

SPOTLIGHT on INFACON 80

by C. W. P. FINN*

Introduction

INFACON is of special significance to people in South Africa who are interested in ferro-alloys, because it was in South Africa that the idea of regular international congresses on ferro-alloys was conceived and developed. INFACON 74, the first-ever such congress, was held in Johannesburg from 22nd to 26th April, 1974, being organized by the South African Institute of Mining and Metallurgy, the National Institute for Metallurgy, and the Ferro Alloy Producers' Association of South Africa.

INFACON 80, the second in the series, was held in Lausanne, Switzerland, and was organized by IPFEO, which is the European Association of Ferro-alloy Producers. As shown in Table I, 412 delegates from 28 countries attended, the largest delegation being from West Germany (44), followed by France and South Africa, with 40 delegates each. The only Communist country represented was Yugoslavia, with 1 delegate.

Technical Presentations

The Congress ran from 13th October to 16th October, 1980, at the Palais de Beaulieu. There were 7 technical sessions, at which 23 papers were read (Table II). Of the 23 papers, 4 dealt with economics, 5 with production, 3 with process control, 5 with environmental control, 2 with energy, and 3 with research, and 1 (the closing address) with an overview of the future of the industry.

Monday, 13th October

After a short welcoming address by Mr R. Björklund, President of INFACON and IPFEO, the first technical paper was read by M. Jacques Gall, President of SOFREM, France. He discussed the technical and economic aspects of the ferro-alloy industry, providing an excellent background to the industry, especially from the point of view of economics.

First Session on Production

Production was a misnomer since both papers in this session were basically on process economics rather than production. M. Henri Bromet, Scientific Director of CUAEM, France, gave a presentation (in French but well translated) on the economic aspects of the various types of furnace used for the production of ferrosilicon and ferromanganese. He also mentioned some technical aspects in passing. Next, Ing. Enrique Madero, President of Cia Minera Autlan, Spain, spoke (in Spanish but with an English printed text available) on growth prospects in the manganese industry. His chief conclusion was that countries would tend to specialize in the future, with

TABLE I
DELEGATES AT INFACON 80 BY COUNTRY

Country	No. of delegates	%
West Germany	44	10,8
South Africa	40	9,8
France	40	9,8
U.S.A.	38	9,2
Great Britain	35	8,5
Norway	34	8,3
Italy	28	6,8
Switzerland	24	5,8
Sweden	19	4,6
Japan	16	3,9
Spain	15	3,6
Brazil	10	2,4
Austria	9	2,2
Belgium	9	2,2
Finland	8	1,9
India	8	1,9
Portugal	8	1,9
Zimbabwe	6	1,5
Canada	3	0,7
Luxembourg	3	0,7
Mexico	3	0,7
Venezuela	3	0,7
Australia	2	0,5
Iceland	2	0,5
Netherlands	2	0,5
Chile	1	0,2
Denmark	1	0,2
Yugoslavia	1	0,2
TOTAL	412	100,0

production occurring in those countries with raw materials, cheap energy, and low labour costs.

Session on Furnace Control

The first presentation was by Mr Gunter Sommer, Director of the Measurement and Control Division, National Institute for Metallurgy (NIM), South Africa. He described the research and production problems associated with a project on the application of computer control to the production of ferrochromium. The main results of the project, he said, were a better understanding of the process, redesigning of the furnace, automatic control of raw-material feeding and electrodes, and an increase in furnace production to 125 per cent of design capacity.

The second paper in the session, by Dr Bruce Stewart, Assistant Director of the Measurement and Control Division, NIM, South Africa, complemented the previous presentation. He outlined the problems involved in the making of accurate electrical measurements in a large, interactive system, and described a new type of process controller that overcomes these problems.

The final paper in this session was read by Dr Jim Downing, of Union Carbide, U.S.A. It described a mathematical model for a submerged-arc furnace that

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TABLE II
PAPERS READ AT INFACON 80 BY COUNTRY

Rank	Country	No. of papers	%
1	South Africa	7	30,6
2	France	3	13,0
3	Japan	3	13,0
4	Sweden	2	8,8
5	U.S.A.	2	8,8
6	Belgium	1	4,3
7	Great Britain	1	4,3
8	Italy	1	4,3
9	Norway	1	4,3
10	Spain	1	4,3
11	Zimbabwe	1	4,3
TOTAL		23	100,0

had been developed from a purely resistive algorithm. Computer simulations of furnace performance were presented, but these were not accompanied by performance details.

