

Comminution '16



(Twitter #Comminution16)

Sunday April 10th

16.30-18.00 Registration and wine reception, with hot and cold canapés (accompanying persons welcome)

Monday April 11th

- 07.30 Registration desk opens. Light breakfast of filled croissants, tea, coffee and fruit juice
- 08.40 Welcoming Remarks
B.A. Wills (MEI, UK)
- 09.00 *Technical Session 1*
Chairmen: B.K. Loveday (University of KwaZulu-Natal, South Africa) and C.M. Evertsson (Chalmers University of Technology, Sweden)
- 09.00 **Keynote Lecture: Improving comminution efficiency – old ideas and new designs**
J. Pease (Mineralurgy Pty Ltd, Australia)
- 09.40 **Using the comminution energy curves to assess equipment performance**
G. Ballantyne and M. Powell (JKMRC, Australia)
- 10.00 **A demonstration of combining technologies to substantially reduce milling energy and CAPEX requirements in the processing of refractory gold ores**
D. Capstick and R. Van Ommen (FLSmidth, South Africa)
- 10.20 Coffee, exhibition and poster viewing
- 11.10 **Significantly improved energy consumption, particle liberation, and size reduction by VeRo Liberator® comminution**
G. Borg, F. Scharfe, O. Scharfe, A. Kamradt, and C. Lempp (PMS, and Martin Luther University, Germany)
- 11.30 **Investigating steel media differences in microstructure, hardness, abrasion and fracture toughness**
A. Sabih (McGill University, Canada), P. Radziszewski (Metso, Canada) and I. Mullany (Hatch, Canada)
- 11.50 **Dynamical cost and profit optimization comminution circuit**
M. Bengtsson, G. Asbjörnsson, E. Hulthén and C.M. Evertsson (Chalmers University of Technology, Sweden)
- 12.10 **Increasing efficiency by selective comminution**
M. Hesse and H. Lieberwirth (Institute of Mineral Processing Machines, Germany)

- 12.30 **Unlocking additional value by optimising current comminution strategies to process Grade Engineering streams**
C. Carrasco, P Bode, L. Keeney (Co-operative Research Centre for Optimising Resource Extraction (CRC ORE), Australia) and T.J. Napier-Munn (JKMRC, Australia)
- 12.50 Lunch
- 14.00 *Technical Session 2*
Chairmen: L. Auret (Stellenbosch University, South Africa) and G. Borg (Martin Luther University, Germany)
- 14.00 **Numerical study of the influence of irradiation parameters on the microwave-induced damage of rocks for industrial applications**
M. Toifl, P. Hartlieb, R. Meisels, T. Antretter and F. Kuchar (Montanuniversitaet Leoben, Austria)
- 14.20 **Modelling reduction and liberation for rare earth minerals applications**
L. Guldris, M. Bengtsson, E. Hulthén and C.M. Evertsson (Chalmers University of Technology, Sweden)
- 14.40 **Fault detection and root cause analysis for a simulated milling circuit**
B.J. Wakefield, B.S. Lindner and L. Auret (Stellenbosch University, South Africa)
- 15.00 **Neurocontrol of a ball mill grinding circuit by use of covariance matrix adaptation evolution strategies**
S.L. Hunter (University of Stellenbosch, South Africa) and C. Aldrich (Curtin University, Australia)
- 15.20 Coffee
- 16.00 **Advanced grinding circuit control using on-line analyzer systems**
A. Rantala, J. Kaartinen, O. Haavisto and I. Kejonen (Outotec, Finland)
- 16.20 **Speed is the key factor: optimizing grinding process in comminution circuits by using variable speed drives**
T. Cebeci, B. Klein, C. Wang (University of British Columbia, Canada), I. Atutxa and I. Legarra (Ingeteam Power Technology, Spain)
- 16.40 **Simulation as a tool to enable world's best mill relining practice – a sense-making tool for decision makers**
P. Rubie, G. O'Shannassy, F. Yap and J. Russell (Russell Mineral Equipment, Australia)
- 17.00 Happy Hour, Vineyard Gardens
Accompanying guests welcome

