Comminution ‘14

Sunday 6th April

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

Monday 7th April

07.30  Registration desk opens
Light breakfast of filled croissants, tea, coffee and fruit juice

08.30  Opening Remarks
B.A. Wills (MEI, UK) and M.S. Powell (JKMRC, Australia)

08.55  Presentation of 2013 MEI Young Person’s Award

09.00  **Technical Session 1**
Chairmen: L.M. Tavares (Universidade Federal do Rio de Janeiro, Brazil) and M.H. Moys (University of Witwatersrand, South Africa)

09.00  **Keynote Lecture: The next stage of evolution in comminution**
A. Muir (AngloGold Ashanti, South Africa)

09.30  **Implementation of dynamic simulation at Anglo Platinum**
G. Asbjörnsson, E. Hulthén and M. Evertsson (Chalmers University of Technology, Sweden)

09.50  **Mechanistic modeling of the vertical shaft impact crusher (VSI)**
E.R. da Cunha, R.M. de Carvalho and L.M. Tavares (Universidade Federal do Rio de Janeiro, Brazil)

10.10  Coffee, exhibition and poster viewing

11.10  **Control systems for improvement of cone crusher yield and operation**
M. Evertsson and E. Hulthén (Chalmers University of Technology, Sweden) and M. Nordström (Roctim AB, Sweden)

11.30  **Validation of product size distribution and throughput predicted by DEM for a cone crusher**
P.W. Cleary, G.W. Delaney, M.D. Sinnott (CSIRO Computational Informatics, Australia) and R.D. Morrison (JKMRC, Australia)

11.50  **Strategies for size reduction control in cone crushers**
P. Itävuo, T. Väyrynen, M. Vilkko (Tampere University of Technology, Finland) and A. Jaatinen (Metso Automation, Finland)
12.10  Real-time optimization of a speed controlled cone crusher in an iron ore application  73
E. Hulthén, M. Evertsson (Chalmers University of Technology, Sweden), K. Hofling (Roctim AB,
Sweden), E. Öberg, A. Apelqvist and Å. Sundvall (LKAB, Sweden)

12.30  Adaptive mass flow sensor calibration method for crushing circuits  85
T. Väyrynen, P. Itävuo, M. Vilkko (Tampere University of Technology, Finland) and A. Jaatinen
(Metso Automation, Finland)

12.50  Lunch

14.00  Technical Session 2
Chairmen: K.P. van der Wielen (SELFRAF AG, Switzerland) and A. Hinde (Mintek, South Africa)

14.00  Modelling the influence on power draw of the slurry phase in autogenous (AG), semi-autogenous
(SAG) and ball mills
S. Morrell (Citic SMCC Process Technology Pty Ltd, Australia)

14.20  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, M. Powell (JKMRC, Australia), P.W Cleary, G.W. Delaney, S. Cummins (CSIRO
Computational Informatics, Australia) and B. Loveday (University of KwaZulu-Natal, South Africa)

14.40  An extended model for the Drop Weight Test
C.L. Schneider and T.B. Duque (CETEM, Brazil)

15.00  Comparison of single particle, Bond and bed tests for fine particle ore breakage characterisation
G.R. Ballantyne, F. Shi, B. Bonfils and M.S. Powell (JKMRC, Australia)

15.20  Coffee

16.00  Breakage characterization of multicomponent ore  N/A
L.X. Liu, F. Saeidi and M.S. Powell (JKMRC, Australia)

16.20  What is needed to develop the next generation of mechanistic breakage models in comminution?
R. Chandramohan (Ausenco Services Ltd, Australia), B. Bonfils and M. Yahyaei (JKMRC, Australia)

16.40  Modelling particle size reduction in a batch grinding ball mill
F. Shi, W. Xie and M. Powell (JKMRC, Australia)

17.00  Happy Hour. Vineyard Gardens. Accompanying guests welcome

Tuesday 8th April

08.10  Light breakfast

08.50  Technical Session 3
Chairmen: B.I. Pålsson (Luleå University of Technology, Sweden) and I. Govender (University of Cape
Town, South Africa)

08.50  Keynote Lecture: Is progress in energy-efficient comminution doomed?
T. Napier-Munn (JKMRC, Australia)

09.20  An energy based comparison of vertical roller mills and tumbling mills
D.I.T. Plochberger and D.I.M.B. Avila (Cemtec, Austria)

