

The Present Situation and Future Prospects of Ferroalloy Industry in China

Wu Jianmin

Chairman, China Ferroalloys Industry Association
President, Jilin Ferroalloys Corp., China

ABSTRACT

In this paper on Chinese ferroalloy industry, both achievements during past decades and problems it has to face today are elaborated. Future trend of development which will link China more closely with the world is also discussed.

Introduction

In China, iron and steel industry is one of the basic industries in the development of national economy, and ferroalloy industry is an indispensable part of iron and steel industry. At present, the annual output of iron and steel reaches over 100 million tons, various grades of steel products basically meeting the demands of the domestic market. Ferroalloy production has played an important role in this respect. However, just as our colleagues all over the world, we are now facing the challenges from resources, energy, environment and market. On the eve of striding across the threshold of the coming 21st century it is necessary to review the course of development of the ferroalloy industry in

China and to have an outlook and consideration of the future of Chinese ferroalloy industry and the cooperation with our colleagues in the world.

1. Development of ferroalloy industry

Ferroalloy industry in China is developing with iron and steel industry. Especially since 1979 the total number of ferroalloy plants has reached over a thousand as a result of the appearance of many medium and small local plants in the provinces and regions having advantages of energy, raw materials and labour force. Currently the total capacity of production reaches around 5 million tons.

The annual output soared to nearly 2.46 million tons in 1990. During the decade of eighties, the annual rate of progressive increment is 9.48%, exceeding that of steel in the same period, i.e., 5.98%.

A comparison of crude steel output and ferroalloy output in some representative years from 1949 to 1990 is listed in the following table 1:

Table 1 Annual output of steel and ferroalloy in some representative years

Year	Steel output (10000 tons)	Ferroalloy output (10000 tons)
1949	15.80	0.05
1960	1866.00	41.95
1970	1779.00	54.44
1980	3712.09	99.40
1990	6634.86	245.96

Concurrently with the growth of output, the ferroalloy products are steadily improving in qualities and expanding in varieties. There are now

products with specifications conforming to the standards of ISO, the State, the Ministry and the enterprise as well as products specially made to

order, totalling around 60 varieties and 300 grades and brands and covering almost all of the usable chemical elements. It is remarkable for a single country to have such a complete range of products. The development of the production of ferroalloys ahead of steel in China led to the situation that ferroalloy products were becoming more than self-sufficient. Since mid-eighties, the exportation of ferroalloys has been rising year by year, reaching 0.4488 million tons in 1990. Entering the nineties, the production and exportation of ferroalloys found themselves basically in a state of steady growth despite the fact that there were some rise and fall in the supply market both at home and abroad. Toward 1993, the annual output made a breakthrough of 3 million tons and after 1994 surpassed 4 million tons. The annual exportation also increased year by year, surpassing 0.62 million tons in 1992 and reaching more than 1 million tons in 1995.

Development of production and exportation has continuously heightened the status of our country in the domain of world ferroalloy industry. In terms of annual output of ferroalloys, China ranked the fourth and then the third during the mid-eighties and leaped to the leading position in the world during the nineties.

2. Progress in technology

The progress of ferroalloy technology has been made under the conditions of ore resources, energy sources and other specified economical and technical factors in China. In connection with the utilization of indigenous manganese ores and chrome ores characterized by leanness, sundryness and fineness and the blending of them with imported ores, the treatment of waste gases, water and slags from production processes, the preparation of various carbon reductants from coals, etc, a great deal of research work has been carried out and many significant results have been achieved. Many difficult problems regarding burden preparation, smelting practice, furnace structure and treatment of furnace gas, waste water and slag have been overcome in the production of high carbon ferromanganese in blast furnace. We have been constantly absorbing advanced experiences from

abroad, making innovations in production process and equipment, improving the qualities of products, lowering energy consumption and materials consumption and raising recoveries of metals. All these efforts were reflected in the remarkable results attained in the production of medium and low carbon ferromanganese, medium and low carbon ferrochromium, manganese metal, chromium metal, vanadium pentoxide and vanadium metal, etc. Long ago we had our own unique experience in the production of manganese metal by silico-thermic process. Based on our own resources of alloying elements and the requirements of markets both at home and abroad, we have developed ferroalloys of vanadium, titanium, tungsten, molybdenum, niobium and rare earths as well as various multi-type products such as composite de-oxidants, alloying agents, inoculants, powders and core wires.

Regarding production equipment, large-scale closed or semi-closed electric furnaces with capacities of 25000, 30000 and 50000 kVA have been installed in some key enterprises through designing and manufacturing by ourselves or introducing from abroad. Accessory equipment for the recovery and cleaning of furnace gases, briquetting and pelletizing of burdens, stoking of furnace, tapping, casting and crushing of alloys have also been installed. Through renovation and expansion, a large number of medium and small plants have also upgraded their furnaces and ancillary equipment. Success has been achieved in DC furnace smelting technology. Computer technology has found more and more applications.

Under the specific conditions of our country, both social and historical, the uprising of many medium and small ferroalloy plants in some years before have caused such problems as unstable qualities of products, high consumption and low productivity, environmental pollution, etc. Despite the fact that some of these plants have undergone renovation and made some improvement recently, it is difficult to have a radical change. Even in the case of large enterprises, the above-mentioned problems also exist in varying degrees. Therefore, taking the qualities of our ferroalloy industry as a whole, the scale and level of production technology are still lagging behind those of some advanced enterprises in other countries.

