

Comminution '12

Sponsored by:



Monday 16th April

- 14.00 Exhibition booth set-up
17.00-18.30 Registration and wine reception (accompanying persons welcome)

Tuesday 17th April

- 07.00 Registration desk opens
Light breakfast of filled croissants, tea, coffee and fruit juice
- 08.00 Opening Remarks
B.A. Wills (MEI, UK)
- 08.20 *Technical Session 1*
Chairmen: A. Hinde (AH Consulting, South Africa) and D. Meadows, FLSmidth, USA
- 08.20 **Keynote Lecture: 2020 - what will the typical PGM Concentrator flowsheet look like?**
C. Rule (Anglo American Platinum, South Africa)
- 09.00 **Comminution design for 2020 and beyond - the GCC contribution**
M.S. Powell (JKMRC, Australia), H. Benzer (Hacettepe University, Turkey), A.N. Mainza (University of Cape Town, South Africa), C.M. Evertsson (Chalmers Rock Processing Research, Sweden) and L.M. Tavares (Universidade Federal do Rio de Janeiro, Brazil)
- 09.20 **Early rejection of gangue - how much energy will it cost to save energy?**
G. Ballantyne and M.S. Powell (JKMRC-SMI, Australia)
- 09.40 **A granular flow model for tumbling mills**
I. Govender, M. Richter, G.B. Tupper, A.N. Mainza (University of Cape Town, South Africa) and D.J. Parker (University of Birmingham, UK)
- 10.00 **The influence of equipment settings and material properties on the fragmentation process produced by high voltage breakage**
K.P. van der Wielen, R. Pascoe, F. Wall (Camborne School of Mines, UK) and A. Weh (SELFRAG AG, Switzerland)
- 10.20 Coffee
- 11.00 **Recent international concentrator start-ups – do and don'ts for effective grinding mill design**
D. Meadows (FLSmidth, USA), P. Scinto and J. Starkey (Starkey & Associates Inc., Canada)

- 11.20 **Investigating the effects of ball filling through SAG-ROM ball mill pilot trials**
U. Erol, A. Mainza (University of Cape Town, South Africa), M. van den Heever, B. Claremont (Magotteaux (Pty) Ltd, South Africa) and N. Plint (AngloAmerican Platinum, South Africa)
- 11.40 **Multi-component AG/SAG mill model**
M.P. Bueno, F. Shi, T. Kojovic and M.S. Powell (JKMRC, Australia)
- 12.00 **Predicting the evolution of rock size distribution, throughput and product size using different modes of breakage in AG and SAG mills**
R. Morrison, M. Powell (JKMRC, Australia), P.W. Cleary, S. Cummins, G. Delaney (CSIRO Mathematics and Information Services, Australia) and B. Loveday (University of KwaZulu-Natal, South Africa)
- 12.20 **Media type effect on grinding efficiency**
L. Guzmán Rivera (Moly-Cop Adesur S.A., Peru)
- 12.40 **Analysis and validation of a run-of-mine ore grinding mill circuit model**
J.D. le Roux and I.K. Craig (University of Pretoria, South Africa)
- 13.00 Lunch
- 14.00 *Technical Session 2*
Chairmen: L.M. Tavares (Universidade Federal do Rio de Janeiro, Brazil) and M.H. Moys (University of the Witwatersrand, South Africa)
- 14.00 **Improved comminution circuit simulations using new set of equations of a hydrocyclone classifier**
M. Narasimha (Indian Institute of Technology, India), A.N Mainza (University of Cape Town, South Africa), P Holtham, M Brennan, and M.S Powell (JKMRC, Australia)
- 14.20 **The influence of a change in pulp rheology on hydrocyclone classification**
J. Waters, A. Mainza and I. Govender (University of Cape Town, South Africa)
- 14.40 **Improving grinding performance with high efficiency classification**
J. Roettle (ECUTEC Barcelona S.L., Spain)
- 15.00 **Interactions in a multi-component hydrocyclone feed – the effect of operating conditions**
A.R. Collins, P.N. Holtham and T.Kojovic (JKMRC, Australia)
- 15.20 **Using the three product cyclone to improve the operations of the comminution circuit – a pilot plant study**
A.N Mainza (University of Cape Town, South Africa) and M.S. Powell (JKMRC, Australia)
- 15.40 Coffee
- 16.10 **Development of a dynamic simulator for modelling complex flows in mineral processing circuits**
H. King, M. Daniel, R. Chandramohan and G. Lane (Ausenco, Australia)
- 16.30 **Tuning of real-time algorithm for crushing plants using a dynamic crushing plant simulator**
E. Hulthén, G. Asbjörnsson and M. Evertsson (Chalmers University of Technology, Sweden)
- 16.50 **Dynamic modeling and simulation of cone crushing circuits**
P. Itävuo, M. Vilkko (Tampere University of Technology, Finland), A. Jaatinen (Metso Automation, Finland) and T. Onnela (Metso Minerals, Finland)
- 17.10 **Modelling and simulation of dynamic crushing plant behaviour**
G. Asbjörnsson, E. Hulthén and M. Evertsson (Chalmers University of Technology, Sweden)