09.40  Energy distribution models in tumbling mills using positron emission particle tracking
T. Pathmathas, I. Govender and D. De Klerk (University of Cape Town, South Africa)

10.00  Coarse waste rejection using sensor based technologies
W. Millar, D.J. Bowman, R.A. Bearman (Bear Rock Solutions, Australia), D. Miljak and N. Cutmore
(CSIRO Minerals Down Under Flagship, Australia)
10.20  Positron emission particle tracking in tumbling mills  208
I. Govender, D. de Klerk and A.N. Mainza (University of Cape Town, South Africa)

10.40  Coffee

11.20  Predicting charge motion, slurry flow and rock breakage within and discharge from a 3D pilot SAG mill using a coupled DEM-SPH model  217
P.W. Cleary (CSIRO Computational Informatics, Australia) and R.D. Morrison (JKMRC, Australia)

11.40  Commination circuit design, what test work is required for a bankable feasibility study?  235
J. Starkey and M. Brissette (Starkey & Associates, Canada)

12.00  Dry grinding: current and future systems in mineral processing  244
E. Burchardt and W. Brandhoff (ThyssenKrupp Resource Technologies, Germany)

12.20  Research of iron ore grinding in a Vertical-Roller-Mill  259
M. Reichert, H. Lieberwith (TU Bergakademie Freibery, Germany), C. Gerold (Loesche GmbH, Germany), A. Fredriksson and G. Adolffson (LKAB, Sweden)

12.40  Lunch

14.00  Technical Session 4
Chairman: H. Lieberwith (TU Bergakademie Freibery, Germany)

14.00  Wear in high pressure grinding rolls subjected to the composition of heterogeneous abrasive materials
Y. Sesemann, C. Broeckmann (RWTH Aachen University, Germany) and A. Höfter (Köppern Entwicklungs GmbH, Germany)

14.20  New population balance model for predicting particle size evolution in compression grinding  287
V.P.B. Esnault, H. Zhou and D. Heitzmann (Lafarge Centre de Recherche, France)

14.40  Sample requirements for HPGR testing procedure  294
V.K. Alves (VALE S.A, Brazil), C.L. Schneider, T.B. Duque (CETEM, Brazil) and A.E.C. Peres (UFMG, Brazil)

15.00  Pellet feed grinding by HPGR  306
F.P. van der Meer and S. Oenol (Weir Minerals, The Netherlands)

15.20  A DEM model of HPGR operation using bed compression models calibrated with a piston die test  324
G.K.P. Barrios, L.M. Tavares (University of Rio de Janeiro, Brazil) and J. Pérez-Prim (DEM Solutions Ltd, UK)

15.40  FLSmidth® F360 HPGR test campaign Rio Tinto Kennecott Utah Copper Mine  332
J. Pownell and T. Bookless (FLSmidth, USA)

16.00  Coffee

18.30  Coaches depart for conference dinner in Cape Town
Wednesday 9th April

08.15 Light breakfast of filled croissants, tea, coffee and fruit juice

09.00 Technical Session 5
Chairmen: C.L. Schneider (CETEM, Brazil) and H.-R. Manouchehri (Sandvik Mining, Sweden)

09.00 Keynote Lecture: A multiscale view on comminution 353
W. Peukert (University Erlangen, Germany)

09.30 Predicting breakage rates of fine particles in stirred media mills depending on stressing energy and frequency 363
G. Gronau, S. Beinert, C. Schilde and A. Kwade (Technische Universität Braunschweig, Germany)

09.50 Shear based stirred mill power model – an adimensional analysis N/A
P. Radziszewski (Metso Minerals, Canada)

10.10 Technical gaps and challenges for fine grinding 371
L.X. Liu, S. Palaniandy and M.S. Powell (JKMRC, Australia)

10.20 Economical optimization of stirred media milling processes 383
A. Kwade (Technische Universität Braunschweig, Germany)

10.40 Coffee

11.20 Development of the Larson/Morrison IsaMill JKSimMet model 394
M. Larson, M. Young (Xstrata Technology, Australia), R. Morrison and Weiguo Xie (JKMRC, Australia)

