EVOLUTION OF THE FERROALLOY INDUSTRY IN EUROPE IN THE LAST YEARS FACING THE ENERGY CRISIS. FUTURE TRENDS

JUAN GRAU

Managing Director
S.E. de Carburos Metalicos, S.A.

As President of IPFEO which is the Western European Ferro-alloy Producers Institute, it is both a privilege and a pleasure to be invited to talk at INFACON 83. The subject of my talk today is The Evolution of the Ferro-alloy Industry in Western Europe.

Evolution means gradual change and we in Europe are proud of our past history even though it has been and still is fraught with many problems. The evolution of the Western European Ferro-alloy Industry covers a very important period of history from roughly 1900 to the present time.

During this wide expanse of time two major wars were fought on European soil, a number of serious adverse economic cycles have been experienced and high inflation has reared its ugly head on numerous occasions. In the face of these herculean obstacles the Western European Ferro-alloy Industry has met its obligations to its many customers in both peace and war times.

The first metal production by an IPFEO member was started at Meraker, Norway, in 1826.

The plant was originally established to produce copper from local ores but over the years this production gave way to the production of chromium and silicon alloys.

In 1910 trial runs were made on low carbon ferro chrome and in 1915 production was started.

Totay Elkem's Meraker Smelteverke has a modern ferrosilicon and silicon metal plant.

The first ferro-alloy industrial production in Europe was started in 1903 at Ugine, France by SOCIETE DES A CIERIES ELECTRIQUES PAUL GIROD producing FeSi.

The latest ferroalloy plant to be constructed in the Western European Area was Icelandic Alloys in Iceland. There a modern, fully abated plant has produced ferrosilicon and is capable of further expansion should the occasion demand. Presently there are two 30 Megawatt Elkem furnaces in operation, each capable of producing 25,000 Mt of ferro silicon. The first furnace started up in 1979 and the second in 1980.

The present ferro-alloy production in Western Europe involves 35 companies and subsidiaries operating 14 countries. The industry has experienced a steady growth of small, medium and large size operations.

The commodity products of Manganese and Silicon have dominated the scene over the years, however, speciality alloys and related products have also been developed and produced in quality and quantity for special markets and applications.

The cyclic pattern of the steel and ferro-alloy industry in Europe during the 1970's and early 1980's has led to a multitude of management and production problems.

Inflation and its inherent spin off effects, such as adverse exchange rates, high costs of money and inventory problems have made life very difficult for Western European Ferro-alloy Producers.

High energy costs, overcapacity, some inefficient and old equipment and a lean market have often tended to drain the necessary profits from a business that is capital intensive. Currently we need a healthy order book in order to re-invest profits back into our business.

In order to survive there must be a greater understanding within our industry on a worldwide basis if our companies are to progress and make the contributions to our customers and stockholders that we are capable of doing.

Three major facts have dominated the scenario of the European Ferro-alloy Industry in the past three years:

1. ENERGY CRISIS

   Rampant escalation of power cost.

2. STEEL RECESSION

   Severe steel industry recession. Sharp decrease of the world ferro-alloy market and fierce cut-throat competition among alloy producers.

3. CONSEQUENCES

   Vertical or forward integration of the ore producers into alloy manufacture and concentration of non-integrated alloy producers into big conglomerates or management ventures with or without Government intervention.

1. ENERGY CRISIS

After World War II our industry experienced moderate expansion and fulfilled the needs of our customers. In 1973-1974 and again in 1979 Western Europe, as well as the rest of the world, experiences massive oil price increases which affected our entire economy. This quantum rise in oil prices had its detrimental effect on all products and supply lines and laid the foundation for a false sense of security or insecurity as the case may be.

In 1976-1978 our industry became aware of over capacity, weak markets and high fixed and variable costs, all of which made a strain on profits. The same condition exists today several years after the second oil price increase.

The two oil crises struck each European country differently accordingly to the production structure of the electrical power on one side, and to Government intervention in the Power Utilities Corporations and the kWh pricing formulae or tariff rates on the other.

In any country and in any case, energy recovery from the furnace fumes has become more and more attractive, in combination with pollution abatement compulsory by law in practically all Europe.

New-old concepts in power pricing, like seasonal or interruptible power, have reappeared on the scene. Hydroelectric power has been the favourite source of energy with fossil fuel in second place. In those countries with little or no hydropower available it is now necessary to concentrate on nuclear and coal sources. Nuclear power production and coal fired power production have gained widespread roles in the supply of "base energy" or "base power" for the off-peak hours with special preference for the "empty or valley hours" where low price kWh are available to avoid the unnecessary expansion of the "reversed pumping-power stations." The kWh price range during the different hours in the year have a maxi-mini range of 1 to 15.