Wednesday 18th April

- 07.30 Light breakfast
- 08.20 **Technical Session 3**
Chairmen: A. Weh (SELFRAF AG, Switzerland) and S. Martins (McGill University, Canada)
- 08.20 **Keynote Lecture: Step change in the context of comminution**
R. Bearman (Bear Rock Solutions Pty Ltd, Australia)
- 09.00 **Closed circuit ball mill –basics revisited**
A. Jankovic and W. Valery (Metso Process Technology and Innovation, Australia)
- 09.20 **A dynamic Ergun equation for slurry transport in tumbling mills**
G.B. Tupper, I. Govender and A.N. Mainza (University of Cape Town, South Africa)
- 09.40 **Investigation of particles with high crack density produced by high pressure grinding rolls (HPGR) and its effect on percolation of heap leaching in the long term operation process**
Y. Ghorbani, A.N. Mainza, J.Petersen, M. Becker, J-P. Franzidis (University of Cape Town, South Africa) and J.T. Kalala (Mintek, South Africa)
- 10.00 **Determination of UG2 particle parameters to optimizing product size distribution for flotation purposes**
N. Chimwani, D. Glasser, D. Hildebrandt and M.J. Metzger (University of Witwatersrand, South Africa)
- 10.20 Coffee
- 11.10 **A new approach for evaluating the performance of industrial regrinding mills based on grindability and floatability**
D. Hamed, S. Abbas (Bahonar University of Kerman, Iran), P. Parviz (Sahand University of Technology, Iran) and B. Asghar (NICICO, Iran)
- 11.30 **Industrial application of the attainable region analysis to a joint milling and leaching process**
N. Hlabangana, D. Vetter, M.J. Metzger, D. Glasser and D. Hildebrandt (University of the Witwatersrand, South Africa)
- 11.50 **Real-time grind control enabled by diffuse reflective spectroscopy**
C. Steyn, W. Breytenbach (Anglo American Platinum, South Africa) and K. Keet (Blue Cube Systems, (Pty) Ltd, South Africa)
- 12.10 **Multi-component modelling of a clinker grinding circuit**
D. Altun, H. Benzer and N.K Aydoğan (Hacettepe University, Turkey)
- 12.30 **Prediction of solids flow and energy transfer in vertical shaft impact crushers using DEM**
E.R. da Cunha, R.M. de Carvalho, L.M. Tavares (Universidade Federal do Rio de Janeiro, Brazil)
- 12.50 Lunch
- 14.00 **Technical Session 4**
Chairmen: E. Hulthén (Chalmers University of Technology, Sweden) and P. Cleary (CSIRO, Australia)
- 14.00 **Recent installations and developments of Loesche Vertical - Roller - Mills in the ore industry**
C. Gerold (Loesche GmbH, Germany)
- 14.20 **The crushing and air classification processes in the production of manufactured sand for concrete**
R. Johansson and M. Evertsson (Chalmers University of Technology, Sweden)

- 14.40 **A model that simulates pulverised fuel production in an air-swept tube mill**
M.M. Bwalya and M.H. Moys (University of the Witwatersrand, South Africa)
- 15.00 **Design exercise of an HPGR**
H. Dundar, H. Benzer and N. Aydogan (Hacettepe University, Turkey)
- 15.20 Coffee
- 15.50 **The effect of feed moisture on the comminution efficiency of HPGR circuits**
D. Saramak (AGH University of Science & Technology, Poland) and R.A. Kleiv (Norwegian University of Science & Technology, Norway)
- 16.10 **Benefits of the HPGR replacing conventional grinding in mineral applications**
S. Oenol and F.P. Van der Meer (Humboldt Wedag GmbH, Germany)
- 16.30 **HPGR technologies in the processing plants of Russia and Kazakhstan**
A. Senchenko, Institute TOMS, Russia) and A. Romanchenko (TOMS-Engineering, Russia)
- 18.30 Coaches depart for conference dinner at Gold Restaurant, Cape Town

