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**PANEL DISCUSSION  
&  
RECOMMENDATIONS**

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## Panel discussion

A panel discussion was arranged in the concluding session of the Seminar to bring out salient points which need to be further nurtured by the industry, research laboratories and the policy makers for the healthier growth of the ferro alloy industry. The Session was chaired by Professor V. A. Altekar, Director, National Metallurgical Laboratory and Chairman, Organising Committee. While complimenting various authors who had presented so well their view points during the Seminar, Prof. Altekar requested the Chairmen of the various Sessions to summarise the important points raised during the deliberations and put forward their own considered views. The points covered during the panel discussion were :

- Power requirements of the ferro alloy industry
- Raw materials
- Reductants
- Capacity utilisation and economics of production
- Gas cleaning and pollution control

### **Power requirements of ferroalloy industry**

Mr. A. Dasgupta of M/s. M. N. Dastur & Company, observed that for ferroalloy industry, the most important thing for its survival is an assured supply of power at a reasonable cost. The power cuts vary from state to state and at times the industry is faced with the problem of complete shut-down due to lack of power. Another thing which needs to be considered is the power tariff which varies from state to state. He felt that there should be a rationalisation in the power tariff; no matter in which state the ferroalloy industry is situated. The government should take appropriate steps to ensure

adequate power supply to the ferroalloy industry at reasonable rate.

Mr. D. N. Gupta of M/s. Kharidelwal Ferro-alloys felt that rationalisation may be a very difficult thing as there is no national policy and the national grid is also not effective to that extent. According to him the centre should recommend to individual states to have some basic norms with regard to power supply to the ferroalloy industry as in continuous process industries. He felt that at least 60% of the required power should be made available to the ferroalloy industry for its survival.

While commenting on the point of power, Mr. Ghorpade of M/s. Sandur Manganese, felt that an alternative is to relax government policy, and allow private entrepreneurs to set up mini-hydel projects wherever such possibility exists. The cost of mini-hydel project would be around one crore for every 1MW unit; so for a 10 to 18 MW project the amount would be approx. Rs. 18 crores. The power from such mini-hydel project would at least meet 1/3rd of the power requirement of the furnace and this may be an attractive proposition to the ferroalloy producers. He further stated that the Central and State Govts. should give clear directions in this regard to all private industries who are interested in hydro-project of the mini type.

### **Raw-materials**

On the raw-material side, Mr. A. Dasgupta felt, that there is no dearth of quartzite for the ferro-silicon industry, but there is really a problem for good quality manganese ore for the production of ferro-manganese. Proper steps should be taken by the producers to beneficiate

and agglomerate the fines so that the unused accumulated fines as well as the low grade ores can be made use of. He further said that some of the ferro alloy producers are already on the way for it. Mr. D. Naresh of the Ministry of Steel & Mines was also of the opinion that utilisation of waste fines by beneficiation and agglomeration will help in conserving the mineral resources.

### **Reductants**

Mr. Ghorpade referred to the current high prices of the reductants, and said that for a ferroalloy plant producing 35,000 tonnes of various alloys per year, the expenditure on the reductants for such a plant would be in the order of Rs. 500 lakhs; to this if the cost of electrode paste is also added, it is probably another crore. Thus a ferro alloy plant would be spending Rs. 5-6 crores on reductants alone to produce 35,000 tonnes of the alloy. It is justifying on the part of ferro alloy producers who are spending such a staggering amount on this alone, to ask for a quality reductant. The steel plants supply their reject pearl coke which is supposed to be in the range of 10-20mm size. But all the ferro alloy producers in the last few years have suffered the indignity of receiving coke in the name of mix coke, with fines -6 mm to the extent of 75/76%. He wished that the steel plants and the authorities would take note of this complaint and see that in future at least, they are given the size that is acceptable for the ferro alloy furnaces.

