### TABLE OF CONTENTS

Chairman/Editor's Foreword

Editor's Biography

Organizers

Committees

Sponsors/Financial Supporters

Sponsors' Logos

Corporate Section

**Plenary Papers**

The State of Control in the Processing Sector  
*MMM13_0123_FI*  
*R. Russell Rhinehart*

Automated Systems – a Component of Sustainable Mining  
*MMM13_0122_FI*  
*John Meech*

Circulating Load Calculation in Mineral Processing Closed Circuit Operations  
*MMM13_0121_FI*  
*André Silva; Elenice Maria Schons Silva; Ricardo Antonio de Rezende*

Solid State Electrochemical Sensors in Metal Processing  
*MMM13_0120_FI*  
*Carsten Schwandt; Ramachandran Vasant Kumar*

Control and optimization in the bio-extraction of metals from primary ores before the new mineral processing techniques  
*MMM13_0112_FI*  
*Luis G. S. Sobral; Débora Monteiro Oliveira*
**Contributed Papers:**

**Mineral Processing**

Modeling of a Concentration Plant to Improve the Carbon Content Control of Iron Oxide Pellets  
*Hallab, Soufiane; Poulin, Eric; Hodouin, Daniel*

Improving Sustainability Strategies in Industrial Complexes: System Integration and Collaboration  
*Bascur, Osvaldo; Fernando, Romero*

Hydrocyclones Simulation Using a New Modification in Plitt’s Equation  
*Silva, André Carlos; Silva, Elenice Maria Schons; Matos, Jainer Diogo Vieira*

The Importance of Uncertainty Covariance Tuning for Steady-State Data Reconciliation in Mineral and Metal Processing  
*Vasebi, Amir; Hodouin, Daniel; Poulin, Eric*

An Integrated Simulation-Based Solution for Operator Effectiveness  
*Toro, Rodrigo; Ortiz Maya, José Manuel; Zamora, Claudio*

Increased Vertimills Productivity by Applying MPC & Advanced Control Systems at Minera Los Pelambres  
*Silva, Daniel; Henriquez, Felipe; Jimenez, Cesar*

Model Predictive Control of Potassium Chloride Drying by Fluidized Bed Dryer  
*Miranda, Rodrigo Cesar; Guimarães Neto, Joaquim Ferreira; Aguiar, Barbara Burgarelli Alves; Silva, Cláudio Luís Soares; Martins, Marco Aurelio*

The Importance of Good and Complete Historical Data for Improved Plant Operation and Advanced Process Control Implementation  
*Clout, Peter; LePore, Janarde*

Advances in Developing Supervisory Control Strategies for Flotation Plants  
*Bergh, Luis; Yianatos, Juan; Pino, Catalina*

Using a Virtual Flotation Process to Track a Real Flotation Circuit  
*Kaartinen, Jani; Pietila, Janne; Remes, Antti; Torttila, Sampo*
Parameter Estimation for a Flotation Process Tracking Simulator
*MMM13_0048_FI*
*Pietila, Janne; Kaartinen, Jani; Reinsalo, Ari-Matti*

Parameterization of Bubble Size Distribution in Flotation Columns
*MMM13_0073_FI*
*Riquelme, Alberto; Desbiens, Andre; Bouchard, Jocelyn; del Villar, Rene*

Hybrid Dynamic Predictive Model for Rougher Flotation
*MMM13_0062_FI*
*Putz, Eduardo; Cipriano, Aldo*

A Flotation Cell Model for Dynamic Simulation
*MMM13_0064_FI*
*Ortiz Maya, José Manuel; Toro, Rodrigo*

Modern Systems of Automatic Control of Processes of Grinding and Flotation of Copper-Molybdenum Ore
*MMM13_0032_FI*
*Morozov, Valery; Ganbaatar, Zorigtyn; Delgerbat, Lodoy; Topchaev, Vladimir; Sokolov, Igor; Stolyarov, Valeriy; Davaasambuu, Dorj*

Non Ferrous Ore Flotation Control Using Image Analysis and Expert System
*MMM13_0068_FI*
*Machado, Frederico; Gontijo, Hugo; Aguiar, Barbara Burgarelli Alves; Martins, Marco Aurelio*

Automatic Control of Impact Crushers Based on Visual Measurement of Size Distribution
*MMM13_0088_FI*
*Jaatinen, Antti; Onnela, Tero*

