SAG Conference 2023 - Technical Program

Monday, September 25, 2023

Session 1			AG Milling (5)
8:00	8:30		**Chairperson - Welcome and Opening Remarks**
8:30	8:45	Paper 2	Will AG milling make a comeback? (M. Powell)
8:45	9:00	Paper 3	Ag Mill Design for Low Competence Ores (T. Beyl)
9:00	9:15	Paper 4	Pilot Study of Rock Transport Rates in AG Milling (G. Chiasson)
9:15	9:30	Paper 5	Enhancing AG Milling Circuit Performance Through Advanced Liner Design, Modelling, Material Selection and Digital Tools (M. Hazell)
9:30	10:00		Question Period
10:00	10:15		Coffee

Session 2			Operations Optimization and Design (6)
10:15	10:30	Paper 6	Secondary Crushing Synergy with the Mount Milligan Bag Mill (A. Doll)
10:30	10:45	Paper 7	Successful Conversion of Autogenous to Semi-Autogenous Milling at Unki Platinum Mine (J. Kalala)
10:45	11:00	Paper 8	Review and Optimization of the Hudbay Constancia Comminution Circuit (R. Valle)
11:00	11:15	Paper 9	Campaign Processing of Ores from Santa Elena and Ermitaño Mines Using the Same Comminution Circuit (F. Wang)
11:15	11:30	Paper 10	Improvements in Grinding Circuit Performance at the Fekola Gold Mill, Mali West Africa (D. Rodabough)
11:30	11:45	Paper 11	Processing Stockpiled Scats at Glencore Kamoto Copper Company (P. Madrid)
11:45	12:15		Question Period
12:15	13:00		Lunch

Session 3			Ball Mill Comminution Circuit Design (5)
13:00	13:15	Paper 12	The Fundamentals of Tumbling Mill Design (A. Giblett)
13:15	13:30	Paper 13	Application of the Natural Selection Function to Grate Discharge Mills (A. Vien)
13:30	13:45	Paper 14	Tumbling Mill Modelling: A 3-Way Comparison of Real-Time Predictions from a New Granular Flow Model Against Both DEM and Experiment (I. Govender)
13:45	14:00	Paper 15	Considerations in Stirred Mill Selection (B. Nielsen)
14:00	14:15	Paper 16	Comminution Efficiency Comparison: Cadia's HPGR-Ball Mill Vs HPGR-Sab Circuits (C. Haines)
14:15	14:45		Question Period
14:45	15:00		Coffee

Session 4			HPGR Comminution Circuit Design (6)
15:00	15:15	Paper 17	Energy Effects of Dry Grinding with HPGR (F. Heinicke)
15:15	15:30	Paper 18	Implications of Recent HPGR Design Developments for Stress Distribution in Grinding Gap and Milling Performance (H. Lieberwirth)
15:30	15:45	Paper 19	Experiences and Operating Results from Applying Rotating Side Plates to High-Pressure Grinding Rolls in Minerals Applications (T. Mackert)
15:45	16:00	Paper 20	Upgrading a 2.4-Meter HPGR with Advanced Mechanical Skew Control and Flanged Roll Design (B. Knorr)
16:00	16:15	Paper 21	Development of Fine High-Pressure Grinding for Mineral Processing Plants (R. McIvor)
16:15	16:30	Paper 22	Evaluating the Impact of HPGRs on Concentration Process Metallurgical Performance (S. Makni)
16:30	17:00		Question Period
17:00	18:00		Cocktail Reception and Sundowner—In Memory of Ken Major with McGill University
18:00	20:00		**Master Class 1** Measuring and Reducing Carbon Footprints in Comminution