Tuesday April 12th

- 08.00 Registration desk opens. Light breakfast of filled croissants, tea, coffee and fruit juice
- 09.00 *Technical Session 3*
B. Tordoff (Carl Zeiss, UK) and G. Ballantyne (JKMRC, Australia)
- 09.00 **Keynote Lecture: The business of grinding: plant grinding process improvement tools for metallurgists and company management**
R.E. McIvor (Metcom Technologies, Inc., USA)
- 09.40 **From flowsheet design and equipment selection to circuit optimization – CITIC SMCC's comprehensive solution**
J. Tian and S. Morrell (CITIC SMCC Process Technology Pty Ltd, Australia)
- 10.00 **The commissioning and start up of the MMG Las Bambas milling circuit**
E. Ruiz, J. Villanueva, E. Delgado, H. Zinanyuca (MMG Las Bambas, Peru) and J.T. Kalala (Hatch, South Africa)
- 10.20 Coffee, exhibition and poster viewing

- 11.00 **Intensifying crushing performance for eco-efficient comminution practices**
H.-R. Manouchehri (Sandvik Mining, Sweden)
- 11.20 **Cone crusher performance evaluation using DEM simulations and laboratory experiments with a design of experiments approach**
J. Quist, M. Johansson, M. Evertsson and E. Hulthén (Chalmers University of Technology, Sweden)
- 11.40 **Prediction of liner evolution for a cone crusher using DEM**
P.W. Cleary, S. Cummins, G.W. Delaney, M.D. Sinnott (CSIRO Data61, Australia) and R.D. Morrison (JKMRC, Australia)
- 12.00 **Improving crusher performance by comparing various control strategies on a verified simulation**
C.W. Steyn (Anglo American Platinum, South Africa) and R.P. Brown (Stone Three Mining, South Africa)
- 12.20 **Monitoring and validation of life time prediction of cone crusher with respect to loading and feeding conditions**
M. Evertsson, J. Quist, M. Bengtsson and E. Hulthén (Chalmers University of Technology, Sweden)
- 12.40 **DEM modelling of the novel multi-shaft mill**
R.J. Bracey, N.S. Weerasekara and M.S. Powell (JKMRC, Australia)
- 13.00 Lunch
- 14.00 *Technical Session 4*
Chairman: C. Aldrich (Curtin University, Australia)
- 14.00 **Dry finish grinding with HPGRs: the next step ahead in mineral comminution?**
E. Burchardt (ThyssenKrupp Industrial Solutions, Germany)
- 14.20 **Technical and economic assessment of a non-conventional HPGR circuit**
P. Rosario and K. Lee (Hatch, Canada)
- 14.40 **Modelling HPGR Edge recycling with progressive grinding data**
F. Heinicke, H. Günter (Köppern Aufbereitungstechnik GmbH & Co. KG, Germany) and H. Lieberwirth (Institute for Mineral Processing Machines, Germany)
- 15.00 **Rigorous characterisation of ball milling requirements from HPGR products**
G. Ballantyne, E. Lessing, F. Van Der Meer, R. Stocco and M. Hilden (JKMRC, Australia)
- 15.20 **Dynamics in double roll crushers**
P. Hillmann and H. Lieberwirth (Institute of Mineral Processing Machines, Germany)
- 15.40 **Energy consumption applied to high pressure grinding rolls modelling with population balance models**
H. Anticoi, E. Guasch, S.A. Hamid, J. Juan de Felipe, J. Oliva and P. Alfonso (Universitat Politècnica de Catalunya Barcelona Tech, Spain)
- 16.00 Coffee
During the coffee break Aubrey Mainza and Indresan Govender will present a short introduction to the potential use of PEPT in developing comminution and classification models for design, optimisation and control
- 17.45 Coaches leave for conference dinner at Kirstenbosch Botanical Gardens