Thursday 19th April

- 07.30 Light breakfast
- 08.20 *Technical Session 5*
Chairmen: C. Philippe (Magotteaux International SA, Belgium) and S. Palaniandy (JKMRC, Australia)
- 08.20 **IsaMill- 1:1 direct scaleup from ultrafine to coarse grinding**
M. Larson, G. Anderson, K. Barns and V. Villadolid (Xstrata Technology, Australia)
- 08.40 **Characterising grinding media motion inside an M4 IsaMill™ using PEPT**
A.P. van der Westhuizen, I. Govender, A.N. Mainza (University of Cape Town, South Africa), H. de Waal (Xstrata Technology, South Africa) and K. Barns (Xstrata Technology, Australia)
- 09.00 **Effect of operating parameters on dry stirred milling efficiency**
O. Altun, H. Benzer (Hacettepe University, Turkey) and U. Enderle (NETZSCH-Feinmahltechnik GmbH, Germany)
- 09.20 **Grinding to nano-sizes: effect of media size and slurry viscosity**
M.H. Moys (University of the Witwatersrand, South Africa) and Pradip (Tata Research Development and Design Centre, India)
- 09.40 **Prediction of energy effective grinding conditions**
S. Breitung-Faes (Institute for Particle Technology, Germany)
- 10.00 **Energy efficient drying, grinding and classification of minerals and ceramics below 1 µm**
U. Enderle (NETZSCH-Feinmahltechnik GmbH, Germany)
- 10.20 Coffee
- 11.00 **Validation of product size distributions predicted using DEM for a cone crusher**
P.W. Cleary, G. Delaney (CSIRO Mathematics, Informatics and Statistics) and R.D. Morrison (JKMRC, Australia)
- 11.20 **Simulating pressure distribution in HPGR using the discrete element method**
J. Quist and M. Evertsson (Chalmers University of Technology, Sweden)
- 11.40 **Tactical mill management using next generation DEM tools**
G. Naidoo (Optsys Engineering, South Africa)

- 12.00 **Simulation of the breakage of bonded agglomerates in a ball mill**
M.J. Metzger and B.J. Glasser (The State University of New Jersey, USA)
- 12.20 **Influence of operating and design variables in batch milling using the mechanistic model of the ball mill**
R.M. de Carvalho, L.M. Tavares (Universidade Federal do Rio de Janeiro, Brazil)
- 12.40 **Effect of slurry density on load dynamic and milling performances in an iron ore ball mill - on-line estimation of in-mill slurry density**
B. de Haas, A. Van den Bosch (Magotteaux, Belgium) and A. Köttgen (University of Liège, Belgium)
- 13.00 Lunch
- 14.00 *Technical Session 6*
Chairman: G. Dean (Keramos, Australia)
- 14.00 **Do's and don'ts of measuring ceramic beads wear in the lab and in the industry**
B. Clermont and C. Philippe (Magotteaux International SA, Belgium)
- 14.20 **Fine grind attritional mills: can they or should they go coarser?**
D. Capstick and B. Currie (FLSmidth Knelson, Canada)
- 14.40 **Introducing a novel new ultrafine grinding mill with an evaluation of its grinding efficiency compared to a horizontal and vertical mill**
M. Varley, R. Pullin, A. Griffiths (Cardiff University, UK), D. Young, M. Battersby, S. Flatman and R. Imhof (Maelgwyn Mineral Services Ltd, UK)
- 15.00 **Selecting ceramic media: the theory**
H. Kotzé (Consensi Consulting, South Africa)
- 15.20 **Detecting mill unbalance and creating an optimum milling environment**
H. Kotzé (Consensi Consulting, South Africa)
- 15.40 **Viscosity effects in stirred media milling**
A. Kwade, C. Schröder and S. Breitung-Faes (Institute for Particle Technology, TU Braunschweig, Germany)
- 16.00 Coffee