Tuesday, September 26, 2023

Keynote: Agnico Eagle

Session 5			Optimization (5)
8:00	8:30	Keynote	Implementation of High-Pressure Grinding Rolls (HPGR) as the Tertiary Crusher at the Meadowbank Process Plant (F. Robichaud)
8:30	8:45	Paper 2	Operational Debottlenecking of the Cadia 40ft SAG Mill Through Constraint Mapping Analysis (C. Geoghegan)
8:45	9:00	Paper 3	Low-Cost SAG Milling Opportunities (M. Powell)
9:00	9:15	Paper 4	Optimization and Continuous Improvement of Oyu Tolgoi Comminution Circuit (G. Malkhuuz)
9:15	9:30	Paper 5	Throughput Increasement at Doña Inés de Collahuasi Mining Company in SAG Mill Through the Adecuation on Grinding Media Size, Methodology, Strategy and Results Obtained on This Implementation (S. Olmedo)
9:30	10:00		Question Period
10:00	10:15		Coffee

Session 6			Practical Modelling and Control (6)
10:15	10:30	Paper 6	The Influence of Steel Addition in SAG Mills Operated with High Steel Ball Loads (A. Mainza)
10:30	10:45	Paper 7	Online Particle-Size P80 By Acoustic and Apc at Minera San Cristobal (W. Churata)
10:45	11:00	Paper 8	Rio Tinto Kennecott's SAG Optimization Since 2020 (J. Mortensen)
11:00	11:15	Paper 9	Identification of Semi-Autogenous Grinding Mill Operating States Using Clustering (N. Adhikari)
11:15	11:30	Paper 10	Molycop Digital Engine: Machine Learning-Accelerated SAG Mill Optimization (Y. Mohammadi)
11:30	11:45	Paper 11	Sag Mill Advanced Process Control and Optimization Using Brainwave MPC (A. Kheradmand)
11:45	12:15		Question Period
12:15	13:00		Lunch

Session 7			Test Work & Characterization (5)
13:00	13:15	Paper 12	A Review of SAG Milling - History of Mill Selection and Testwork Analysis (R. Chandramohan)
13:15	13:30	Paper 13	Insights Into Rock Breakage Experience for Over 30 Years (M. Weier)
13:30	13:45	Paper 14	Assessing Comminution Circuit Performance Using Precision Measurement of Size Specific Energy (S. Ali)
13:45	14:00	Paper 15	Engineering and Early Operation of the Las Chispas Project (B. Foggiatto)
14:00	14:15	Paper 16	Comparison of Pilot and Industrial Scale Ag/Sag Mill Performance - Case Studies on Three Different Ore Types (S. Nkwanyana)
14:15	14:45		Question Period
14:45	15:00		Coffee

Session 8			Energy Efficient and More Sustainable Comminution (6)
15:00	15:15	Paper 17	The Flowsheet of the Future: HPGR, Vertical Stirred Mill, Coarse Particle Flotation, Vertical Stirred Regrind Mill (M. Sherman)
15:15	15:30	Paper 18	The Versatility of Stirred Milling in Innovative Comminution Flowsheets (B. Foggiatto)
15:30	15:45	Paper 19	Circuit Energy Savings of Microwave-Assisted Comminution and Ore Sorting (X. Tian)
15:45	16:00	Paper 20	Rock Pulverization and Mineral Liberation with Transcritical Carbon Dioxide (Tco2) Cycling (M. Hesse)
16:00	16:15	Paper 21	The Conjugate Anvil Hammer Mill - a New, Highly Efficient Grinding Machine (S. Wilson)
16:15	16:30	Paper 22	Gravity-Induced Stirred Mill (TowerMill) in Coarse Grinding Applications (S. Palaniandy)
16:30	17:00		Question Period
17:00	18:00		Cocktail Reception and Sundowner—Student Social
18:00	20:00		**Master Class 2** Extended Reality for Comminution Circuits