Tuesday, 14th October

Dr J. P. Kearney, Chairman, SAMANCOR, South Africa, opened the second day's proceedings with a historical outline of the ferro-alloy industry in South Africa, tracing its growth from the opening of spiegel-eisen blast furnaces in Newcastle to the commissioning of the largest ferromanganese furnace in the world. This talk was to have been followed by a multi-projector audio-visual presentation, but, because of technical problems, the presentation was postponed.

Session on Raw Materials and End-uses

The first paper in this session, on the end-uses of ferro-alloys, was presented by Mr Dan Reeves, Chief Metallurgist, British Steel Corporation (BSC). He detailed the BSC computer programme used to optimize stainless-steel production. Basically, it is a programme that uses the replacement cost of various ferro-alloys to show which of more than 30 materials should provide the minimum cost of the final product. The programme also guides BSC's plans for the purchase of alloys.

Next, Dr C. Fornaini, Societa Ferrolegha, Italy, presented (in Italian with a French printed text) a description of the various types of ores used in the production of ferrochromium. He covered the chemical, physical, technical, and economic aspects in a well-presented paper.

This paper was followed by a presentation on reaction mechanisms in the reduction of chromite with carbon given by Dr C. W. P. Finn, of the University of the Witwatersrand, South Africa. This paper was based on the research work of a Ph.D. student, Mr C. S. Küçük-karagöz, whose work was supported by NIM's Pyrometallurgy Research Group. The paper pointed out the complex multi-stage nature of chromite reduction, which has at least three rate-controlling steps at various degrees of reduction. Great interest was shown in the mathematical model presented, and ores from India, Zimbabwe, and South Africa were offered in the discussion session for further testing of the model.

After the interference between the projector control system and the system for simultaneous translation had

been eliminated, Dr Kearney's audio-visual presentation was shown. It had been prepared by the Ferro Alloy Producers' Association of South Africa, and gave an impressive overview of South Africa in general and the importance of its ferro-alloy industry in particular. It spelled out, in graphic detail, the vast reserves of chromium and manganese in Southern Africa.

Second Session on Production

Dr Don Slatter, Senior Metallurgist, Institute for Mining Research, Zimbabwe, read a paper on the direct production of raw stainless steel from chromeium and nickel ores. This work, which had been conducted during the sanctions era, had previously been reported only to limited audiences. It proposes a major change in the industry, but, owing to the present depressed market conditions, it did not arouse much enthusiasm.

Mr F. J. Potgieter, Production Manager, SAMANCOR, described the commissioning of the world's largest ferromanganese furnace, the 81 MVA furnace at Meyerton. He discussed the learning process that led to the successful operation of this furnace, which reached design capacity within two months of commissioning. Many of the questions put by delegates could not be answered because of the company's desire for secrecy in those matters.

The final paper in the session was read by Mr T. Izawa, General Works Manager, Nippon Kokan K.K., Japan. He described the application of scale-up models derived from the 'dig-outs' of small operating ferromanganese furnaces. An account of this research, which extended over ten years, had not previously been reported outside Japan. It was interesting to note the similarities between this work and that done by NIM over the same period. Because of language difficulties, Mr Izawa was unable to answer questions during the session. However, in private discussions (with the aid of a translator), he was very co-operative, and a fruitful exchange of ideas occurred.

Wednesday, 15th October

Session on Work Environment

Four papers were presented on atmospheric pollution and the removal of dust before discharge of process gases. *Session on Recent Trends in Electric-furnace Smelting*

This was basically the third session on production. The first paper, by Mr Arne Arnesen, Vice-President of ELKEM, Norway, outlined the role of energy usage in the production of ferro-alloys. He predicted that dependence on oil would continue for several decades but that, since the percentage of energy used in the production of ferro-alloys was small, energy would be available at a price. This would force producers to change to more energy-efficient processes and to countries where the costs of energy were low.