11.40 VertiMill® - Preparing the feed within floatable regime at lower specific energy 408
S. Palaniandy, M. Powell, M. Hilden (JKMRC, Australia), J. Allen (Metso Mining and Construction, USA), K. Kermanshahi (Metso Minerals Ltd, Australia), B. Oats and Mark Lollback (BHP Billiton, Australia)

12.00 Pilot scale studies in fine grinding with Outotec HIGmills 423
H. Lehto (Outotec Oy, Finland)

12.20 Mixed media milling- a new operating technique for dry agitated media mills 439
C. Martin (RSG Inc., USA)

12.40 Lunch

14.00 Technical Session 6
Chairmen: R. Chandramohan (Ausenco Services Ltd, Australia) and S. Palaniandy (JKMRC, Australia)

14.00 Vertical agitated media mill scale-up and simulation N/A
D.B. Mazzinghy, R. Galéry (UFMG, Brazil), C.L. Schneider (CETEM, Brazil) and V.K. Alves (VALE S.A., Brazil)

14.20 The research for selection of the third mill of a refractory micro-fine iron ore 443
X. Xiao, G. Zhang, X. Zhao, L. Huang, L. Shi and Y. Long (Changsha Research Institute of Mining & Metallurgy, China)

14.40 Ultra fine grinding gold sulphide float concentrates, the economic drivers and challenges 456
D. Capstick (FLSmidth, South Africa)

15.00 Evaluation of grinding media wear-rate by a combined grinding method 464
J. Wang, B. Wang, F. He, X. Zhou, W. Deng, H. Xu (King’s Ceramics, China) and Q. Li (East China Normal University, China)

15.20 Coffee
16.00 Selecting ceramic media: part 2 evaluating the wear 480
H. Kotzé (Dakot Milling Media (South Africa) and N. Bedesi (Anglo American Platinum, South Africa)

16.20 Thinking outside of the sphere – adventures in space mining 487
P. Radziszewski (Metso Minerals, Canada)

16.40 A standardised methodology for the assessment of high voltage breakage behaviour of ores 499
K.P. van der Wielen, A. Weh, M. Hernandez, R. Müller-Siebert (SELFRAF AG, Switzerland)

17.00 Happy Hour. Vineyard Gardens. Accompanying guests welcome

Thursday 10th April

08.15 Light breakfast of filled croissants, tea, coffee and fruit juice

09.00 Technical Session 7
Chairmen: C.J. Greet (Magotteaux Australia Pty Limited, Australia) and P. Radziszewski (Metso Minerals, Canada)

09.00 New cone crusher: excellent product control results in new potential for flow sheet design in high capacity crushing applications 521
F. Silbermann (ThyssenKrupp Resource Technologies, Germany)

09.20 Energy efficiency in comminution: Vibrocone, a crusher having grinding performance 527
H.-R. Manouchehri (Sandvik Mining, Sweden)

09.40 SAG mill functionality optimization by Medium Voltage VFD utilization: Rudnik Alexandrovskiy experience 539
A. Gaztelu, I. Atutxa and I. Legarra (Ingeteam Power Technology, Spain)

10.00 Mill discharge modification – from a pilot plant testwork to an industrial test at Mortimer UG2 556
J. Dahner (Magotteaux (Pty) Ltd, South Africa), A. Van den Bosch (Magotteaux SA, Belgium) and G. Makgopo (Anglo American Platinum, South Africa)

10.20 Validation of a model for physical interactions between pulp, charge and mill structure in tumbling mills 571
P. Jonsén, J. Stener, B.I. Pålsson and H.-Å. Häggblad (Luleå University of Technology, Sweden)

10.40 Lunch

11.20 Testing of a new mechanistic slurry transport model with Positron Emission Particle Tracking 588
G.B. Tupper, I. Govender, D. de Klerk, A.N. Mainza (University of Cape Town, South Africa), and J. Mann (Anglo Platinum Mining, South Africa)

11.40 Using attainable region analysis to simulate a full-scale ball mill that incorporates a realistic transport model 601
N. Chimwani, M. Bwalya (University of the Witwatersrand, South Africa), F.K. Mulenga, D. Hildebrandt and D. Glasser (University of South Africa, South Africa)

12.00 Influence of the mineralogical structure in grinding specific energy consumption of itabirite iron ores 624
D.B. Mazzinghy, H.D.G. Turrer, J.F.C. Russo (Iron Ore Brazil–Anglo American, Brazil) and L.M. Tavares (Universidade Federal do Rio de Janeiro, Brazil)