3. Optimization of production structure

With the transition of the economic system , the overall arrangement of production, structure of industry , mechanism of management have been undergoing constant optimization.

In view of the regional difference among the patterns of energy and ore resources, production of energy intensive ferrosilicon products are shifted to the northwest region where abundant power supply gains the upper hand. Production of manganese ferroalloys are transferred to the southwest region where rich reserves of manganese ore are located. Ferroalloys of vanadium, molybdenum, nickel, niobium and rare earths have already been produced in their origins of ore resources. All these measures reflect the optimized combination of the essential elements of production and the allocation of resources.

Following are some examples of optimization of organization of enterprises and mechanism of management. Some ferroalloy plants have liaised with power stations, mines, users and sales agencies. Some export-oriented plants of trans-regional and trans-departmental joint operation and management are also processing raw materials on clients' demand. Some specialized plants have streamlined the principal parts, removed the subsidiary parts and adjusted the product structure. In short, through many-sided restructuring , the system of ferroalloy production has basically become market-oriented, thereby invigorating the enterprise and improving the management, competitiveness and the ability to adapt to market. These changes marked the raising of the comprehensive qualities of ferroalloy industry in China.

Several years ago, the local plants took an active part in ferroalloy production leading to a swift and violent development of the whole industry. The economic system of China at that time was just undergoing transition; the market mechanism was still not perfect; macro-control was not yet competent ; the total production capacity was in excess of supply. Originally the key enterprises had been in a dominant position; yet they could not withstand the impact from these local medium and

small plants benefited from cheap power supply, low labour and management costs as well as flexibility in operation, thus confronting great difficulties in production and management. However, in recent years, the latter were also facing the difficulties to adapt themselves to the changing situation of market and the tendencies to be forced to shut down.

Since the enlarging of export during the mid-eighties, the extensive origins of production and the lack of effective control in exportation with the addition of suppressed-price purchasing of some intermediate agencies by taking advantage of our weakness caused competitive-price export and confusion among various places in the country and gave rise to anti-dumping abroad. These situations damaged seriously the selling price, the image and the reputation of our exported products. The authorities have worried about this matter long before and have been paying great attention to control measures and making great efforts for their perfection.

4. Prospects

From now on, the steady progress of iron and steel industry under the optimization of the structure of steel products and acceleration of the technological advance will again require relatively large usage of ferroalloys and will unceasingly put forward new demands. It is impossible to depend on large volume of imported ferroalloys. Basically, we should have our foothold on self-sufficiency. The tremendous demand on ferroalloys in the domestic and East Asian steel producing sites is a very favorable vast market for our ferroalloy industry. However, both opportunities and difficulties co-exist. We are not only facing the acute competition from international market, but also the serious challenge from our own situation.

Owing to the reform and adjustment of the price system in China, prices of coals, raw materials, transportation and power supply are incessantly on the rise, resulting in the escalation of production costs of ferroalloys. However, the sale of products and prices have already been in line with the international practice. Supply in excess of demand will also keep the selling price in a low status.

Thus, our production and management have been trapped in the embarrassed condition of little profit and even deficit, threatening the existence of many enterprises.

China is short of chrome ores and rich manganese ores, depending on import in varying degrees. With the joint operation of mining industry and metallurgical industry, there is little room for the free purchase of ores. The use of imported chrome ores and rich manganese ores is going to be regulated by the sources and prices of ores more and more.

As already mentioned, the fact that many medium and small plants are equipped with low standard facilities and are lacking the measures for the treatment of pollution has been stemmed from the conditions at that time, both subjective and objective. From now on, more stringent control will be required for environmental protection in the whole world and also in our country. Not only will these plants find that it's difficult to adapt themselves to this situation, but also the large enterprises will face this reality. Therefore, many of them will be forced to shut down.

As mentioned above also, the general scale of ferroalloy production will undergo diminution instead of expansion. In connection with this, Chinese Ferroalloy Industry Association and even the authorities have clearly stated that production capacity should be enlarged no more and emphasis should be placed on continuing reform and adjustment, bringing about the restructuring and optimization of productive force, guiding and regulating the total output from macro-control, striving to maintain the coordinated order and

stability of production and export-import of ferroalloys of the whole country.

For those enterprises capable of maintaining production should further pursue modern management and advanced technology, reduce personnels and increase benefits, improve the qualities of the staffs and workers, make great efforts to save energy and lower consumption, cut down production costs and improve competitiveness to adapt to the changing market.

The unevenness of the distribution of energy sources and ore resources and the development of economy have decided the constant expansion of the flow of ferroalloys by international trade. China has already become a part of the international market. With perfecting of standardization and legalization of market mechanism, we will strive to rectify the order of production and management, import of raw materials and export of products in order to achieve fair transaction. Under the coordination of the authorities, we will give full play to the function of guidance and supervision by the trade associations and export-import associations, intensify self-restrain and maintain a normal and orderly transaction and competition in the market both at home and abroad.

We will also take an active part in the strengthening of cooperation with our colleagues in the world, improving mutual understanding, and developing close relationship with ferroalloy associations in various countries and regions in order to facilitate the order of the international market and common interest and contribute to the prosperity of the world's ferroalloy business. A bright future will be ahead of us!