

CONFERENCE REPORTS

Mineral Processing 2000 Conference,

(South African Institute of Mining and Metallurgy, Western Cape Branch), President Hotel, Cape Town, South Africa, August, 24–25, 2000.

Now in its 19th year, “Mineral Processing” is the premier event on the South African calendar in science and technology of mineral processing. The conference attracts a mix of delegates, both local and international, with representatives from all sectors of the minerals processing field. In conjunction with a strong industrial sponsorship, the stature of the conference has been strengthened by the continued presence of representatives of several overseas organisations such as the Julius Kruttschnitt Mineral Research Centre (JKMRC), widely recognised as the world’s leading centres in research and education in mineral processing.

The conference technical programme was conducted in 2 parallel sessions, in which a total of 56 papers and 14 posters were presented. This was complimented by two plenary addresses. The technical programme covered the fields of flotation, pyrometallurgy, control, hydrometallurgy, comminution, copper processing and environment. The programme profiled the strengths of local institutions, in particular, flotation at the University of Cape Town, the relatively new addition of pyrometallurgy at the University of Stellenbosch and University of Pretoria, and hydrometallurgy at the Cape Technikon and the University of Stellenbosch.

The opening plenary address on the development of Namakwa Sands, subtitled, “from drawing board to reality”, set the tone for the conference, highlighting the commitment required to assemble the logistical know how, from process design to essential services, and closing the lifecycle of operations by being environmentally responsible. And, apart from this, Namakwa Sands is a thriving

organisation that continues to enjoy an expanding market share globally.

The technical content on optimisation and control reflected the maturity of this field, where Metallurg Automation and Svedala (South Africa) presented the results and benefits of currently operating systems. This was balanced by academic contributions from the Universities of Stellenbosch and Cape Town, showing the intimate link between control and the range of process modelling techniques now available.

The areas of research in comminution were varied, ranging from DEM modelling to descriptions of rock breakage. A particular highlight in this field came from the JKMRC, presenting work on the non-contact acoustic measurement of in-mill SAG variables. In contrast to previous work in this field, microphones were used to delineate processes that occur inside the mill as well as the mill shell dynamics. Other work by the JKMRC highlighted the need for an improved breakage descriptor, *viz.* a size dependent t_{10} value.

Work at Magotteaux on milling discharge reiterated the value of collecting sufficient and appropriate data in order to understand process dynamics. Alban Lynch, a great proponent of data driven investigations, gave this piece of work special praise. This approach was also mirrored in the work conducted by Peter Holtham on electrical characterisation of titanium minerals using mineral resistivity and relative permittivity. Bulk characterisation remains a difficult problem, given the high sensitivity to the surrounding ambient conditions. Nevertheless, extensive data sets are proving to be the key to understanding individual mechanisms.

Dave Wiseman presented his generic flowsheet simulator, LIMN, which makes use of Excel as the vehicle for flowsheeting and model entry. The underlying idea behind this type of simulator is that in an era permeated by the Microsoft paradigm, beginners in the trade of simulation are presented with a well understood platform that is transparent to the programmer and the end user.

Environmental presentations are few compared to the more classical mineral processing fields. However, relevant work is still being conducted on solid and soluble contaminants. In particular, Stellenbosch University in conjunction with Melbourne University in Australia has sufficiently developed geopolymerisation such that waste

material, *i.e.*, fly ash, can be immobilised and put to use as building material.

Last, but not least, and certainly just as important as the presentations, Cape Town has once again been a marvellous venue for this event. The calming surrounding waters make an ideal setting for business, networking and taking a sneak preview of the future of mineral processing in South Africa.

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MINPREX 2000 Conference,
Melbourne, Australia, September 11–13, 2000.

The MINPREX 2000 conference was held at the Carlton Crest Hotel and was attended by approximately 180 delegates from Australia and overseas. The technical programme consisted of three plenary sessions, several keynote presentations and three parallel sessions.

Of considerable interest was a keynote lecture by J. A. Herbst (University of Utah) entitled *Mine-to-mill optimisation-research and practice*. Mining companies that co-ordinate operations between the mine and the concentrator often achieve significant increases in productivity (more than 20 per cent). The key to realising these large benefits has for the most part arisen from improved communication between mining operations and plant operations personnel and the judicious use of new tools to evaluate alternatives for improvement and to minimise the risk of implementation.

Industrial ecology and metal production was the title of a keynote address by N. J. Themelis of Columbia University. As the population and global standard of living increase, the role of metals will not diminish in the 21st century, despite substitution and dematerialisation. Dispersive uses of metals will be phased out and post-use recovery of materials and energy will increase. Processes that can use metal scrap and waste streams will be favoured.

J. van Deventer of the University of Melbourne discussed the methods of conversion of mineral waste to modern materials by geopolymerisation. Geopolymerisation can transform a wide range of

waste alumino-silicate materials such as fly ash and blast furnace slag into building and mining products with excellent chemical and physical properties.

Approximately sixty five papers were presented in three parallel sessions. The author of this report presented a paper *Separation in magnetic fluids: time to meet the technological needs*. The paper described recent developments in ferrohydrostatic separation at De Beers and applications of this technology in the diamond industry. Of considerable interest were two papers on magnetic technology presented by N. R. Allen. Neil Allen is a retired high-school teacher of physics who decided to contribute, in an innovative way, to the magnetic technique of material separation.

The first paper dealt with a new approach to eddy current separation of small particles. Conventional eddy current separators generating a repulsive force among metallic particles work well for sufficiently large particles. As the particles become smaller, the repulsive force is being replaced by a rotational torque. Based on this observation Allen developed an eddy current separator based on particle rotation rather than particle repulsion. Practical separation of particles smaller than 200 μm is possible.

The second paper by Allen described the development of low-intensity dry and wet magnetic separators that employ particle rotation. Magnetic separation using particle rotation in a continuously rotating magnetic field offers very low entrapment of non-magnetic particles. It was shown that a single wet rotating magnetic field unit is able to achieve a cleaner separation than a three-stage separation using conventional wet drum separators. The rotation-based separation is claimed to work well for particles much smaller than 50 μm . Allen's company, Ka Pty. Ltd., Exton, Tasmania offers a range of rotation-based magnetic and eddy current separators.

The overall impression was that the conference had been ably organised and presented an opportunity for both the mining management and the academic sector to exchange new ideas. The Proceedings that contain most papers presented at the conference are a high-quality publication that should find its way on bookshelves of inquisitive metallurgists.

Jan Svoboda