New schemes or programmes of operation of the alloy furnaces are of major interest today, mainly if the hydropower production is available to the alloy producer as happens in certain cases. It is necessary for us to consider modulation of the furnaces power consumption during the different hours of the day and adjustment of the production programmes during the year thereby increasing production in the summertime whilst decreasing in wintertime with annual maintenance shutdowns in the latter period.

The application of the small computers in the operation of the furnaces is gaining more and more acceptance and interest. In the big furnaces one wants to obtain a steady operation of the metallurgical processes combining the loading of raw materials, electrical constants, electrode slippage, etc. In the medium sized furnaces (30 Mw) the higher flexibility allows the best utilization of the grid power available and the combination with one's own or captive hydropower when in existence, as is the case in some European plants.

2. STEEL RECESSION

The crisis of the steel industry has pushed the technical evolution towards better steel grades with higher mechanical performances allowing or requiring a decrease in the weight of steel employed per unit. Such crises have also favoured advances in technological progress in the steel industry all affecting the use, either quantitatively or qualitatively, of the ferro-alloys. I will try to comment briefly on the most important points:

1) Acid operation of the blast furnaces decreasing the coke unit consumption and increasing the production and allowing the utilization of lower grades of raw materials. Such operation

allows the molten pig iron desulphurization in the open or closed ladle to finally achieve the steel specification required with the minimum cost. This technique means consumption of calcium carbide but generally decreasing the unit consumption of ferro-alloys per ton of steel.

2) Mixed blowing of molten steel with oxygen plus an inert gas (such as argon) to decrease the O_2 partial pressure in the final blowing stage and so regulate and control the oxidation rate. With this technique (similar to the AOD but applied to normal and improved mild steel grades) the carbon oxidation is properly done in the final stages without incurring any unnecessary and unwanted oxidations of alloying elements, such as manganese and silicon. The unit consumption of ferro-alloy is consequently decreased.

3) Injection techniques in the ladle of alloying elements with inoculation effects. New grades in chemical and grain size specifications of the innoculants have been developed to adapt to these techniques.

4) The expansion of the continuous casting installations in all Europe with practically toal replacement of the Siemens-Martin old processes either by oxygen steel or by electric furnace steel has meant again a decrease in the ferro-alloys unit consumption.

All these technical developments plus the unknown end of the steel recession plus the flat IISI forecasts have meant a decreasing alloy market and a fierce competition in the market of the alloy producers to increase the market share in order to compensate the decreasing tonnages sold. The International Iron and Steel Institute has projected for the next 5 to 7 years practically a flat annual growth rate of the world's apparent steel consumption and from this projection it is necessary for all of us to concentrate our management skills to making our operations more efficient by the use of all the technical aids available to us.

3. CONSEQUENCES

The Ferro-alloy Industry is a capital intensive one. The market recession and the present high cost of money makes it practically impossible for any new investment in the industry other than the cost reducing ones. In Europe no plant expansion is being made today but on the contrary the small and less efficient producing plants are being progressively shut down.

As a defense scheme, two movements have appeared in Europe:

1) Intervention of the governments in certain countries through either financial participation or financial help (subventions or low cost loans) to maintain the alloy producing plants that have a future.

2) Formation of big groups (with or without Government intervention) of ferro-alloy production units to rationalize the operation and management of the plants and the marketing of the products.

In both cases the movements have a definite nationalist accent as it always does in depression times.

The existing crisis in the alloy industry, due to continue for a certain time, has also seriously affected the raw material situation, especially the ores market (Mn and Cr) that have also reflected the crisis. The prices of ores have logically decreased, favouring the forward integration of the ore suppliers into the alloy market in order to offer a basket of commercial possibilities, such as selling the metal unit in the form of ore or alloy to suit the convenience of the customers and incidently the suppliers.

SUMMARY

The European alloy industry will survive the crisis with a profound restructuring.

The future trends in Europe in alloy production will be:

1) Further concentration in big groups to rationalize the management and the progressive disappearance of the small producers.

2) Government intervention of some type, temporary or permanent.

3) Optimum utilization with computers of the electrical energy through:

   a) Energy recovery.
   b) Efficient use of the variable energy pricing during the different time periods.
   c) Combination of use of grid power in off hours and own hydropower when available in normal and peak hours.

4) Production of special grades and special alloys to suit the customer's needs when converting a "commodity" supply into a "service" supply whenever it is necessary and possible.

5) Reasonable collaboration between non integrated "home alloy" producers with "ore-alloys" producers in order to achieve an orderly market avoiding or minimizing the cyclic effects.