An On-Line Training Simulator Built on Dynamic Simulations of Crushing Plants
*MMM13_0105_FI*
*Asbjörnsson, Gauti; Hulthen, Erik; Evertsson, Carl Magnus*

Indirect Particle Size Distribution Control in Cone Crushers
*MMM13_0052_FI*
*Itävuo, Pekka Tapani; Vilkko, Matti Kalervo; Jaatinen, Antti*

Evaluation of MPC strategies for mineral grinding
*MMM13_0066_FI*
*Karelovic, Pablo; Razzetto, Roberto; Cipriano, Aldo*

Beyond the Minimum Dimension for Particle Size Control
*MMM13_0100_FI*
*Smith, Andrew; Steigerwald, Stefan*
Computer Controlled Pilot Scale Test of Bioleaching of Copper Sulphides Flotation Concentrate
MMM13_0111_FI
Sobral, Luis G. S.; Oliveira, Débora Monteiro; Souza, Carlos E. G.

Implementation of a SAG Grinding Expert System at Kansanshi Mine - Zambia
MMM13_0071_FI
van Zyl, Frane; Paquot, Francois; Metzner, Gunter; Fouche, Fanie; Gomez, Alan

Mass-flow Estimation in Mineral-processing Applications
MMM13_0023_FI
Väyrynen, Teemu Petteri; Itävuo, Pekka Tapani; Vilkko, Matti Kalervo; Jaatinen, Antti

Optimization of Hydrocyclone Classification by On-Line Detection of Coarse Material in the Overflow Stream
MMM13_0101_FI
Russell, Jerin; Cirulis, Dylan; Maron, Bob; O’Keefe, Christian; Rothman, Paul; Newton, David

Fuzzy Logic a Successful Example
MMM13_0004_FI
Ruel, Michel

Polyhedration of Multicomponent Mineral Systems
MMM13_0017_FI
Lutsyk, Vasily; Vorob’eva, Vera; Sumkina, Olga; Lamueva, Marina

New Technology of Processing Pyrite Concentrate
MMM13_0043_FI
Hakobyan, Kliment; Hakobyan, Armen; Melkomyan, Ararat; Karamyan, Gagik

Development and Testing of Environmentally Friendly Hydro-Electrochemical Technology for Processing Copper Sulfide Concentrates of Armenian Deposits
MMM13_0044_FI
Hakobyan, Kliment; Hakobyan, Armen; Melkomyan, Ararat; Karamyan, Gagik; Hayrapetyan, Vahram; Paramazyan, Grenik; Bryukvin, Vladimir; Leontiev, Vladimir; Tsybine, Oleg

Technology of Secondary Niobium Raw Material Recovery
MMM13_0097_FI
Upolovnikova, Alena; Chumarev, Vladimir; Udoeva, Liudmila

Mining

Characterization of Copper Sulfides Formed in MEMS Connections by Atmospheric Corrosion in Indoor of Electronics Industry of Arid & Marine Environments
MMM13_0080_FI
GL, Gustavo López Badilla; SL, Sandra Luz Toledo Perea; MMA, Maria Marcela Acosta Gomez; ER, Elizabeth Romero Samaniego
Mining Accident Detection Using Machine Learning Methods
MMM13_0051_FI
Basso, Franco; Santibanez, Francisco; Flores, Carlos; Jimenez, Abelino; Bravo, Francisco; Nunez, Felipe; Luco, Hector; Martinez, Luis; Benitez, Angel

Decision Making Applied to Shift Change in Stochastic Open-Pit Mining Truck Dispatching
MMM13_0090_FI
Sousa Bastos, Guilherme

Optimisation Algorithms in the Case of Mineral Detection Using Raman Analysis
MMM13_0021_FI
Kauppinen, Tommi Kaapro; Haavisto, Olli; Häkkänen, Heikki

Laser-Induced Breakdown Spectroscopy for Rapid Elemental Analysis of Drillcore
MMM13_0047_FI
Haavisto, Olli; Kauppinen, Tommi Kaapro; Häkkänen, Heikki

Studies on the Feasibility of Laser-Induced Breakdown Spectroscopy in Explosion Proof Atmospheres
MMM13_0022_FI
Nienhaus, Karl; Bartnitzki, Thomas; Fietz, Nina Britta

Concept of Shield-Data-Based Horizon Control for Longwall Coal Mining Automation
MMM13_0074_FI
Holm, Mirjam; Beitler, Stephan; Arndt, Thorsten; Junker, Martin; Bohn, Christian