Mr. Harman of M/s.Ferroalloys Corporation, suggested that the public sector organisation which is handling coal in our country should install a centralised plant for making formed coke from non-coking coals which will cater to the needs of the ferro alloy industry. He felt that the total requirements of the coke would be 0.6 million tonnes at present, and pleaded that to produce 0.6 million tonnes of formed coke in a year would not be a big task for a public sector organisation like Coal India Limited. A plant like that would solve the

problem of charcoal availability and the industry would be spared from using high ash content reductants which contributes a lot to the cost of production of the ferroalloys and its quality.

Mr. Ghorpade welcomed the suggestion of Mr. Harman for a public sector plant to produce formed coke, but was afraid it would take few years at least before the ferroalloy producers would reap the benefits of such a venture. In the meantime, he stressed that the government may have a policy which will enable the ferro-alloy producers to import low ash reductants such as Australian Char as a substitute for charcoal.

### **Electrode Paste**

Regarding the electrode paste, the high cost exists because this is being purchased mainly from the aluminium based industries. However, it is gratifying to note that in the last decade more than six small companies in the private sector have also made their entrepreneurship efforts to manufacture electrode paste. Mr. Ghorpade felt, if this is encouraged and provided they can maintain the quality without increasing the price, as the bigger electrode manufacturers do, the ferro alloy industry can bring down its cost of production.

### **Gas cleaning and pollution control**

Mr. Harman appealed to all the ferro alloy producers to make a joint concerted effort to get into the problem of the energy recovery from the waste heat combined with pollution control. He felt that if we are to remain in step with the rest of the ferroalloy producers in the world we have to update our technology and also try to reduce the costs of inputs to the maximum extent. He made a reference to the key note paper where he had given the possible solution to bring down the energy input and also to establish the norms of the characteristics of the outgoing dusts in various furnace operations in India. He said we cannot just say that our equipment is out-dated and should be

scrapped. Ferro alloy industry in India is not that rich to invest on this additional waste heat recovery energy equipment and recover part of energy that we put in. This will need heavy investment, probably as much as an equivalent size of a new furnace, but before we come to decide this exactly, there has to be some initial study made which could be done jointly because of similar furnaces making similar products. Hence, a job could be undertaken by a centrally developed institution with the assistance of the participants and probably with some Central assistance to identify clearly what kind of equipment would be best to put in and to provide some assistance from financial institutions at low rate interest loans or some tax concessions which would be able to absorb the additional investment.

Mr. Gupta of M/s. Khandelwal Ferro alloys felt that the major problem in gas cleaning, pollution control and energy recovery, is that, a lot of investment is needed and the returns are very less. According to him, the cost of equipment is about a crore of rupees just for the gas cleaning part and in case one wants to utilise the gas also the cost would increase to Rs. 3 crores. Whatever energy saving we may get by this, it would not take care of the interest and depreciation of the plant leave aside the operating costs. No Indian party is coming forward to put up a right type of gas cleaning equipment suitable for old and already depreciated plants. Even though one may not go in for that sophistication as available in foreign countries, at least we should be having something which can serve our purpose well. For this Mr. Gupta felt that some of the Indian engineering firms should come forward with suitable type of gas cleaning plants. Further, suitable type of instrumentation has also to be there for the gas cleaning part, as it is hazardous and may lead to explosion if not properly handled.

Mr. Ghorpade felt that the concept of gas cleaning and waste heat recovery is good but the facts are different. According to him, the

cost of putting gas cleaning and power generation unit is quite high, at least by Indian standards. To generate say 8 MW from 32 MW installation capacity, one would require nearly something of Rs. 8 to 10 crores which is equivalent to putting up a new plant. Until and unless there is substantial tax benefit or some incentives by the Government, this sort of approach may not be the right one, particularly in a power starved State, when they are forced to run the furnace say nine months on 80% cut. He suggested that the Government may relax its policy and allow private entrepreneurs to set up mini-hydel projects wherever such opportunity exists. Mr. Harman, however, felt that a situation may arise when the State pollution control authority may serve a notice to close down the industry if proper action regarding pollution control is not taken and the industry should not wait for that day.