Wednesday, September 27, 2023

Keynote: Teck Resources

Session 9			Project Delivery, Construction, Commissioning (5)
8:00	8:30	Keynote	The Quebrada Blanca 2 Project: Development of a Multi-Line SABC Chilean Copper Concentrator Grinding Circuit Design from Concept Through to Operation (B. Rairdan)
8:30	8:45	Paper 2	Is the capital cost of your grinding circuit too high? (M. Pyle)
8:45	9:00	Paper 3	Concentrator Grinding Circuit Layout and Design - Considerations from the Past, Present and for the Future Emerging Upbeat Market Conditions (D. Meadows)
9:00	9:15	Paper 4	Commissioning of Single-Stage SAG Mill at the Meliadine Process Plant (F. Robichaud)
9:15	9:30	Paper 5	Ahafo Mill Expansion Commissioning (E. ASAKPO)
9:30	10:00		Question Period
10:00	10:15		Coffee

Session 10			HPGR Energy Efficient and More Sustainable Comminution (6)
10:15	10:30	Paper 6	Improvements in Asset Efficiency Through Tyre Wear Life Optimisation at Cerro Verde (J. Hofmann)
10:30	10:45	Paper 7	Trade-Off Realities in HPGR Vs SAG Milling - a Practical Comparison of Tropicana and Gruyere Comminution Circuits (I. Lovatt)
10:45	11:00	Paper 8	Kamoa-Kakula Copper Mine Complex Phase I &Ii : Review of Commissioned Plant Performance and Back-Referencing HPGR & Comminution Testwork (D. Frost)
11:00	11:15	Paper 9	Trial Results of the Novel Smartcone Control System at Freeport Mcmoran Morenci Canyon Crushing Circuit (D. Jacobson)
11:15	11:30	Paper 10	Remote Mill Monitorization: a Solution for Higher Efficiency and Asset Optimization (D. Gallego Lobato)
11:30	11:45	Paper 11	Optimizing Energy and Throughput for HPGR: a Case Study for Copper Mountain Mine (G. Pamparana)
11:45	12:15		Question Period
12:15	13:00		Lunch

Session 11			Safer Operation & Maintenance Practice (5)
13:00	13:15	Paper 12	Mill Liner Separation Method That Enables Recycling of Worn Rubber and Poly-Met Mill Liners (L. Furtenbach)
13:15	13:30	Paper 13	New Technology for Safer and Faster Mill 3d Scans (A. Araya)
13:30	13:45	Paper 14	Indoor Versus Outdoor Materials Handling at Mount Milligan (T. Marques)
13:45	14:00	Paper 15	Latest Developments in Mechanised Grinding Mill Relining: Site Trials and Simulation Results (S. Gwynn-Jones)
14:00	14:15	Paper 16	PTFI & RME Collaboration: Technology Makes Mill Relines Safer and More Efficient (J. Wilmot)
14:15	14:45		Question Period
14:45	15:00		Coffee

Session 12			Advances in Mill & Liner Design (6)
15:00	15:15	Paper 17	Revolutions in SAG Mill Liner Design Through DEM Modelling (R. Stephens)
15:15	15:30	Paper 18	Evaluating the Throughput Benefits and Safety Aspects of Mill Liner Design for Performance (C. Ndimande)
15:30	15:45	Paper 19	Liner Optimization of Ahafo Mine Ball Mill (J. Delgadillo)
15:45	16:00	Paper 20	Sag Digital Twin-Hybrid Models for Jc, Jb, and Liner Wear- Overview of Modelling Methods and Results from Implementation at Los Pelambres Mine (A. Medina)
16:00	16:15	Paper 21	Using SAG Mill Vibration for Advanced Process Control Strategies and Monitoring Liner Improvements (C. Pedersen)
16:15	16:30	Paper 22	A Novel Framework for Studying Loads on SAG Mill Liners Using the Impactfinder System, and DEM and FEM Simulations (K. Kluge)
16:30	17:00		Question Period
17:00	18:30		Chairperson's Reception
19:00	22:30		**Gala**

