

KEY NOTE ADDRESS

Status of Ferro Alloy Industry in the Liberalised Economy

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I wish you a very good morning and look forward to a very interesting and frank exchange of ideas during the next two days for the benefit of the FERRO ALLOYS INDUSTRY in our country.

I consider it a great honour and privilege that the National Metallurgical Laboratory and Jamshedpur chapter of Indian Institute of Metals have given me this opportunity to present the Inaugural Address at the National workshop on "The Status of Ferro Alloys Industry in the Liberalised Economy".

My association with the National metallurgical Laboratory started in the year February, 1962 when I attended the first international symposium on Ferro Alloys organised by the National metallurgical Laboratory. This symposium was attended by many foreign delegates, some of them being pioneers in the field of Ferro Alloys. This was the time when the bulk Ferro Alloys industry in India was still in its nascent stage and the major alloys produced were of Manganese and silicon only. There were four main producers of ferro manganese in the Private Sector and one major producer of Ferro Silicon in the Public Sector. Even at that time as it is now, the production capacity of Ferro Alloys which existed was much more than the demand of indigenous steel Industry mainly because the Steel Industry did not expand upto the planned target. However, this symposium presented an opportunity for all the producers and users of Ferro Alloys as well as the new interested parties in Ferro Alloys Industry to know about the technological status of Indian Ferro Alloys Industry Vs. the major producers in other countries. This created an atmosphere for increased activity in Ferro Alloys. This also gave the industry an opportunity to see the facilities available for R&D work which could be carried out in the mineral based Industries at NML; particularly, the low shaft furnace, pilot plant for beneficiation of minerals and pilot electric smelting furnace were noteworthy. Within a few years when FACOR wanted to embark on the production of

Ferro Chromium the pilot furnace of NML was utilised for proving the suitability of Indian Chrome Ores, cokes and coals for achieving a product of standard specifications. I think about 100 tonnes of Ferro-Chromium were produced over a period of about two weeks trial smelting utilising Low Phos. Giridhi coke which was the only low phos. coke source at that time in India and Low Phos. non coking coal. Dr. B. R. Nijhavan the Director of N.M.L. and Mr. P. P. Bhatnagar, the Asst Director, Incharge of Extractive Metallurgy Division, took personal interest in assisting and carrying out this experimental production to achieve the desired results. This gave FACOR the confidence of going ahead with Industrial scale production of Ferro-Chromium based on totally indigenous raw materials and the product was made available to Indian Steel Industry in 1968.

At that time, the pronounced policy of the nation was "BE INDIAN AND BUY INDIAN". The stress was on self-sufficiency and as far as possible to install totally indigenous equipment and for utilisation of indigenous raw materials only for every industrial product.

The Social, Political and Economic conditions prevailing in our country immediately after achieving independence made it necessary for the policy makers to follow the path of Self reliance. The limited resources with Private Sector made it imperative that all heavy industry and infrastructure be developed by Public Sector. The country lacked the capital required and dependence on any foreign country for resources directly to be invested in Private Sector was not considered healthy in the national interest. At that time, beginning was made with three integrated steel works in the country, two in the private sector i.e., TISCO and IISCO and one in public sector i.e., Mysore Iron & Steel Works Limited (MISL), Bhadravati. MISL was also a producer of Ferro Alloys, particularly, Ferro Silicon. If we take a look at the Industrial Policy of our Government, during the last five decades, we will be convinced that the decisions at every stage were very pragmatic and in keeping with the prevailing Social, Economic and Political conditions. I will illustrate this with the help of slides.

Slide No. 1 : Industrial Policy of 1948

The policy envisaged a mixed economy for India resting with the Government the right and responsibility for planned development of Industries and their regulations in the National Interest. It has two components :

- a. The Philosophy of a good Society to shape industrial growth.
- b. The implementation which gives concrete shape to the philosophy of the policy.

The motivating philosophy behind market regulation and Government itself undertaking the task of entrepreneurship is that a mixed economy, gives the best control in a free market society and accelerates socialism, while avoiding the evils of both communism and Capitalism.

The second component of Industrial policy includes features such as principles, procedures, rules and regulations, which are initiated to control and regulate industrial undertaking both large scale and small scale.

The division of Industries is made as :

- | | |
|----------------|--------------------------|
| i. Public | ii. Private |
| iii. Joint and | iv. Co-operative Sectors |

The Industrial Policy of 1948 broadly indicated the Government's attitude and approach towards the process of Industrial development and laying the foundations of a mixed economy.

- a. The policy indicated the need for an important role of Cottage and Small Scale Industries.
- b. To achieve fair labour conditions for harmonious relations between management and labour.
- c. For securing the participation of foreign capital and private enterprise to a limited extent.

However, the foreign participation has been regulated in the National interest. The resolution made it clear that as a rule, the major interest in ownership and effective control should always be in Indian hands. Importantly, the Government insisted upon the progressive Indianisation of foreign concerns. (Caltex became HPCL).

Slide No. 2 : Industrial Policy Resolution 1956

The Policy mainly aimed towards the rapid industrialisation and thrust on heavy industries, envisaged an outlay of Rs. 890 Crore for Industrial Development and Mining. The important provisions of the resolution were

1. New Classification of Industries :

Schedule A : Those which were to put as an exclusive responsibility of the state.

