

## **THE ROLE AND PROSPECT OF THE DEVELOPING CHINA'S FERROALLOY INDUSTRY**

Wang Mengjun

China Iron & Steel Industry and Trade Group of Companies

### **ABSTRACT**

1. Effective production capacity of China's ferroalloy industry.
2. Location of China's ferroalloy industry and its major raw materials sources.
3. Electricity supply for China's ferroalloy industry.
4. Environmental protection.
5. The future prospect of China's ferroalloy industry.

It is known to all that China's iron and steel industry has been developing very rapidly since it adopted the policy of reform and opening to the outside world. With a crude steel production of 91.53 million tons and steel products output of 80.03 million tons in 1994, China now ranks in the front of the large steel producing countries. In the meantime, the ferroalloy industry also made great leap forward especially in recent years during the course of China's shifting from central planned to market economy.

There are now three categories of ferroalloy plants of national major, local major and local small ferroalloy plant with a total designed capacity of 4.5 million tons and effective production capacity of 3.8 million tons per annum. The product mix, quantity and quality can not only meet the demands of the development of China's iron and steel industry, but we also export several hundred thousand tons to meet the demand of the international market.

### **GENERAL SITUATION FOR FERROALLOY PRODUCTION**

1. The annual ferroalloy production was sustained at 2.4-2.6 million tons from 1990 to 1992, and in 1993 and 1994, it reached almost 3 million tons per year.
2. There are more than 30 varieties of main ferroalloy products in China, which can basically meet the needs of domestic iron and steel industry.
3. The ferroalloy plants are scattered all over China based on raw material supply, electricity supply and the labor cost.

### Ferro-alloy plants location

- Manganese ferroalloy plants are mainly in southwest and central south China, including the provinces and autonomous regions of Sichuan, Guizhou, Yunnan, Henan, Hubei, Guangxi, Guangdong and Hainan etc., such as Zunyi Ferroalloy Plant and Hunan Ferroalloy Plant
- Ferro silicon and some of chrome ferroalloy plants are mainly in northwest, including the provinces and autonomous regions of Shaanxi, Gansu, Ningxia, Xinjiang and Qinghai etc., such as Northwest Ferroalloy Plant.
- Special ferroalloy plants are mainly in northeast and east area, including provinces of Heilongjiang, Jilin, Liaoning, Jiangsu, Zhejiang, Anhui, Fujian, Jiangxi, Shandong and Shanghai, such as Jiling Ferroalloy Plant and Shanghai Ferroalloy Plant.
- Special ferroalloys and ferro silicon is also produced in northern part of China, including Beijing, Tianjin, Hebei and Shanxi province as well as Inner Mongolia autonomous region, such as Xinzhou Ferroalloy Plant.

### Location of raw materials.

- Southwest and central south parts of China are rich in manganese ore with manganese content over 30% which is of low sulfur. Silica is also rich in these areas with  $\text{SiO}_2$  content of 96-98% and the mining cost is low. Many ferroalloy plants are set up near the mines to produce ferro manganese and silicon manganese.
- Northwest, north and northeast parts of China are rich in silica with  $\text{SiO}_2$  content over 97% and  $\text{Al}_2\text{O}_3$  content below 0.7%. These areas also have abundant coal resources and cokes produced here are of high fixed carbon and low ash, good reactivity and low price, which are good reductant for ferroalloys.
- Tibet area is rich in chrome ore with  $\text{Cr}_2\text{O}_3$  content over 38% which can supply the northwest area to produce ferro chrome.
- Northeast and northern parts of the country are rich in Tungsten and Molybdenum resources. By taking advantage of skilled personnel resources, good equipment and short distance to the ports, special ferroalloys are mainly produced in these areas with imported chrome ore and manganese ore.