Wednesday April 13th

- 08.20 Registration desk opens. Light breakfast of filled croissants, tea, coffee and fruit juice
- 09.10 *Technical Session 5*
Chairmen: H.-R. Manouchehri (Sandvik Mining, Sweden) and H. Dunder (Hacettepe University, Turkey)
- 09.10 **Keynote Lecture: Comminution modelling in the context of integrated process prediction**
M.S. Powell (JKMRC, Australia)
- 09.50 **Closed circuiting the HPGRs: air classification-their operations and efficiencies**
O. Altun, H. Benzer and H. Dunder (Hacettepe University, Turkey)
- 10.10 **Operational parameters affecting the Vertical Roller Mill performance**
D. Altun, H. Benzer, N. Aydogan (Hacettepe University, Turkey) and C. Gerold (Loesche GmbH, Germany)
- 10.30 Coffee
- 11.20 **Assessing the performance of the Vertical Roller Mill grinding a Platreef ore**
W. Little, A. Mainza, M. Becker (University of Cape Town, South Africa), C. Gerold, J. Langel (Loesche GmbH, Germany) and S. Naik (Anglo American Technical Solutions, South Africa)
- 11.40 **16 Years of successful operation of a Loesche Vertical-Roller-Mill Type LM 50.4 in a hard rock application at Foskor Pty (Ltd) in Phalaborwa**
P. Jacobs, G. Seopa, M. Mofokeng, D. Nienhaus (Foskor Pty Ltd, South Africa) and C. Gerold, (Loesche GmbH, Germany)
- 12.00 **Predicting the evolution of rock size distribution, throughput and product size in AG and SAG mills by incremental damage, chipping, rounding and abrasion**
R.D. Morrison (JKMRC, Australia), P.W. Cleary and G.W. Delaney (CSIRO Data61, Australia)
- 12.20 **Cumulative rates models for AG/SAG Mills**
A. Hinde (AH Consulting, South Africa)
- 12.40 Lunch
- 14.00 *Technical Session 6*
Chairman: M. Battersby (Maelgwyn Mineral Services Ltd, UK)
- 14.00 **Predicting coupled rock breakage and slurry transport in a 3D pilot SAG mill using a coupled DEM-breakage-SPH model**
P.W. Cleary, G.D. Delaney (CSIRO Data61, Australia) and R.D. Morrison (JKMRC, Australia)
- 14.20 **A rapid SAG mill grindability program and mill sizing analysis for Borden Gold**
J. Starkey, J. Hedderson and S. Reeves (Starkey & Associates Inc., Canada)
- 14.40 **The influence of feed size distribution on the SAG mill circuit performance indices – the Tarkwa case study**
A.N. Mainza, P.A. Bepswa (University of Cape Town, South Africa), G. Nutor, S. Arthur, J. Obiri-Yeboah, and M. Lombard (Goldfields Ghana Limited, Ghana)
- 15.00 **Optimisation of secondary crushing stage before single stage SAG mill at Freda Rebecca**
E. Mudoti, T. Ncube, T. Magoronga, T. Mapanzure, T. Muganyi, S. Shibwe (Freda Rebecca, Zimbabwe), A. Hinde (Mintek, South Africa) and J.T. Kalala (Hatch, South Africa)
- 15.20 **An assessment of different ore responses to changes in SAG mill operating conditions**
P.A. Bepswa, A.N. Mainza (University of Cape Town, South Africa), S. Mwansa, M. Phiri and C. Chongo (First Quantum Minerals, Kansanshi Mining PLC, Zambia)
- 15.40 **Evaluating the potential throughput benefit of adopting Derrick fine screening technology in a PGM slag ball mill circuit**
E. Ford, P. Mudau, A. Hinde (Mintek, South Africa), A. Jain (Derrick Corp., USA) and N. Barkhuysen (Derrick Corp., South Africa)
- 16.00 Happy Hour, Vineyard Gardens
Accompanying guests welcome