Schedule B : Those which were to be progressively state owned and in which the State would generally set up new enterprise but in which private enterprise would be expected only to supplement the effort of the State.

Schedule C : All the remaining Industries where Private Sector can fully participate.

2. Fair and non-discriminating treatment for the private Sector. The infrastructure like Transport and other services shall be made available at par with state owned services to the private industries and non-discriminatory treatment for both of them.
3. Encouragement to village and Small Scale Enterprises.
4. Special incentives like differential taxation, subsidies etc., are provided to encourage the Small Scale Producers.
5. Removing regional dis-parties.
6. The Need for the Provision of Amenities for Labour :
Living and working conditions of workers should be improved.
There should be joint consultation with workers and Technicians wherever possible, assist progressively.
7. The foreign capital investment is restricted as per industrial policy resolution of 1948. The policy brought an excellent synchronisation between Government's Industrial policy and the Industrial Programmes included in the Second Five Year Plan.

Slide No. 3 : Industrial policy of 1973

The 1973 policy resolution encouraged private sector participation and at the same time controlled the monopoly of the larger industrial houses. The policy permitted with programmes of progressive nationalisation and expansion of the public sector.

Following are the resolutions :

1. The industrial policy of 1956 will continue to provide the base for the Policy of 1973.
2. The State industrial sector will cover a wider field to promote growth with the social justice and self reliance and satisfaction of basic minimum needs.
3. The policy will have a lead flexibility which has to facilitate the priorities on production objectives in the 5th Five year Plan.

4. The larger industrial houses having assets greater than Rs. 100 crore have to get prior approval for any additional industrial licencing from the Government.
5. The Core Industries, and export oriented industries will fall under basic, critical and strategic Industries "Important" for the growth of the economy.
6. Large houses are eligible to participate only in Industries which are not reserved for the public sector.
7. Foreign concerns are also eligible to participate in such industries which are not reserved for the public sector.
8. The existing policy of reservation for the small scale sector is to be continued.
9. The Joint Sector will not be permitted to be used for the entry of larger houses, dominant undertakings and foreign Companies.
10. In Joint sector the Goernment will apply an effective role in guiding policies, management and operations.

Slide No. 4 : Industrial Policy of 1977

This policy directed mainly for faster economic development within a time bound programme to achieve.

- a. The rate of growth of national income from 3.5% to 7.5% per annum.
- b. A rapid increase in the rate of growth of Industrial Production.
- c. Creating much more employment opportunities and
- d. Reducing wide regional dis-parities and imbalances.

The Salient Features Are

- a. Development of small scale sector
 - b. Protecting the interest of cottage and house-hold industries.
 - c. Promotion of "Khadi" and Village industries
 - d. Development of appropriate Technology to the country's Social and Economic Conditions.
 - e. Role of Large Scale Industries was to be related in setting up infrastructural facilities.
- i) Capital goods industries for meeting the machinery requirement.
 - ii) High Technology Industries related to agriculture and Small Scale Industries, like Fertilisers, Petro Chemicals etc.,
 - iii) Other Industries such as machine tools, Organic and Inorganic Chemicals.

- f. Expanding the role of public sector with a responsibility to encourage ancillary industries.
- g. Foreign investment restricted to 40% in equity.
- h. Takeover of sick units on selective basis.
- i. Restricting family control of industry by encouraging workers participation in the equity of Industrial Units.

Slide No. 5 : Industrial Policy of 1980

The new Industrial Policy announced by government in July, 1980 included major relaxations and concessions benefiting the small, medium as well as large scale sector with the triple object of modernisation, expansion and development of backward areas. The Government permitted the automatic expansion of large scale units in the priority sector, regularise the excess capacity and setting up of several nuclear Industrial Centers in industrially backward areas. The policy re-affirmed its faith in MRTP act and the foreign exchange regulation act.

The main features were

0.1 Socio Economic Objectives

- a. Optimum utilisation of the installed capacity.
 - b. Maximum Production and achieve higher productivity.
 - c. Higher employment generation.
 - d. Correction of regional imbalances.
 - e. Strengthening the agricultural basis.
 - f. Faster promotion of export oriented and import substitution industries.
02. Revival of economic infrastructure by providing the industrial inputs like energy, transport and coal.

03. Revamping of The Public Sector

Public Sector is called as "People Sector". The Policy envisaged the development of managerial cadres in functional fields such as operations, finance, marketing and information systems.

04. Role of Private Sector

The Private Sector has to grow in consonance with targets and objectives of national plans and policies.

05. Economic Federalism

To set up a few nucleus plants in each district identified as industrially backward to generate small, ancillary and cottage units.