## **ELECTRICITY SUPPLY FOR THE FERROALLOY INDUSTRY**

Ferroalloy industry is a main source of energy consuming. At present, the total energy consumed by the ferroalloy industry is equivalent to 8 million tons of standard coal annually, which accounts for 5% of the total energy consumed by the iron and steel industry.

1. China is rich in hydro-power resources. Many small hydro-power stations were set up in northwest, central south and southwest parts of the country with low investment, short construction period but low priced electricity supply for the local ferroalloy plants. On the

other hand, the government also made investment to build a number of large and middle sized hydro-power stations on the Yangtze River and the Yellow River tributaries to supply enough electricity for ferroalloy plants in the area.

2. China ranks first place in the world for coal production. Coal was transferred into electricity in the regions which are rich in coal resources like northeast and northern parts. This can not only solve the tense transportation problem in China, but also supply enough low priced electricity for ferroalloy plants there.

Thanks to the reliable and adequate electricity supply at remote areas, China's ferroalloy production capacity increased from 2 million tons to 4.5 million tons in a short period of time.

### **ENVIRONMENTAL PROTECTION FOR THE FERROALLOY INDUSTRY.**

Ferroalloy production creates environmental problem. In order to protect the environment and for the health of the people, our government worked out many environmental standards and relevant supervising and monitoring measures.

1. Environmental standards for the ferroalloy industry are as follows. The drainage and emission standard for waste water, waste residue and waste gas (shortened as "three wastes") is governed by GBJ4-73. The drainage and emission standard for polluted materials is under GB4911-85. Quality standard for atmospheric environment is under GBH2.1-82. Sanitary standard for noise performed as a draft and the maximum drainage density for industrial waste is under GB2.4-73. The above mentioned standards made definite stipulations for the waste residue, waste water, smoke, noise and dust from the ferroalloy plants.
2. The National Environment Bureau stipulates that the environment inspection station must be set up in every plant. The local government inspects the ferroalloy plant according to the laws and standards and those plants that cannot meet the standards will be fined or shut down for retrofit within a set time period.
3. Some ferroalloy plants in China have been equipped with imported or domestic made dust-collector and sewage treatment facilities. With the implementation of environmental protection law, more and more environment protection equipment will be installed by the ferroalloy plants. These measures have improved a lot for environment protection.

### **THE FUTURE OF CHINA'S FERROALLOY INDUSTRY**

China's iron and steel industry will make a big step further by the turn of the century with an aimed steel production output of over 100 million tons per year. In order to meet the demand of the iron and steel industry, the ferroalloy plants will innovate technology, improve equipment to promote the quality of products according to international standards.

1. The development of the ferroalloy industry stimulates the progress of the industry and creates employment opportunities on one hand, and on the other hand it makes profit for producers and the country. At the same time, export of ferroalloy products supplies

enough foreign currency to import high grade manganese ore and chrome ore as well as advanced technical equipment.

The following table shows the statistics of ferroalloy production and export for the year 1991 to 1994 (Unit 10,000 tons).

	1991	1992	1993	1994
Production	246	265.7	296.4	295.9
Export	62.2	62.3	87.4	92

2. The ferroalloy industry of China has entered into the preliminary stage of taking advantage of each other, co-operating and meeting the demand of international market. Under the encouragement and support of the government, some ferroalloy plants have set up joint-ventures, such as Jilin Ferroalloy Plant, Liaoyang Ferroalloy Plant, Shanghai Ferroalloy Plant, and Ermei Ferroalloy Plant etc. These joint ventures have enough funds and advanced technical equipment as well as good management experience. Combined with local low priced electricity, ore, reductant and cheap labor, they can produce low cost products with high quality for domestic and international markets. This promotes the technology and profit of China's ferroalloy industry.
3. With the further development of China's hydro-power resources such as Three-gorge project, new mineral resources exploration, perfecting of transportation system, making full use of cheap labor and by adopting of foreign fund, equipment and management experience, the ferroalloy industry in China will develop more rapidly and will make even greater contribution to the world ferroalloy industry.