#### Capacity Utilisation

Touching on the subject of capacity utilisation and marketing of ferro alloys. Mr. A. Dasgupta felt that the international market is very dull due to general recession. The higher cost of production in India is making the ferro alloys absolutely non-competitive. This needs to be looked into by the Government and ferroalloy producers concerned. As far as domestic market is concerned he said that there has not been much of improvement in the last few decades and felt that there should be more acceleration in the production of steel in India so that the ferroalloy industry can also contribute effectively.

Dr. T. Mukherjee of TISCO observed that the country is importing a lot of higher alloy steels, the import of which means import of ferroalloys in one way or other. Some of the integrated steel plants particularly Rourkela and TISCO with vacuum arc degassing facilities are capable of producing higher alloy steels specially chromium bearing stainless steels or just ferritic stainless steels or high manganese substitute nickel bearing stainless steels or high man-

manganese substitute nickel bearing stainless steels. The steel plants should be licenced to produce these high alloy steels. This would mean additional investment but on the whole we don't have to import these steels and we would be using more of the indigenous ferroalloys for their production.

Mr. Harman felt that the solution lies in development of overall steel capacity as Dr. Dastur has outlined in his special address. What is required here, is rather more of steel available in the remotest areas at a very economical price, may be removing even the excise duties etc. so that the steel is made abundant, thus making increased use of ferro alloys. Agreeing with Mr. Harman's view, Mr. Dasgupta said the first thing to do would be to reduce the cost of production of ferro alloys. The reduction in power will have to be done by incorporating better controls using process computer and use of prepared burden.

Mr. D. Naresh said that the resources of the Government are limited and the better solution would be to develop those methods which would save energy and utilise the fine size material by beneficiation and other methods. He agreed that there are certain constraints like power availability at a reasonable cost which is being looked into by the Government. Regarding export of ferro alloys. Mr. Naresh observed that on one side, we have materials surplus for export, while we are importing certain ferro alloys like ferro silicon. Also in the case of low carbon and extra low carbon ferro chrome, there is a gap between demand and supply. The Government does not want to create any further capacity because it is aware that in ferro alloys, adequate capacity exists and the requirements can be met by diversification of the product.

#### **Standardisation & Quality Control**

On the subject of standardisation, Mr. M. S. Dakshinamurthy of ISI felt that the recent developments in production of charge chrome warrants that a suitable standard has to be laid

down specially when the material is export oriented. He also pointed out that sufficient data like tumbler Index, abrasion Index, chemical analysis, porosity, etc. should be available for manganese ore sinters, so that a national standard can be formed in line with the standard we have for iron ore sinters.

Dr. Venkatadri of R&D (SAIL) highlighted the use of phase diagrams in assessing the composition of ferro-alloys. He felt a ferro-alloy of eutectic composition should be used for maximum recoveries, for instance, 67% niobium-ferro alloy in the size range 1/2" to 1" gives better recoveries than a 65% Nb composition. Similarly, in ferro-vanadium an eutectic having 50% gives better recoveries. The status on the phase diagram of the various alloys is assuming importance. R&D (SAIL) as well as TISCO and other organisations are engaged in these studies and in the long run, these studies would be very useful to assess the gap that exists in the ferro-alloy systems.

Another aspect of importance is the temperature at which addition of ferro-alloy is to be effected for optimum recovery as overheated steel will pick up more oxygen and consequently loss of ferro alloys. Model studies at R & D (SAIL) are being conducted to assess the temperature effect in the steel bath and this would be very useful for steel industry. He further said that SAIL is not getting good size ferro alloys as far as low carbon ferro chromium is concerned and requested the ferro alloy producers to supply ferro alloys of the specified size and low phosphorus content to the specifications required.

