

'The old order changeth, yielding place to new'

It is appropriate that the Southern African Institute of Mining and Metallurgy devote an issue of its Journal to the 12th International Ferroalloys Conference, even though published proceedings are available. The reasons are twofold. Firstly, the theme of the conference was 'sustainability' and this is perhaps a most critical battle cry in Southern Africa, probably more so than in many other developing region. Secondly, the first INFACON conference was held in Johannesburg 36 years ago and the historical background is of some relevance as it was sponsored by the SAIMM as one of its first international conferences. It was to promote the success of the pioneering work of Dr William Bleloch of Rand Mines to establish an electric arc production plant at Middelburg to utilize the lowgrade but plentiful chromite resources for a competitive ferrochrome product.

There was a great deal of fundamental work needed to support the plant operations, so a pyrometallurgy group was established by the National Institute of Metallurgy, (initially at the University of the Witwatersrand) under the leadership of Dr Peter Jochens and Prof David Howat, to provide the postgraduate support for such work. The interaction and enthusiasm of the whole team was such that the postgraduate students themselves funded the purchase of sleeping bags and stretchers (and appropriate sustenance) so that they could be present on the plant continuously to take samples at the appropriate times throughout the night.

This was the birth of the Pyrometallurgy Division of Mintek and of course the establishment of RMB Alloys as a highly successful ferrochrome producer. It was demonstrated that the submerged arc furnace could produce an acceptable grade of ferrochrome at an unbeatable cost and the results were proudly announced at the first International Ferroalloys Congress in Johannesburg in 1974.

It was this conference that illustrated that the low cost of electric power and the plentiful supply of both chromite and manganese ores placed this country as the natural locality for the evolution of the global ferroalloy industry.

The previous highly favourable situation has changed, and today we face the challenge of having to deal with substantial increases in power costs and looming shortages of the 'lumpy' chromite ore preferred for operation of the conventional submerged arc furnace. So once again it seems we are at the crossroads, with several different directions to assure the sustainability of the industry and particularly the opportunities for added value and job creation.

A number of papers in this issue focus on the DC plasma arc furnace, which has been investigated for several decades as an alternative to the submerged arc furnace because of its ability to accept a finer particle chromite feed.

The papers illustrate well the complexity not only of the stability of open plasma arcs but also of the control features needed in the power supply for converting the AC transmitted power to the large DC requirements. The complexity of the design of the hearth of the furnace, which acts as the anode, is also revealed. The potential of the DC arc furnace was appreciated by Mintek all of three decades ago, and this illustrates the timescale for any major engineering advance to be

commercially implemented and to reach maturity.

The many different approaches to overcome the worldwide problem of the high carbon footprint of electrometallurgical processing and the depletion of the conventional raw materials for ferroalloy production were apparently well covered at the Helsinki conference. The high cost of power from oil or coal is of relevance across the world. It was of interest to note that consideration is being given to the role of natural gas as not only a reductant but also as a source of electric power. As mentioned in a previous Journal Comment, it is of great significance that even in South Africa it is beneficial to pipe natural gas from Mozambique to Johannesburg to drive a generator to produce power for a commercial building in Johannesburg at lower cost than can be provided by Eskom.

The cost of power to those producers sitting in close proximity to natural gas could be internationally highly competitive. It is also significant that, as reported in the last issue of this Journal, there are operations recovering fine chromite from waste residues of the platinum mines. It has proved to be feasible that the recovered material can be successfully reduced to metal, in DC or submerged arc furnaces.

The conference covered several other ferroalloys such as ferromanganese, ferronickel, ferrovanadium, and ferrosilicon, which have similar power cost considerations. The various advances in process options are well covered in the proceedings and form a portfolio of challenges and opportunities for the global metallurgical community, including Southern Africa. Unquestionably, the opportunities of co-generation of power will play a cardinal role in meeting the power crisis in this country.

The expansion plans for the Saldanha-Sishen railway line to accommodate the transport of manganese ore, and the expansion potential for steel production at Saldanha Bay, should a nuclear power plant or the offshore natural gas deposits be developed, are long-term prospects. Also, many billions of tons of waste coal fines are potentially available around the Bushveld Complex and Richards Bay.

Other centres of activity around Namaqualand, the Bushveld Igneous Complex, and at Richards Bay represent a portfolio of developments that will demand a huge level of international collaboration, as was evident at the Helsinki 12th INFACON. New alloys and consumer derivatives from them will demand high priority attention if the most critical demand for employment targets are to be met. It is for this reason that I find most interesting that the theme of INFACON12 is sustainability, and that several of the international companies contributing to the ferroalloy evolution in South Africa are making plans for agricultural-based cluster villages with manufacturing industries around the mining and metallurgical activities.

The resources of the vital elements in the form of chromium, manganese, vanadium, and even nickel are large but, being low grade, the cost and technology needed to convert such resources into reserves will be highly significant. I suspect there will be many more INFACON conferences this century.

12th International Ferrous Congress: Future sustainability

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May our readers enjoy and take full advantage of these international associations.