Friday 20th April

- 08.00 Light Breakfast
- 09.00 *Technical Session 7*
Chairmen: J.T. Kalala (Minetek, South Africa) and M. Narasimhaa (Indian Institute of Technology, India)
- 09.00 **Rock shapes and incremental damage**
R. Chandramohan (Ausenco, Australia), M.S. Powell and P. Holtham (JKMRC, Australia)
- 09.20 **Designing liners for performance not life**
P. Toor and J. Franke (Scanalyse Pty Ltd, Australia)
- 09.40 **Modeling ball impact on the wet mill liners and its application in predicting mill magnetic liner performance**
M. Wu and V. Wang (AMEC Americas Ltd., Canada)
- 10.00 **Prediction of plant ball mill media wear rates from laboratory ball mill test data**
J.D. Gates (University of Queensland, Australia), A. Giblett and R. Dunne (Newmont Mining Corporation, USA)
- 10.20 Coffee

- 11.00 **The optimization of the grinding media and solid contents in primary ball mill circuit in Sungun Copper concentrator plant**
 B. Ebadnejad, G. Karimi (School of Mining & Petroleum, Iran) and A. Bagherian (NICICO, Iran)
- 11.20 **Predicting slurry flow within and discharge from a 3D pilot SAG mill using a coupled DEM-SPH model**
 P.W. Cleary (CSIRO Mathematics, Informatics and Statistics, Australia) and R.D. Morrison (JKMRC, Australia)
- 11.40 **Using Positron Emission Particle Tracking (PEPT) to investigate grinding regions in a laboratory scale tumbling mill**
 A.J. Morrison, I Govender, A.N. Mainza (University of Cape Town, South Africa) and X. Fan (University of Birmingham, UK)
- 12.00 **Comparing methods of determining power draw in tumbling mills using the discrete element method**
 L.S. Bbosa, I. Govender, A.N. Mainza (University of Cape Town, South Africa) and M.S. Powell (JKMRC, Australia)
- 12.20 **An introduction to the Coalition for Eco-Efficient Comminution**
 M.S. Powell (JKMRC, Australia)
- 12.30 Lunch
- 14.00 *Technical Session 8*
 Chairmen: J.D. Gates (University of Queensland, Australia) and V. Murariu (Metso, USA)
- 14.00 **Experimental and simulated instrumented ball in a tumbling mill—a comparison**
 S. Martins, W. Li, P. Radziszewski (McGill University, Canada), B. Picard, A. Faucher, and S. Makni (COREM, Canada)
- 14.20 **A GPGPU implementation of the DEM method applied to tumbling mills**
 M. Hromnik and I. Govender (University of Cape Town, South Africa)
- 14.40 **Incorporating the influence of the lifter profile in tumbling mill models using data from the PEPT system**
 H. Brodner, A. Mainza, I. Govender, A.J. Morrison (University of Cape Town, South Africa) and M.S. Powell (JKMRC, Australia)
- 15.00 **Implementation of optimized compressive crushing in full scale experiments**
 E. Lee and M. Evertsson (Chalmers University of Technology, Sweden)
- 15.20 **Formulation of grinding media models and their implications for breakage energy assumptions in tumbling mills**
 D.V.V. Kallon, I. Govender, A.N. Mainza and A.J. Morrison (University of Cape Town, South Africa)
- 15.40 **Conference summary**
 M.S. Powell (JKMRC, Australia) and A.Mainza (University of Cape Town, South Africa)
- 15.55 **Closing Remarks and Invitation to Comminution '14**
 A.J. Wills (MEI, UK)
- 16.00 Coffee and Wine (accompanying persons welcome)

Poster Presentations

Efficiency of stabilizers of grinding in cement clinker processing

T. Sverak (Brno University of Technology, Czech Republic) and C. Baker (Kuwait University, Kuwait)

Initial investigations of the Deswik vertical stirred mill using DEM simulations

P. Radziszewski, P. Hosseini and S. Martins (McGill University, Canada)

Challenges and difficulties of comminution processes in the KGHM PM S.A. Division of Concentrators

A. Konieczny and B. Bazan (KGHM PM S.A., Poland)

Modelling abrasion of rocks in discrete element method

A. Potapov, L. Nordell (Comminution Technology, Australia) and R. Chandramohan (Ausenco, Australia)