Summing up the Panel Discussion Professor V. A. Altekar, appreciated the various important points raised by the members of the Panel and also those from the audience. He further elaborated on the following points :

#### **Power**

Prof. Altekar said that we are helpless in the power crisis, however some other thing

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can be done in this respect for example where furnaces are used for pig iron production, it has been possible to demonstrate that pre-reduction will reduce the power consumption considerably, which means that when the plant is running up at 50% power cut, the plant can still produce 100% depending upon the pre-reduction facilities. He was glad to note that VISL is actively considering this proposal.

### **Gas Cleaning**

Regarding the gas cleaning he said that the clean gas should be made use of as is done at VISL in their heat treatment plant where they are carrying out forging and other heat treatment work. However, the ferro alloy manufacturers may not have the use of gas at their plant and therefore CO rich gas has to be utilised in some other way. He said it is necessary to explore the possibility of converting carbon monoxide into some chemicals, by establishing a chemical industry by the side of such furnace. Alternatively we can think of converting the gas into electrical or thermal energy.

### **Reductants**

Professor Altekar said that some of the R&D laboratories have been working on production of low ash fuels. Some studies have also been done in making briquettes of fine carbon, oxide of the mineral which have led to the rapid reduction in a given volume of the furnace with comparatively less energy consumption. He felt that if ferro alloy producers keep in constant touch with R&D laboratories, or sponsor or promote R&D programme in the existing laboratories in the country, they are likely to be benefitted. The laboratories have been often asked to evaluate and assess the various physical and chemical characteristics of the raw materials required for the ferro alloy industry.

In concluding, the Chairman thanked all the persons from industry, Government, R&D and other organisations, who have gathered together on a common platform to study in depth the problems and difficulties faced by the ferro alloy industry. These discussions in the form of recommendations will be forwarded to the appropriate authorities in the Government for their consideration.

## Recommendations

As the present available capacity of the ferro-alloy industry is not completely utilised, it is recommended that no additional capacity be created.

It would be necessary to bring down the cost of production and make the products competitive in the international market. For this, it is felt that the Government should come forward in this venture to give some subsidies like excise rebate, good port facilities, etc.

Ferro alloy producers on their part shall take necessary steps to beneficiate and agglomerate the low grade ores as well as fines generated during the mining and handling of the ore and utilise such agglomerated products for the production of ferro-alloys.

It is recommended that the ferro-alloy producers form an association to study and recommend suitable waste heat recovery system coupled with pollution control for the benefit of ferro alloy industry. As this step would involve major capital investment without compensating return on the investment, the Government should take necessary steps to provide assistance by way of low interest loans from financial institutions, subsidies like tax rebate, etc. which would absorb the additional expenditure. This association should also identify Indian engineering firms to fabricate and supply such recovery systems.

It is necessary that steps are taken to develop suitable reductants such as formed coke

from non-coking coal. A public sector industry may be established for making formed coke to cater to the needs of ferro-alloy industry. Pending the establishment of such a centralised unit for the formed coke, the steel plants both in public and private sector be prevailed upon to supply reductants strictly in the size range of 10-20 mm as is used by the ferro-alloy industry.

It is also recommended that the Government may consider relaxation of the import policy and allow the ferro-alloy producers to import low ash reductants particularly for export oriented products.

It is recommended that the Government take steps to ensure a continuous power supply at a uniform rate to the various ferro-alloy producers — irrespective of the State in which the industry is situated. Industry should be sure of getting at least 60% of the required power.

It is recommended that the policies of the States as well as the Central Government be relaxed vis-a-vis power generation and allow the private entrepreneurship to have mini-hydro projects to meet partly the requirements of power wherever such possibility exists.

The ferro-alloy industry should sponsor R&D programmes in the various laboratories in the country to evaluate and assess the various physico-chemical characteristics of the raw-materials and reductants and to suggest improvements to reduce the cost inputs. A close liaison is necessary between the R&D organisations and the ferro-alloy industry.