06. The permissible levels of capital investment in small scale sector and ancillary unit was raised to Rs. 35 lacs and 45 lacs respectively. The small scale sector was assisted by extending Financial & Marketing support.
07. Correcting Regional imbalances.
08. Generation of employment and higher production.
09. Liberalisation of existing/licenced capacities.
10. Provision for automatic growth of the existing capacities by 25% at the rate of 5% per annum during 5 years period.
11. Streamlining the licencing procedures which have been simplified and rationalised.
12. To encourage export oriented units, MRTP/FERA companies were also permitted to go for 100% EOUs.
13. Permitting larger capacities by expansion or by New Projects to be economically viable.
14. Encouragement of Research and Development.
15. Transfer of Technology by simplifying permissions.
16. Modernisation packages towards optimum utilisation of energy or the exploitation of alternative sources of energy by extending finance on concessional terms.
17. The monitoring system and data bank towards monitoring are the implementation of the scheme through the system of data bank.
18. Evaluation of incentives.
19. Divising an early warning system to bring into line is the industrial sickness.
20. Industrial relations by envisaging the revival of the tri-party labour conference, to achieve higher standards of productivity and industrial harmony. The new Policy allowed to open 5 more core sector industries to large houses and "FERA"

Companies and allowed the industry to enhanced capacity by 33.33%.

21. The policy has been liberalised for non-resident Indians for investment in any companies.

However, the cumulative effects after pursuing the above policies not found to be satisfactory. The country came under heavy foreign debt, the productivity in the Industry was extremely low, the technological strides made by the other countries can not be kept pace. It was realised that political independence without economic independence is inadequate. Hence, there was no other alternative except to liberalise controls and amend the policies. Bring down the import duty tariffs and promote foreign capital to be brought into the country for industrial and infrastructural development. So the New Industrial policy 1991 was announced.

Slide No. 6 : New Industrial Policy of 1991

The major objectives of the new Industrial Policy

01. To correct the distortions or weaknesses that might have crept in during earlier policy.
02. To maintain a justified growth and productivity and employment.
03. To attain International Competitiveness.
04. To preserve the environment and ensure efficient use of available resources.
05. All sectors of Industries Small, Medium, Large, Public, Private, Co-operative etc., are allowed to grow and improve on their past performance. To achieve the above objectives, Government liberalised the policies with respect to
 - a. Industrial Licencing
 - b. Foreign Investment
 - c. Foreign Technology Agreements
 - d. Public Sector Policy
 - e. MRTP act.

Industrial Licencing Policy

The Government role changed from that of exercising control to providing help and guidance by eliminating delays. Industrial licencing has been abolished to all

industries except for 8 categories of the Industries reserved for Government like Defence, Security, Hazardous Chemicals, Coal, Petroleum, Sugar etc. For the rest of the Industries, there is no need to go for obtaining industrial licence except to file information and a memorandum on new projects and substantial expansions.

Foreign Investment

In order to have access to high technology and to the world's largest manufacturing marketing firms, the Government has permitted for direct foreign investment upto 51% of the equity. The foreign companies are allowed to have for even 100% equity in Power Projects. This has permitted the multi-National companies to invest in India on a large scale.

Foreign Technology Agreements

Government approves automatically for technology agreements related to high priority industries within the specified parameters. Indian Companies are free to exchange the terms of technology transfer with the foreign counter parts according to their own commercial judgment. The hiring of foreign counter parts will be according to their own commercial judgment. The hiring of foreign technicians and foreign testing of indigenously developed technologies will also not require prior clearances.

Public Sector Policy

The priority areas for growth of public sector will be in

- i) Essential infrastructure goods and services
- ii) Exploration of oil and mineral resources
- iii) Defence equipment
- iv) Competition will be induced in public sectors by extending more powers to executives take independent decisions; to compete with other similar industries locally and abroad.

MRTP/FERA Act

- i) The MRTP Act was amended, totally removing the pre-entry registrations on establishment of new undertakings and expectations.
- ii) The act shall apply to all Government undertakings, and financial institutions also.

- iii) The acquisition and transfer of shares of earlier MRTP undertaking was dispensed with, i.e., one can freely acquire/transfer the shares. FERA companies have been permitted to use their trade mark.
- 06. NRI's coming to India have been exempted from declaring their foreign currency accounts to RBI.
- 07. Exporters of JEMS and Jewellery need not approach RBI for permission for export by airfreight.

Slide No. 7 : Trade Policy

International trade is driving force of the economic activity today. It not only helps in exchange of goods and services but also helps inter-dependent global network of Technology, investment and production. No country can ignore these developments which pose both opportunities and challenges. The Government enhanced various liberal policies.

- 0.1 REP licences have been replaced by a new instrument named Exim Scrips i.e., exporters are allowed to import 30% of FOB value of their exports.
- 02. Exim Scrips issued to exporters are used to import any item in the limited permissible list with the introduction of Exim Scrips. The system is issuing supplementary licenses for raw-materials, components and spares being dispensed with.
- 03. The system of advance important licence designed to provide exporters with duty free access to the inputs they need to purchase competitively for world market. The procedures and documentations were significantly simplified. 100% Export Oriented Units and

Export Processing zones permitted to import duty free. The duty exemptions enjoyed by EPZ/EOU are also extend to DTA. The import duties have reduced on purchasing imports, raw-materials, spare parts etc., in phased manner. The procedures for import of capital goods has been simplified and clearances are obtained in less than 45 days. A new concept of export houses, trading houses, star Trading houses has been defined with respect to their export values and each category has been given more facilities. The input and output norms have been finalised for more than 3500 items. Third party exports are now permitted. Thus, the Government of India, have liberalised the industrial licencing policy, import export policy, Fera Policies, Trade Policy, corporate legislation, financial and physical sector etc.,

to facilitate the process of globalisation of Indian industry and thereby help in building a modern, vibrant, prosperous and forward looking India.