Thursday April 14th

- 08.00 Registration desk opens. Light breakfast of filled croissants, tea, coffee and fruit juice
- 08.50 *Technical Session 7*
Chairmen: A.R. Heath (Outotec, Australia) and N. Wilshaw (Grinding Solutions Ltd, UK)
- 08.50 **Adding pebbles to a ball-mill to improve grinding efficiency**
S.G. Nkwanyana (Mintek, South Africa) and B.K. Loveday (University of KwaZulu-Natal, South Africa)
- 09.10 **Grinding mill optimization through SmartMill™ technical and commercial analysis**
M. Perrucci and M. Pischtschan (ABB, Switzerland)
- 09.30 **Coarse particle milling: Herbst-Fuerstenau characterization for scale-up in the abnormal breakage region**
C.L. Schneider, T.F.M.B. Duque (CETEM, Brazil) and D.B. Mazzinghy (Iron Ore Brazil-Anglo America, Brazil)
- 09.50 **The axial grinding media distribution in the IsaMill at different operation conditions**
D. Schons and A. Kwade (Technical University Braunschweig, Germany)
- 10.10 **Rheological effects in wet stirred media milling**
S. Breitung-Faes and A. Kwade (TU Braunschweig, Germany)
- 10.30 Coffee
- 11.10 **Developments in stirred media milling testwork and industrial scale performance of Outotec HIGmill**
H. Lehto, V. Keikkala (Outotec Oy, Finland), I. Muzinda (FQM Kevitsa Mining Oy, Finland), P. Kurki (Outotec Research Centre, Finland) and A. Paz (Outotec Pty Ltd, Australia)
- 11.30 **A power model for fine grinding HIGMills**
A.R. Heath, A. Paz (Outotec, Australia), V. Keikkala and H. Lehto (Outotec, Finland)
- 11.50 **An initial review of the metallurgical performance of the HIGmill™ in a primary milling application in the hard rock mining industry**
H. Erb, M. van de Vijfeijken (Swiss Tower Mills Minerals Ltd, Switzerland), Y. Hanuman, C.M. Rule (Anglo Platinum, South Africa), W.C.E. Swart (Kumba Iron Ore, South Africa), H. Lehto and V. Keikkala (Outotec, Finland)
- 12.10 **Pursuit of best practices with the Stirred Media Detritor (SMD)**
A. Moore, M. Gallimore (Metso Mining & Construction Technology, USA) and P. Radziszewski (Metso Minerals, Canada)
- 12.30 **The effect and control of vortex stability in Stirred Media Detritors with regard to grinding performance**
S. Bailey, K. Hadler, N. Wilshaw (Grinding Solutions Ltd, UK), F. Lepoint and B. Clermont (Magotteaux International S.A, Belgium)
- 12.50 Lunch
- 14.00 *Technical Session 8*
Chairman: A. Mainza (University of Cape Town, South Africa)
- 14.00 **Understanding the effect of pressure profile on stirred mill impeller wear**
P. Radziszewski and A. Moore (Metso, Canada)
- 14.20 **Evaluation of process parameters and grinding aid dosage strategies in a dry laboratory stirred media mill**
P. Prziwara, S. Breitung-Faes and A. Kwade (Technische Universität Braunschweig, Germany)
- 14.40 **Impact of the stirred mill grinding mechanism on the grinding performance and media consumption**
H. Erb (STM Minerals, Switzerland), C. Cronje, T. Mahlangu (Randgold, South Africa), B. Ebell (DRD Gold, South Africa), Y. Hanuman (Anglo Platinum, South Africa) and H. Lehto (Outotec, Finland)