Thursday, September 28, 2023

Keynote: Ausenco

Session 13			Energy Efficient and More Sustainable Comminution (5)
8:00	8:30	Keynote	The Impact of GHG Emission Costs on the "True Economics" in Comminution Trade-Off Studies (G. Ballantyne)
8:30	8:45	Paper 2	Sag Mill Design and Benchmarking Using Trends in the JKtech Database (T. Vizcarra)
8:45	9:00	Paper 3	Evaluating the Integration of Sensor-Based Pebble Sorting at the Pulang Copper Mine SABC Circuit (G. Li)
9:00	9:15	Paper 4	Is coarse particle liberation the elixir for the new mineral processor? (R. Bearman)
9:15	9:30	Paper 5	Trusted Automation, the Pathway Toward Process Automation of Sabc Circuits (M. Yahyaei)
9:30	10:00		Question Period
10:00	10:15		Coffee

Session 14			Process Control (6)
10:15	10:30	Paper 6	Optimisation of the Leinster Nickel Mine Comminution Circuit (A. Harris)
10:30	10:45	Paper 7	Optimization of the Damang Comminution Circuit (C. Kuupol Kuutor)
10:45	11:00	Paper 8	Improvements in the Operation and Control of SAG Mills in Pt Amman Mineral's Batu Hijau Operation Using Mill Load Soft Sensor (P. Condori)
11:00	11:15	Paper 9	Leveraging Digital Tools for Improving SAG Mill Operation for Stable Charge and Near Real Time Grind Performance Prediction (M. Hazell)
11:15	11:30	Paper 10	Rapid diagnostics and observations of the internal operation of a SAG mill in the context of its grinding circuit. (R. Pax)
11:30	11:45	Paper 11	Mine to Mill the Next Phase - Incorporating Soft Sensors and Data Analytics (P. Madrid)
11:45	12:15		Question Period
12:15	13:00		Lunch

Session 15			Geometallurgy & Mine to Mill (5)
13:00	13:15	Paper 12	Improving Orebody Knowledge with High-Resolution Rock Strength Characterization Using the Minpraxis Tester (S. Nadolski)
13:15	13:30	Paper 13	Applied Geometallurgy at Agnico Eagle's Kittila Operation Using the Geopyörä Breakage Test (M. de Paiva Bueno)
13:30	13:45	Paper 14	Ore Hardness Mapping of Batu Hijau Ore Deposit Using the Hit (Hardness Index Tester) Device (T. Kojovic)
13:45	14:00	Paper 15	Integrated Mine-To-Mill Optimization of the Toromocho Operation at Minera Chinalco, Perú (R. Valle)
14:00	14:15	Paper 16	Mine-To-Mill Optimization and Continuous Improvement of Lundin Mining's Chapada Operation in Brazil (G. Evangelista)
14:15	14:45		Question Period
14:45	15:00		Coffee

Session 16			Future Design (6)
15:00	15:15	Paper 17	Extending STM's Large Vertical Stirred Mill Portfolio to 12.5 Mw (E. Zhmarin)
15:15	15:30	Paper 18	Pebble Crushing Circuits: the SAG Mill's Unappreciated Saviour (K. Erwin)
15:30	15:45	Paper 19	Evaluating the Operating Performance of 40-Foot SAG Mill Circuit Designs (B. Cornish)
15:45	16:00	Paper 20	Challenges of Operating Large Grinding Mill Drives in Renewable Energy Dominated Grids (J. Riedlberger)
16:00	16:15	Paper 21	Adding HIGmill Technology to the Ero Copper Caraiba Concentrator (W. Pretorius)
16:15	16:30	Paper 22	The Next Generation of Very Large Grinding Mills (D. Bordi)
16:30	17:00		Question Period
17:00	18:00		Closing Reception

Notes:
1) Effective date as of August 25, 2023
2) Indicated author is the corresponding author, presenting author may be different at the conference
3) This is a preliminary technical program; the SAG Conference Technical Committee reserves the right to modify this program as necessary