This was a sudden shock to industry that had lived for a long time in a protected market under a closed economy and used to working with restrictions for utilisation of indigenous inputs only. It was like a caterpillar coming out of the cocoon and suddenly being given wings to fly! There has been a drastic change in the industrial environment due to pressures of intense competition in the domestic market as well as in the International markets. In bulk Ferro alloys, the supply has always been in excess of the demand. So the industry has to take all possible steps to keep the costs down, to modernise and update the process technology to be able to compete globally.

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Table - 1: Status of Ferro Alloys Industry by the Mid Sixties

Sl. No.	Name of the Plant	Furnace No.	Capacity In MVA	Year of Start-Up	Type of Furnace
1.	VISL	1	1.5	1950	SAEF OS
		2	1.5	1950	SAEF OS
		3	9.0	1950	SAEF OR
		4	12.0	1962	SAEF OR
		5	12.0	1962	SAEF OR
2.	DANDELI	1	4.6	1956	SAEF OR
3.	FACOR(FAW)	1	7.5	1957	SAEF CR
		2	7.5	1958	SAEF CR
		3	7.5	1962	SAEF OR
4.	TISCO	1	9.0	1958	SAEF CR
		2	9.0	1958	SAEF CR
5.	JEYSUCO	1	3.6	1958	SAEF CR
		2	7.5	1959	SAEF CR
6.	UFA	1	9.0	1959	SAEF CR
		2	9.0	1963	SAEF CR
7.	KHANDELWAL	1	9.0	1961	SAEF CR
		2	9.0	1962	SAEF CR
Total		18	129.4		

Note : SAEF : Submerged Arc Electric Furnace OR : Open Rotating
 OS : Open Stationary CR : Closed Rotating

Slide No. 9*Table 2 : Details of Capacity Additions Between Late Sixties and Seventies*

Sl. No.	Name of the Plant	Furnace No.	Capacity In MVA	Year of Start-Up	Type of Furnace
1.	IMFA	1	10.0	1967	SAEF OR
		2	24.0	1974	SAEF OR
2.	FACOR(FAW)	4	12.0	1968	SAEF OR
		5	8.0	1968	SAEF ORTR
3.	SMIORE	1	15.0	1968	SAEF OS
		2	20.0	1977	OAEF OR
4.	IDCOL	1	9.0	1969	SAEF OR
		2	6.5	1970	SAEF ORT
5.	DANDELI	2	1.2	1969	CIF
		3	2.5	1969	EAF
		1	33.0	1977	SAEF CS
7.	TISCO	3	4.0	1972	EAF
8.	NAVFAL	1	16.5	1975	SAEF OR
		2	16.5	1979	SAEF OR

Note : SAEF : Submerged Arc Electric Furnace,

EAF : Electric Arc Furnace

OAEF : Open Arc Electric Furnace,

CS : Closed Stationary

ORTR : Open Rotating Travelling,

CIF : Channel Induction Furnace

ORT : Open Rotating Titrating

Slide 10*Table 3 : Brief Details of Capacity Additions During Eighties*

Sl. No.	Name of the Plant	Furnace No.	Capacity In MVA	Year of Start-Up	Type of Furnace
1.	SMIORE	1	20.0	1980	SAEF OR
2.	MEL	1	33.0	1981	SAEF CS
3.	FACOR (FAW)	1	16.0	1981	SAEF OS
4.	IMFA	1	39.0	1983	SAEF OR
5.	NAVFAL	1	16.5	1983	SAEF OR
6.	VBC	1	16.5	1984	SAEF SCS
7.	FACOR (CCP)	1	45.0	1984	SAEF CS
8.	OMCAL	1	30.0	1986	SAEF OR
9.	IAL	1	10.5	1986	SAEF OS
10.	ICCL	1	48.0	1989	SAEF OS
11.	UFA	1	4.0		EAF
12.	UNIFERRO	2	16.5		SAEF CR
		2	16.5		SAEF CR
TOTAL		28	313.5		

Notes : SCS : Semi Closed Stationary

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Table - 4: Ferro Alloys – Installed Capacity