Hybrid Electric Haulage Trucks for Open Pit Mining
MMM13_0042_FI
Esfahanian, Ehsan; Meech, John

Loading Excavator Analysis for Trajectory Control Improvement
MMM13_0108_FI
Danko, George

Predicting Wear and Temperature of Autonomous Haulage Truck Tires
MMM13_0078_FI
Parreira, Juliana; Meech, John

System Integration of Automated Mine Optimization System
MMM13_0079_FI
Pan, Xiaowei

Optimization of Conveyor Belts Fire-Resistant Rubber Properties Using a Mathematical Model of Desirability Functions
MMM13_0058_FI
Dushi, Afrim; Kongoli, Florian; Rizaj, Musa
Non-ferrous

Enterprise Manufacturing Services to Enhance Energy Effectiveness and Sustainability Management at AngloPlats

Bascur, Osvaldo; Halhead, Michael

Basic principles of controlling a technological process of copper matte converting in a two-zone Vaniukov’s converted furnace

Tsymbulov, Leonid; Pigarev, S.P.; Kongoli, Florian; McBow, I.

Decision Support System for Hydrometallurgical Processing

Tejeda, Gabriel; Reyes, Francisco; Karelovic, Pablo; Herrera, Miguel; Romero, Fernando; Cipriano, Aldo

Dynamic Simulation for Verification of Gains with the Implementation of Advanced Process Control for a Nickel Sulphide Ore Beneficiation Plant

Nogueira, Andre; Vieira, Monica; Martins, Marco Aurelio

Optimal Converter Aisle Scheduling in a Nickel Smelting Plant

Ewaschuk, Christopher M; Swartz, Christopher L.E.; Zhang, Yale

Hot Deformation Processing and Texture in Magnesium Alloy WE43

Avadhani, Ganesh; Tapase, Shekhar; Suwas, Satyam

Control Optimization of a Lead Sintering Process

Moreno Molina, Marcos Francisco; Morales Castelán, Jorge

Dynamic Simulation for Acid Plant Operator Training in Chuquicamata

Gajardo, Mallen; Hernandez, Ramon; King, Kirk

Pilot Plant and New Vapor-Pyrometallurgical Process for Processing Sulfide Concentrates

Hakobyan, Kliment; Sohn, Hong; Hakobyan, Armen; Blanco, Edgar; Tarasov, Andrey; Melkomyan, Ararat; Karamyan, Gagik; Hayrapetyan, Vahram; Bryukvin, Vladimir; Leontiev, Vladimir; Tsybine, Oleg

The Effect of the Nickel Sulphide Alloys Structure on Their Electrochemical Oxidation Parameters

Nechvoglod, Olga; Selivanov, Evgeny; Lobanov, Vladimir

Iron

Monitoring System of Firebrick Lining Erosion of Blast Furnace Hearth

Dmitriev, Andrey; Chesnokov, Yuri; Chen, Kai; Ivanov, Oleg; Zolotykh, Maxim
Influence of Iron Ore Materials Softening Interval on Cohesive Zone Location and Form in Blast Furnace

*Dmitriev, Andrey; Vitkina, Galina; Chesnokov, Yuri; Petukhov, Roman*

Iron Ore Materials and Coke Quality Characteristics and Quantitative Indicators of Blast Furnace Smelting

*Dmitriev, Andrey; Vitkina, Galina; Chesnokov, Yuri; Petukhov, Roman*

On Dependence of High Temperature Rheological Behaviour of Blast Furnace Slag on Its Network Structure

*Mukherjee, Dr. Kakali; Prakash, Swatantra*

Automatic Control of Direct Reduction Iron Ore (DRI) Process

*Guanin, Simone; Pignattone, Dino; Martinis, Alessandro*

Online Modelling of ENERGIRON Direct Reduction Shaft Furnaces

*Zugliano, Alberto; Primavera, Alessandra; Pignattone, Dino; Martinis, Alessandro*

Effect of South African Reductants on Ferrochrome Production

*Pan, Xiaowei*

**Heat Treatment and Material's Properties**

Energy-Efficient Control of Continuous Reheating Furnaces

*Steinboeck, Andreas; Wild, Daniel; Kugi, Andreas*

Three-Phase Reaction Type Changing in Mo-Zr-V and Ti-Ir-Ru Systems

*Lutsyk, Vasily; Vorob'eva, Vera; Sumkina, Olga; Tsynguev, Bulat*

Correction of T -X-Y Diagrams for Lead-Free Solders

*Lutsyk, Vasily; Vorob'eva, Vera; Zyryanov, Alexandr; Shodorova, Svetlana*

**Steel**

Molten Metal Pressure Control for Defect Prevention with Generalized Predictive Control in Rapid Press Casting

*Tasaki, Ryosuke; Hashimoto, Kunihiro; Terashima, Kazuhiko*
On the Development of Transformable Sheet Metal Forming Tools
MMM13_0040_FI
Birkhold, Markus; Pauli, Franz-Bernd; Lechler, Armin; Verl, Alexander

Model Predictive Controller for Strip-Tracking During Tail-Out of the Finishing Mill
MMM13_0082_FI
Hol, Camile W.J.