- 15.00 **Vertical Stirred Mill scale-up and simulation: model validation by industrial samplings results**
D.B. Mazzinghy, J.F.C. Russo (Iron Ore Brazil- Anglo American, Brazil), C.L. Schneider (CETEM, Brazil), J. Lichter (Anglo American, USA) and R. Galéry (Universidade Federal de Minas Gerais, Brazil)
- 15.20 **Ceramic bead behaviour in ultra fine grinding mills**
P. Hassall (SEPR Saint-Gobain ZirPro, France), V. Keikkala (Outotec Oy, Finland), T. Komminaho and L. Kotila (FQM Kevitsa Mining Oy, Finland)
- 15.40 **How grinding media affects wet grinding process in stirred mills**
J. King, H. Deng, A. Wang, R. Xu, C. He (King's Ceramics & Chemicals Co. Ltd, China) and Q. Li (East China Normal University, China)
- 16.00 **Stirred milling: does it have an impact on the pulp chemistry and subsequent flotation response?**
C.J. Greet, J. Kinal and G. Small (Magotteaux Australia Pty Limited, Australia)
- 16.20 Conference Summary
A. Mainza (University of Cape Town, South Africa)
- 16.35 Closing remarks and invitation to Comminution '18
A.J. Wills (MEI, UK)
- 16.40 Coffee and Farewell wine function, Vineyard Gardens
Accompanying guests welcome

Friday April 15th

- 14.15 Optional guided hike, Lion's Head
All invited, but this is undertaken at your own risk

POSTERS

Stirred mills as an alternative to grinding in ball mills

A. Senchenko (TOMS Institute, Russia)

Bonded particle model calibration using design of experiments and multi-objective optimization

M. Johansson, J. Quist, and M. Evertsson (Chalmers University of Technology, Sweden)

New insight into ball mill and stirred mill breakage mechanisms provided by Auto-SEM-EDS shape characterisation

L. Little, A. Mainza, M. Becker and J. Wiese (University of Cape Town, South Africa)

Prediction of Tromp-function by system-parameters

P. Büttner, H. Lieberwirth (Institute of Mineral Processing Machines, Germany) and F. Heinicke (Köppern Aufbereitungstechnik GmbH, Germany)

Pulverizing capability prediction of ball mill based on generalized linguistic model with self-initialization

Hui Cao and Dapeng Yan (Xi'an Jiaotong University, China)

Modelling particle breakage in a Vertical Shaft Impact Crusher

S. Grunditz, M. Evertsson, E. Hulthén and M. Bengtsson (Chalmers University of Technology, Sweden)

DEM Modelling and Simulation of Banana Screen Classification Efficiency

A. Davoodi, J. Quist, E. Hulthén, M. Bengtsson and C.M. Evertsson (Chalmers University of Technology, Sweden)

The investigation of operating parameters in a vertical stirred mill in an ultrafine grinding application

G. Edwards and A.P. van der Westhuizen (University of Cape Town, South Africa)

Predicting flows from the dynamic Ergun equation

G.B. Tupper, A.N. Mainza (University of Cape Town, South Africa) and I. Govender (University of KwaZulu-Natal, South Africa)

A granular flow model of an annular shear cell

S. Bremner, A. Mainza (University of Cape Town, South Africa) and I. Govender (UCT and University of KwaZulu-Natal, South Africa)

Fundamentally derived scale-up rules for tumbling mills

I. Govender (University of Cape Town, South Africa)

New approach to ball mill modelling as a piston flow process

E. Guasch, H. Anticoi, S.A. Hamid, J. Oliva and P. Alfonso (Universitat Politècnica de Catalunya Barcelona Tech, Spain)

The influence of speed on a pilot plant SAG mill with a high ball load

M. Lisso, A. Mainza (University of Cape Town, South Africa), B. Clermont and M. Van Den Heever (Magotteaux (Pty) Ltd, South Africa)

The statistical challenges of back-calculating breakage parameters from batch milling tests

A. Hinde (AH Consulting, South Africa)

IsaMill media motion and packing versus operating conditions using DEM/CFD and PEPT

A.P. van der Westhuizen (University of Cape Town, South Africa) and U. Enderle (NETZSCH-Feinmahltechnik GmbH, Germany)