Sl. No.	Installed Capacity	Transformer Rating MVP	Product Range	
1.	DANDELI Steel & Ferro Alloys	15000	5.8(2)	FeMn, SiMn
2.	Ferro Alloys Corporation Ltd., Shreeram Nagar, A.P.	72000	58.50(6)	FeCr, FeMn, SiCr FeSi
3.	Ferro Alloys Corporation Ltd., Orissa (100% EOU)	50000	45.0(1)	Charge Chrome
4.	Jeypore Sugar Co., Orissa	24000	11.10(2)	FeMn, SiMn
5.	Khandelwal Ferro Alloys, Nagpur	53750	18.00(2)	FeMn
6.	Maharashtra Electro Ltd., Maharashtra	100000	66.00(2)	FeMn, SiMn
7.	Sandur Manganese Ltd.,	60000	55.00(3)	FeMn, SiMn, FeSi
8.	TISCO – Orissa	30000	22.00(3)	FeMn, FeCr
9.	Universal Ferro & Allied Chemicals Ltd., Maharashtra	85000	21.50(3)	FeMn, SiMn
10.	Ispat Alloys Ltd., Orissa	54000	42.00(3)	FeCr, FeSi, SiMn
11.	Nava Bharat Ferro Alloys, A.P.	36000	49.50(3)	SiMn, FeSi, FeCr
12.	VISL, Karnataka	23800	40.00(5)	Fe-Si, HCFeCr, LCFeCr, SiCr
13.	Indian Metals & Ferro Alloys, Orissa	20000	82.00(3)	FeSi, Si Metal
14.	Indian Metals & Ferro Alloys, Orissa	45000	82.00(3)	FeSi, Charge chrome(100% EOU)
15.	Indian Charge Chrome Ltd.,(100% EOU)	50000	48.00(1)	Charge Chrome
16.	Travan Core Electro Chemical Industries Ltd., Kerala	10000	NA	FeSi
17.	VBC Ferro Alloys, A.P.	30000	33.0(2)	FeSi, FeCr
18.	Ferro Chrome Plant (IDCOL), Orissa	25000	15.50(2)	FeCr, SiCr
19.	JINDAL Ferro Alloys Ltd., A.P.	15000	17.0(2)	FeCr
20.	Monnet Ferro Alloys Ltd., Raipur	15000	7.5(1)	FeCr
21.	TISCO (OMC Alloys) Orissa (100% EOU)	50000	30.9(1)	Charge Chrome HCFeCr
22.	Kartik Ferro Alloy, M.P.	15000	7.5(1)	FeMn
23.	Birla Jute Industries Ltd, W.B.	10000	5.0(1)	FeMn
24.	Triveni Heat Treatment, U.P.	15000	NA	FeCr
25.	Standard Chrome & Allied Products Ltd., M.P.	30000	1615(3)	FeCr
26.	Raghuvir Ferro Alloys, M.P.	9000	7.5(1)	FeCr
Total		943050	703.9	

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The present capacity of Ferro alloys in India

High Carbon Ferro Chromium	234,000
Charge Chrome	200,000
Manganese Alloys	600,000
Silico Alloys	110,000
Total	11,44,000

Table - 5 : Capacity of Small Scale Units

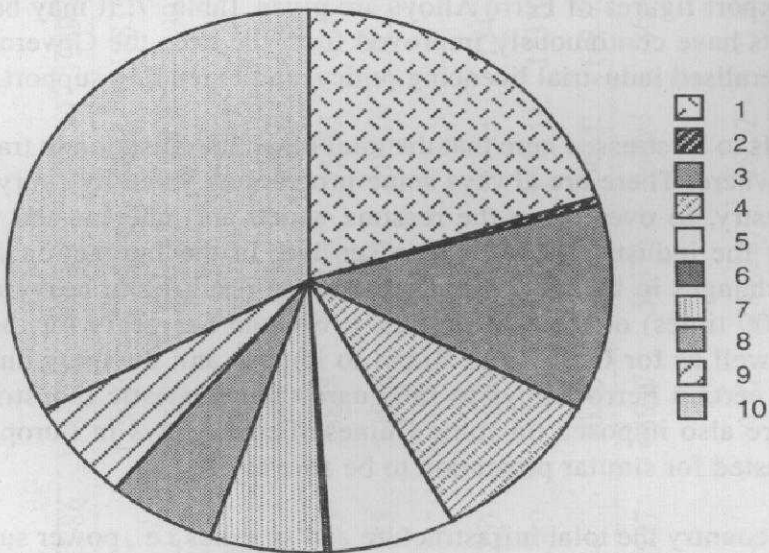
Sl. No.	Name of the Plant	Installed Capacity	Transformer Rating	Product MVP Range
1.	HIRA Ferro Alloys, M.P.	10000	5.0(2)	FeCr
2.	Srinivasa Ferro Alloys, M.P. Sri Girija Smelters, M.P.	21500	10.8(3)	FeMn, FeCr
3.	Andhra Ferro Alloys, A.P.	7200	3.6(1)	FeMn, FeCr
4.	Aloke Ferro Alloys, M.P.	10000	5.0(1)	FeMn
5.	Balaji Electro Chemical Ltd., M.P.	7200	3.6(1)	FeMn
6.	Crescent Alloys(P) Ltd., M.P.	5000	2.5(1)	FeMn
7.	Jain Carbide Chemicals Ltd., M.P.	17000	8.5(3)	FeMn
8.	Standard Ispat, M.P.	6000	3.0(1)	FeMn
9.	Shree Ganesh Ferro Alloys(P) Ltd.	8000	4.0(1)	FeMn
10.	Standard Ferro Alloy, M.P.	15000	7.5(1)	FeMn, FeSi
11.	Jalan Ispat Confings, M.P.	8750	7.5(1)	SiMn
12.	Nav Chrome Ltd., M.P.	7575	6.5(1)	SiMn
13.	Nav Chrome Ltd., M.P.	15000	7.5(1)	FeMn
14.	Quartz Steel & Forging Ltd., M.P.	4200	3.6(1)	SiMn
15.	Silical Electro Thermic, Pondichery	5210	4.5(1)	SiMn
16.	Silical Electro Thermic, Pondichery	9600	12.0(1)	FeSi
17.	Deepak Ferro Alloys, M.P.	6000	4.0(1)	FeCr
18.	Gmr Vasavi Industries Ltd., A.P.	20000	6.0(1)	FeCr
19.	Mandesaur Ferro Alloys, M.P.	6000	7.5(1)	FeCr
			4.0(1)	FeCr
20.	Indsil Electro Smelt, Kerala	8500	12.0(1)	FeSi
21.	Balaji Ferro Alloys, A.P.	3600	3.6	FeSi, FeCr
	Total	2,01,350	132.2	