Mr Marcel Sciarone, Technical Manager, Consolidated Metallurgical Industries (CMI), South Africa, described the unusual process used by CMI in the production of ferrochromium. This paper demonstrated the conversion, to a commercial operation, of a process that had been described at INFACON 74 as a research idea. As with the SAMANCOR presentation, company secrecy limited the value of this otherwise excellent paper.

The final paper in this session was read by Mr Sonji Yoneka, Technical Director Ferralloy Division of Japan Metals and Chemicals Ltd, who presented design equations for the dimensions of electric furnaces. While it was somewhat difficult to follow the methods applied in the development of these equations, it appears that they are used in the Japanese industry. As before, question time was of limited value owing to language difficulties.

Thursday, 16th October

Mr Lenhard Holschuh, Secretary General of the International Iron and Steel Institute, discussed the present and future prospects of the world's steel industry. This is of great importance to the ferro-alloy industry since nearly all the ferro-alloys produced are ultimately used by the steel industry. Mr Holschuh painted a gloomy picture of over-production and excess capacity until at least 1985. He dismissed press reports of a steel shortage in 1982, and questioned the motives of the authors of such reports.

The closing address was given by Dr Louw Alberts, Chairman of the International Committee on Ferro-Alloys and President of NIM. He thanked all the speakers and delegates, praised the IPFEO for the organization of the Congress, and announced that the next INFACON would be held in Japan in 1983.

Dr Alberts mentioned some disappointment in INFACON 80, which was due to a lack of papers on alternative or new applications, as well as on new processing techniques such as plasma smelting. He announced the creation of a Chromium Centre in South Africa, which would model itself on the lines of the Manganese Centre in France and would serve as a clearing house for ideas on chromium. This announcement was well received by the delegates.

Exhibitions

Major industries had display booths in the upper foyer of the Palais de Beaulieu. Technical and commercial literature was available at these booths, as well as the opportunity for fruitful discussions. Among other exhibits, Siemens mounted a large display of the electrode-control system developed by NIM; Tanabe Kakoki, of Japan, proudly displayed their engineering of SAMANCOR's new 'super' furnace; TRB, of France, had a useful display of refractories and carbon products available to the ferro-alloy industry; Atlas-Copco offered information on mechanized equipment; and ELKEM, of Norway, had an impressive model of their new split-ring counter-revolving ferrosilicon furnace. Various companies that market systems for the control of air pollution also displayed their wares.

Social Events

No conference consists of technical sessions alone; much of the business of a conference is transacted at the associated social events. INFACON 80 was no exception. Being held in the French speaking-section of Switzerland, the social events went off with the *joie d'vivre* of the French and the efficiency of the Swiss. The lunches were of *cordon bleu* standard and included French wines. The evening functions included a welcoming buffet on Sunday evening addressed by the Swiss Minister of Agriculture, Industry and Trade, a reception on Monday evening hosted by the cantonal and municipal authorities, a cocktail party on Tuesday evening hosted by the French Ferro-alloy Industry, and a banquet on Wednesday evening. This gala event opened with a cocktail party on board a steamboat crossing Lake Geneva, and continued with a banquet of eight courses at the Royal Hotel in Evian-les-Bains (France) and a return by steamboat in the wee hours.

Design Awards

The Design Institute is inviting entries for the 1981 Shell Design Awards. Any product that falls into the three categories shown below, and that was designed in South Africa and is in production, is eligible for an award.

Since their inception in 1970, the Shell Design Awards have gained in status to the extent that they are recognized today both nationally and internationally as the highest acknowledgement of design merit bestowed in South Africa.

The Awards take the form of certificates presented to the manufacturing company and to individual members of the design team, and an emblem, which can be used in any manner beneficial to the marketing effort of the award-winning company.

Entry forms are obtainable from the Design Institute, SABS, Private Bag X191, Pretoria 0001.

The product categories are as follows:

Consumer products

Any products that are intended for purchase by members of the general public for use in their domestic, working, or recreational pursuits.

Engineering products

Products that are intended for use in general industry, agriculture, mining, medicine, transportation, or communication.

Contract products

Products that are used in the equipping or furnishing of public or commercial premises and/or environments.