the main steel plant to decrease their production of foundry grade pig iron for added value conversion to steel, compelled the promotion of the mini–blast furnace (MBF) technology. Today, individual installed capacities range from of 90–465 kt/year. With liberalization of imported coal and coke by decreasing the import duty from about 110% to 25%, the growth of MBFs is being witnessed particularly at ore–and port–based sites. Moreover, cogeneration of electricity is a boon in power–starved regions since it makes the unit self sufficient. Therefore, these units are expected to cater to the demand of the foundry industry which is projected to grow from some 1.6 million in 1989–90 to 3.0 million tonnes in 1994–95, to 5.8 million by 1999–2000. this will be met through indigenous sources to the extent of 63%. The rest may have to be imported.

In any case, the fate of electric pig iron was sealed long ago and revival in the present context is nowhere in sight. Even if productivity could be enhanced by technological upgradation such as preheating of raw materials and lowering the specific energy by immersing the electrodes in a slag bath, the chances of competing with the MBFs seems remote by the sheer difference in the economies of scale.

CONCLUSIONS

Production of FeSi by electric smelting has certainly been affected by liberalization of the economy by creating surplus capacity without corresponding increase in demand from the steel industry. Supplies of FeSi matches demand at

50% capacity utilisation mainly because of power shortage. The economic viability of the ferroalloy industry, however, depends on obtaining cheap power through captive generation or through NTPC for exports. Whether or not the small industries can sustain production once subsidised power and tax holiday are over seems doubtful.

Electric smelting of pig iron was affected mainly by hikes in power tariff and the advent of cheap imports. Liberalization has speeded the installations of MBFs, particularly in the south by import of either low ash coal for coke making or low phosphorous metallurgical coke. These concessions help the MBFs to meet the foundry demand to the extent of 63% by the turn of the century.