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Thus total Ferro alloy production capacity in India is approximately 1.144 million tonnes against world capacity of 19.405 million tonnes i.e. about 5.9%. Presently India is the sixth largest producer of Ferro Alloys in the world (Fig. 1).

The demand for Ferro Alloys is directly linked with growth of iron and steel industry. Earlier, with the protection of the industry by Government, the Ferro alloy installed capacity was planned to be sufficient to meet the indigenous demand of the steel producers. However, with the gradual change in the industrial licencing policy from the protected market to the global competition the total scenario in the Ferro alloy production has changed dramatically and they are compelled to meet the requirements of the world iron and steel producers. As already, enunciated, the Ferro alloy industrial capacity has markedly increased than to the demand of the Indian market yet making the Ferro alloy producers to export at international prices which are too low compared to high cost of production in our country.

Fig. 1 : World Production Capacity of Bulk Ferro Alloys (Units '000 Tonnes)



USSR	U.S.A.	S.A.	CHINA	NORWAY	KOREA	JAPAN	BRAZIL	INDIA	OTHERS	TOTAL
1	2	3	4	5	6	7	8	9	10	11
3896	115	2375	1837	1320	68	1168	1122	1144	6360	19405

The Process

The production of Ferro Alloys containing Chromium, Manganese, Silicon is done in Three phase sub merged arc electric furnaces. Oxides from respective ores of Manganese, chrome or Silicon are smelted with carbon from coke, coal, char and in some cases wood chips as reductant and fluxes like limestone, dolomite, quartz, bauxite and magnasite are used to fix the slag to the desired composition. The sub-merged arc furnaces kept in continuous operation with the raw materials being continuously fed and tapped at regular intervals through tap holes, at the bottom of the furnaces. The tapped alloy and slag are separated by de-canting process or by adopting gravity using skimmer blocks. The metal is collected or cast into cast iron pans. After solidification, the same is crushed, sized, screened and later packed duly in drums or bags with chemical assay to make it ready for despatch.

Slide No 14 : The production of Ferro Alloy in the last decade is given in the Table 6.

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The export figures of Ferro Alloys are given Table 7. It may be noted that the exports have continuously improved from the time the Government introduced liberalised industrial licencing policy, and extending support.

It needs to be stressed here that the total ideal liberalisation in trade does not exist anywhere. There are always some protections given by every country to their industry, to over come the reasons which are inherent and beyond the control of the industry, to be able to survive. In the International scene, the political changes in USSR and Eastern Europe resulting in heavy devaluation (about 6000 times) of their currencies, it became necessary for the European Union as well as for U.S.A. and Brazil to impose anti dumping duties against import of certain Ferro Alloys to safeguard their domestic industries. Similar tariffs were also imposed on some Chinese Ferro Alloys in Europe. We have also requested for similar protection to be able to exist.

In our country the total infrastructure and supplies i.e., power supply, transport and communications, oil supply, coal and coke supply, ores supply (since the major part of the mining activity of metallic-Ferrous ores is done by Public Sector) are in the hands of the Government. So the Ferro Alloys Industry is dependent for almost 80% of the total inputs on supplies from public sector and have no control on cost of these inputs. These costs are much higher compared

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Ferro Alloys Production - India

Year	(Units: Tonnes)										
	1985-86	1986-87	1987-88	1988-89	1989-90	1991-92	1991-92	1992-93	1993-94	1994-95	
HCFeMn	-	179910	173259	138381	188338	221136	231399	222707	136478	161768	
SiMn	-	24782	37504	52895	33992	65569	74514	100672	83378	142306	
Total	-	204692	210763	191181	222330	286705	305913	323379	219856	304074	
%Change	-	-	+2.97	(9.29)	+16.29	+28.95	+7.0	+5.71	(32.01)	+38.30	
HCFeCr	18603	25888	24763	43085	42405	90880	121413	132054	138724	239677	
Charge	37535	50650	60103	101516	77220	79205	96694	117467	112966	-	
Chrome											
LCFeCr	12251	12680	12922	8143	13478	8426	11370	6626	6163	5011	
Total	68389	89218	97788	152744	133103	178511	229477	256147	257853	244688	
%Change	-	30.46	(9.61)	56.20	(12.85)	34.11	+28.55	11.62	+0.7	(5.10)	
FeSi &	53527	63947	50376	64493	78636	91615	74772	86993	80172	92043	
Si Metal											
% Change	-	19.47	(21.22)	28.02	21.93	14.17	(18.38)	16.34	7.84	14.80	

Note : SiCr PRODUCED WAS MAINLY FOR INTERNAL CONSUMPTION IN PRODUCTION OF LCFeCr AND HENCE PRODUCTION WAS NOT FURNISHED.
REF : IFAPA, ERU Report, US BUREAU OF MINES APRIL-1992.