Analysis of Radiative Heat Transfer in an Indirect-Fired Strip Annealing Furnace Based on Integral Equations
MMM13_0034_FI
Niederer, Martin; Steinboeck, Andreas; Strommer, Stephan; Kugi, Andreas

Estimation of Plate Temperatures in Hot Rolling Based on an Extended Kalman Filter
MMM13_0006_FI
Speicher, Katrin; Steinboeck, Andreas; Wild, Daniel; Kiefer, Thomas; Kugi, Andreas

Mold Level Stabilization Using a Standing Wave Model in Continuous Casting
MMM13_0087_FI
Shimamoto, Hiroyuki; Asano, Kazuya; Okazaki, Kentaro

Estimation of Camber Generation in Rough Rolling Process
MMM13_0076_FI
Kang, Youngil; Choi, Yong-Joon; Oh, KiJang; Won, Sangchul

Control Algorithm of a Pick and Place Three Dimensional Robots
MMM13_0029_FI
Krasniqi, Fehmi

Model Predictive Control of Continuous Ingot Solidification
MMM13_0046_FI
Ivanova, Anna

Metal and Ceramic Coating, Power Generation

Properties of Powder Coatings Formed by Gas-Dynamic Accelerator
MMM13_0033_FI
Vasilik, Nikolay; Tyurin, Yuriy; Kolisnichenko, Oleg; Kovaleva, Marina; Prozorova, Marina; Arseenko, Mariya

Macrokinetics of Plasma Electrolytic Oxidation of AZ91D Alloy
MMM13_0039_FI
Lugovskoy, Alex; Zinigrad, Michael; Kazanski, Barbara

Sustainable Wind Power Generation by Online Sensor Oil Condition Monitoring against Premature Gearbox Bearing Failures
MMM13_0035_FI
Mauntz, Manfred R.; Gegner, Jürgen; Kuipers, Ulrich; Klingauf, Stefan
Recycling & Waste Treatment

Basic control principles for producing a high performing new ceramic glass by mixing fly ash, ferronickel slag and waste glass
MMM13_0057_FI

Ibrahimi, Izet; Kongoli, Florian; Rizaj, Musa; Pula, Justina

Metals Recovery From Waste of Printed Circuit Boards Processed in Plasmatron Plasma Reactor
MMM13_0109_FI

Szalatkiewicz, Jakub

Structural Characterization of Seydiş Ehir Red Mud to Utilization in Roof Tile Manufacturing
MMM13_0010_FI

Piskin, Sabriye; Kantürk Figen, Aysel; Özkan, Emrah; Özçay, Ünal

The Preparation of Silicon and Aluminum Alkali Extracts from Fused Turkish Coal Fly Ashes
MMM13_0011_FI

Piskin, Mehmet Burcin; Sari Yilmaz, Muge

Environmental Issues

Controlling Indoor Benzene Concentrations Using a Fuzzy System
MMM13_0075_FI

Pitalúa-Díaz, Nun; Herrera López, Enríque Jaime; Luis, Velázquez Contreras; Alvarez-Chávez, Clara Rosalía; Nora, Munguía Vega

Increasing the Pollution Control in Natural Waters by Automation the Sampling Technology and Laboratory Analyses in Combination with Spot Water Sampling
MMM13_0031_FI

Neziri, Anila; Malollari, Ilirjan

Control of the Influence of Minerals, Nitrogen, Phosphorus and Potassium During Cultivation of Some Varieties of Winter Barley (Hordeum Vulgare L.) for Beer Production
MMM13_0049_FI

Shala, Nexhedet; Kelmendi, Bakir; Berisha, Defrime; Zuka, Violeta

Ecological and Technological Aspects of Use of Water Recirculation at Extraction of Precious Metals from Quartzites
MMM13_0028_FI

Tyushkova, Natalia