12.20 Finding the mill setting sweet spot – a DEM assisted case study 632
J. Franke (Outotec, Australia) and P. Cleary (CSIRO Mathematics, Informatics and Statistics, Australia)

12.40 Lunch
14.00  **Technical Session 8**  
Chairman: A.N. Mainza (University of Cape Town, South Africa)

14.00  **Flotation: the diagnostic indicator of comminution circuit performance** 651  
C.J. Greet, J. Kinal and G. Small (Magotteaux Australia Pty Limited, Australia)

14.20  **The design and optimisation of grinding circuits incorporating stack sizer screens** 668  
A. Hinde, C. Bergmann, (Mintek, South Africa) and N. Barkhuysen (Derrick Corporation, South Africa)

14.40  **Grind circuit optimization at Rio Tinto Kennecott using real-time measurement of individual hydrocyclone overflow stream particle size enabled by novel CYCLONEtracSM technology** 694  
C. O’Keefe, P. Rothman, R. Maron, D. Newton, J. Mercuri (CiDRA Minerals Processing, USA), D. Cirulis and M. Holdsworth (Rio Tinto Kennecott, USA)

15.00  **Conference summary and open discussion on the future of comminution** N/A  
A.N. Mainza (University of Cape Town, South Africa)

15.40  **Closing Remarks and Invitation to Comminution ‘16** N/A  
A.J. Wills (MEI, UK)

15.45  Farewell Coffee and Wine in Vineyard Gardens (accompanying persons welcome)

**POSTERS**

- Development of a mechanistic model to define the incremental damage mechanics of rock samples N/A  
  R. Chandramohan (Ausenco Services Ltd, Australia) and B. Bonfils (JKMRC, Australia)

- Simulation and pilot testing of a circulating air classifier used in production of manufactured sand 712  
  R. Johansson and M. Evertsson (Chalmers University of Technology, Sweden)

- Use of temperature for diagnosing mixing in the IsaMill 720  
  R. Gunda and M.H. Moys (University of the Witwatersrand, South Africa)

- The effect of high shear in a stirred mill on the shape properties of a multicomponent ore 747  
  L. van de Ruit, M. Becker, W. Little and A.N. Mainza (University of Cape Town, South Africa)

- Development of a laboratory batch test for Vertical Mill sizing N/A  
  M.G. Bergerman (Federal University of Alfenas, Brazil) and H. Delboni Jr. (Sao Paulo University, Brazil)

- Experimental validation of breakage function independence to grinding environment 749  
  Z. Pourkarimi (IMPRC and Amirkabir University of Technology, Iran) and B. Rezai (Amirkabir University of Technology, Iran)

- Ultrafine grinding in IsaMill for projects in Russia 756  
  A.Y. Senchenko and Y.V. Kulikov (LLC “TOMS Science-Research and Design Institute”, Russia)

- Fundamentals of roll surface functionality and wear in operation 767  
  J. Pownell (FLSmidth, USA)

- Experience of SAGDesign test application in grinding technology development for a gold plant at Aleksandrovskoye deposit 786  
  A.Y. Senchenko and Y.V. Kulikov (LLC “TOMS Science-Research and Design Institute”, Russia)

- Mill relining optimization for greenfield plant design and brownfield sites’ relining practices through filmed data and simulation N/A  
  J. Russell (Russell Mineral Equipment Pty Ltd, Australia)

- Application of Fourier and Wavelet Methods to an experimental tumbling mill using 3D particle tracking data 794  
  D.V.V. Kallon, A.N. Mainza and I. Govender (University of Cape Town, South Africa)
An assessment of the rock characteristics and the ball mill energy requirements at a mine in Ghana, West Africa
K.A. Boateng (AngloGold Ashanti, Ghana), C.E. Abbey and R.K. Amankwah (University of Mines and Technology, Ghana)

Mechanical impacts analysis in SAG mills due to small failures in the electric drive
V. Guerrero and J. Pontt (Universidad Federico Santa María, Chile)

Modelling the energy spectra of a tumbling mill using DEM
L. Bbosa, A. Mainza and I. Govender (University of Cape Town, South Africa)

Mechanistic modelling of grinding in continuous ball mills
R. Carvalho and L.M. Tavares (Universidade Federal do Rio de Janeiro, Brazil)