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Ferro Alloys Export - India

Year	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86
HCFeMn	31,903	35,870	29,928	-	18,631	3,536	4,118	7,500	6,000
SiMn	-	-	-	-	-	-	-	2,023	-
Total	31,903	35,870	29,928	-	18,631	3,536	4,118	9,523	6,000
HCFeCr	10,097	7,275	6,814	-	12,201	7,539	3,982	3,945	-
Charge Chrome	-	-	-	-	-	-	-	-	36,873
Total	10,097	7,275	6,814	-	12,201	7,539	3,982	-	36,873
Fe-Si	6,424	9,560	7,594	-	2,999	2,000	-	-	-
Year	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-9
HCFeMn	-	1,575	3,300	8,231	13,544	14,973	8,315	-	-
SiMn	-	-	7,400	7,638	-	4,368	10,967	-	-
Total	-	1,575	10,700	15,869	13,544	19,341	19,282	40,081	56,625
HCFeCr	-	-	10,538	2,454	3,630	16,968	22,575	-	-
Charge Chrome	44,417	60,475	96,827	72,792	68,426	88,625	96,295	-	-
Total	44,417	60,475	107,365	75,246	72,056	105,593	127,031	128,762	117,072
Fe-Si	-	-	1,842	-	1,469	-	-	-	96

REF.: IFAPA, ERU REPORT - 1994

to the cost of similar inputs borne by producers in other countries. For Example, the Power Costs are 4-5 times higher than the Power Costs abroad. Hence, with such high input costs, the industry can not survive to compete in the global market. The Government has to gear its policies to assist the industry at least for export production. It is important not only to maintain but to increase the Exports. As per the EXIM Policy, several inputs like Low Phos. coal, and coke furnace oil for captive power generation, high grade limestone and some portion of the ores can be imported duty free against the exports after satisfying the prescribed value addition of 1.35 times to keep the costs down and to be able to produce the product according to International Specifications. All such measures have assisted the Industry and the Government has to come forward to provide such safe guards despite the ideology of total liberalisation.

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But the industry has to put its main thrust towards modernisation and re-engineering of existing facilities considering application of areas for energy conservation since power tariff in India is 4-6 times higher than in other countries Table 8.

The energy conservation measures can be adopted right from raw-materials selection to disposition of finished products (Fig. 2)

The flow sheet had been developed with the vast experiences available at FACOR R&D and can be taken as a cue to adopt by the Ferro Alloy Industry.

The continuous Research & Development in the process & Products, Energy Conservation, utilisation of by-products, pollution control etc., is a must to compete in the global market.

The R&D can be directed in the following areas :

01. Implementation of closed furnaces for recovery of potential and sensible heats in off gas.
02. Reduction of slag rate saves 60-70 units of power per Ton of product.
03. Utilisation of tapped molten Ferro Alloy directly in steel making to conserve about 10-15% heat equivalent to electrical energy input in steel making.
04. Application of computer control system for process control and raw-material handling systems which helps to bring down 5-10% of specific energy consumption.
05. Alterations in furnace design and electrical parameters which help to save

Table - 8 : Power Tariff In India And Other Countries

INDIA		PAISE PER K.W.
Andhara Pradesh		270
Karnataka		366
Maharashtra		331
Madhyapradesh		325
Orissa		288
Tamil Nadu		240
Kerala		145
West Bengal		160
OTHER COUNTRIES	USE CENTS/K.W.	PAISE
BRAZIL	2.3	77
NORWAY	1.0	33
POLAND	1.9	64
SWEDEN	2.9	97
FRANCE	2.5	84
SOUTH AFRICA	2.2	74
ZIMBABWE	1.8	60

It is evident that Power Tariff in India is 4-6 times higher than in other countries.

the electrical losses in the system and reduces the specific power consumption.

06. Agglomeration of ore fines to optimally utilise the ores.
07. De-phosphorisation of ores and alloys permit usedas reducing agents to pent high phos coke available in India.
08. Utilisation of Plasma smelting for direct feed in form of fines of ores and reducers.
09. Refining of Ferro Alloys outside the furnace.
10. Development of new Ferro alloys.
11. Process development like
 - a. Open bath slag operation utilising preheated or prerduced fines.
 - b. Smelting reduction in fluidised bed operation to promote use of cheaper energy sources other than electricity.
12. To find out cheaper sources of power generation for captive use like solar energy, wind energy, hydel energy or captive power plants based on DG sets/gas turbines/Thermal power stations.
13. To set up in-house R&D (i) units to take up development in processes for

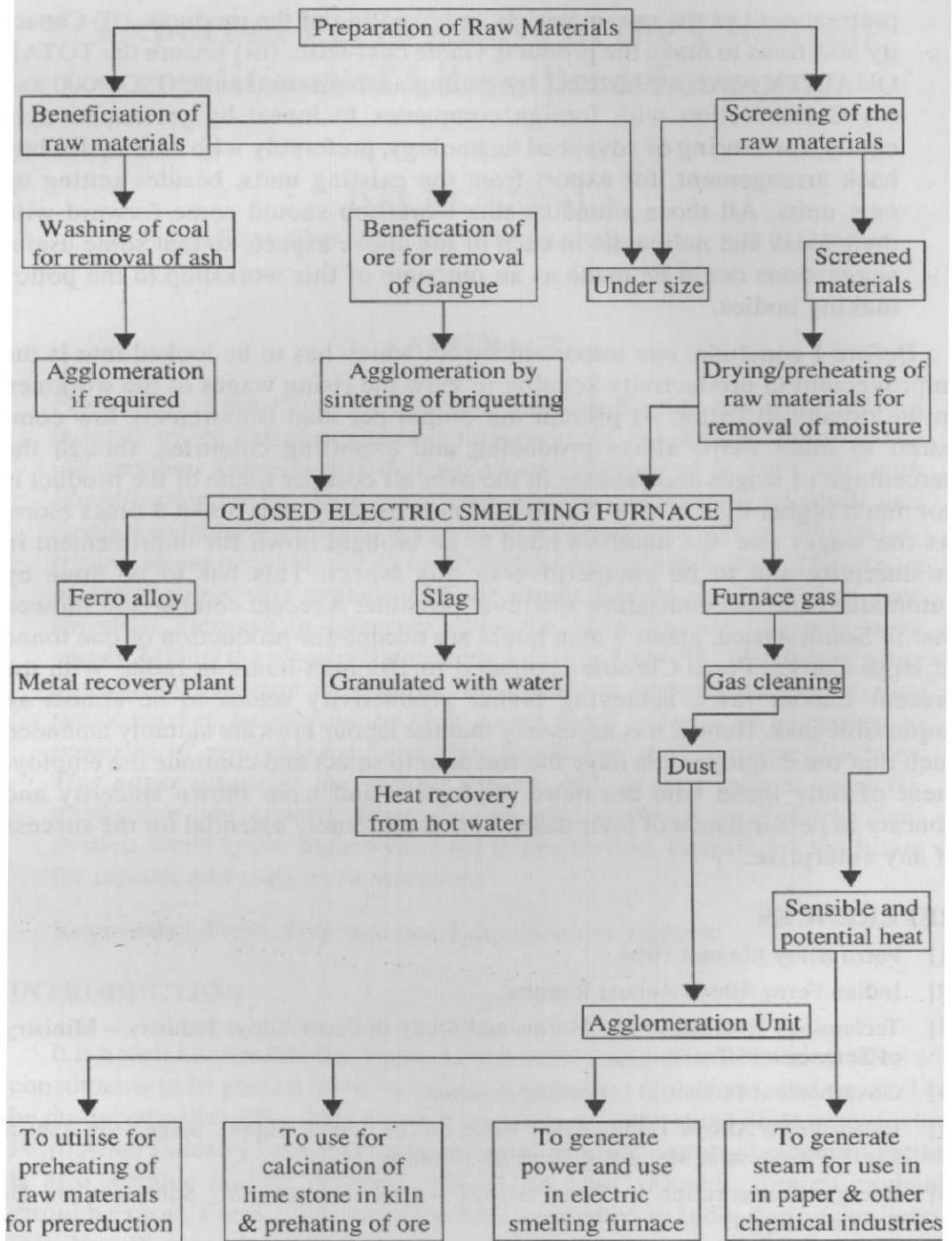


Fig. 2 : Areas for energy conservation in production of ferro alloys.

pretreatment of the raw-materials and handling of the products, (ii) Capacity additions to make the products viable cost-wise, (iii) Ensure the TOTAL QUALITY MANAGEMENT by getting accreditation under ISO 9000 and (v) Collaboration with foreign companies to invest by participation in equity, for sharing of advanced technology, preferably with a tie-up for buy back arrangement, for export from the existing units, besides setting up new units. All those attending this workshop should come forward with their ideas and deliberate in each of the above aspects so that some useful suggestions could be made as an outcome of this workshop to the policy making bodies.

Before I conclude, one important aspect which has to be looked into is the improvement in productivity keeping in view the rising wages of the workmen in the organised sector. At present our output per man is extremely low compared to other Ferro alloys producing and exporting countries, though the percentage of wages and salaries in the over all cost per tonne of the product is not much higher than others. Number of men used by us is about 5 times more. As the wages rise, the numbers need to be brought down for improvement in productivity and to be competitive in this aspect. This has to be done by automation and mechanisation wherever possible. A recent comparison showed that in South Africa, about 9 man hours are needed for production of one tonne of High Carbon Ferro Chrome compared to 105 man-hours in India. With the present Labour laws, achieving higher productivity seems to be almost an impossible task. Hence, it is necessary that the labour laws are suitably amended such that the employer can have the freedom to select and continue the employment of only those who are more productive and have shown sincerity and honesty in performance of their tasks. This is extremely essential for the success of any enterprise.

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