



24th World Mining Congress

MINING IN A WORLD OF INNOVATION

October 18-21, 2016
Rio de Janeiro/RJ • Brazil



IBRAM
INSTITUTO BRASILEIRO DE MINERAÇÃO
Brazilian Mining Association
Câmara Mineira de Brasil

October 18th, 2016 – TUESDAY

MAIN AUDITORIUM

09:30 h - OPENING CEREMONY

Chairman's IBRAM Board: Clovis Torres Junior, Executive Director and General Counsel of VALE S/A, Brazil

Honorary Chairperson: José Fernando Coura, CEO, Brazilian Mining Association (IBRAM), Brazil

Murilo Ferreira, CEO, VALE S/A, Brazil

Congress Chairperson: Prof. Jair Carlos Koppe, Federal University of Rio Grande do Sul (UFRGS), Brazil

World Mining Congress: Prof. Józef Dubiński, Chairman, Central Mining Institute (GIG), Katowice, Poland

AUTHORITIES & GOVERNMENTS

- Paulo Pedrosa, Interim, Minister of Mines and Energy of Brazil
- Zamir Saginov, Executive Secretary of Ministry for Investments and Development, Republic of Kazakhstan
- Shri Balwinder Kumar, Secretary, Ministry of Mines in India
- Wang Xianzheng, President of China National Coal Association
- Guests

HOMAGE CEREMONY – Special Honouree: Marcelo Ribeiro Tunes - Director of Mining Affairs of the Brazilian Mining Association, former General Director of National Department of Mineral Production (DNPM), Brazil

12:30 h – OPENING THE WMC 2016 EXPO

14:30 h – TALK SHOW WITH MINING COMPANIES CEOs

“Mining in a World of Innovation: the mining company of the future”

- Benedikt Sobotka – CEO, Eurasian Resources Group Sàrl, Luxembourg;
- Murilo Ferreira – CEO, VALE S/A, Brazil;
- Ruben Fernandes – CEO, Anglo American, Brazil.
- Tito Martins – CEO, Votorantim Metais, Brazil;

MODERATOR: Gillian Davidson, Head Mining & Metals of World Economic Forum (WEF), Switzerland

16:00 h - BREAK

16:15 h – KEYNOTE SPEAKER:

“Breaking Free: Three Keys to Conquering the Unknown”

Context: Our world is changing faster than ever and yet most companies struggle to adapt and transform, even when they know they must. This session will explain how human nature perpetuates down-cycles, stifles innovation and slows down progress and the three keys that allow future focused firms to seize opportunity and change the very nature of their industries.

- George Hemingway, Partner & Innovation Practice Lead, Stratalis Consulting, New York City, USA

17:00 h – PLENARY SESSION WITH WMC CHAIRPERSONS

“Past, Present and Future: evolution of dialogue and knowledge generated by World Mining Congress”

- Prof. Józef Dubiński, Chairman World Mining Congress, Poland
- Prof. Ferri Hassani (McGill, Canada, WMC2013)
- Prof. Jair Carlos Koppe (UFRGS, Brazil, WMC2016)
- Prof. Zharmanov Abdurassul Aldashevich (WMC2018 in Astana, Kazakhstan)

MODERATOR: Prof. Luis Enrique Sánchez (USP), WMC2016 Congress Co-chair, Brazil

PARALLEL PROGRAM – ROOM SAFIRA

18:30 h – Public Presentation and Launch of the Book “Mineral Resources in Brazil: problems and challenges”, published in a partnership between the Brazilian Academy of Sciences and Vale S/A.



October 19th 2016 - WEDNESDAY

The Conference with Plenary Sessions will be during the morning and the technical sessions in the afternoon

AUDITORIUM VOTORANTIM METAIS

08:30 h - ISSA Mining Symposium on Safety and Health in Mining: Accidents – Fatalities – Diseases: Daily Business or a Need to Change?

Objective of session: The fatality and accident rates in mining are still much higher than in other industries. Workplace exposures cause illnesses and pain. The industry suffers from bad image, economic loss and a lack of acceptance in society due to this non-satisfying situation. ISSA Mining has launched a new success promising strategy to assist mining countries and the mining industry to change and improve. The basic belief of the VISION ZERO Strategy of ISSA Mining is: every accident and every occupational illness is preventable, if leaders and managers care personally for safety and health and act according to their responsibility. Within the session the VISION ZERO Strategy will be explained and the 7 Golden Rules Concept to implement the strategy will be presented. Speakers from different countries and mining industries will give examples how they face these challenges.

Co-Moderators: **Helmut Ehnes**, Secretary General ISSA Mining, Manager Prevention BG RCI, Germany; and **Cláudia Pellegrinelli**, Coordinator of IBRAM Health & Occupational Safety Program, Brazil

Opening Address with Ulrich Meesmann, President of ISSA Mining, Member of the Management Board BG RCI, Germany

Keynote “VISION ZERO & 7 Golden Rules” - The New Global Prevention Strategy for Safe, Healthy and Sustainable Mining

- **Cristian Moraga**, Vice President of ISSA Mining, C.E.O. Mutual de Seguridad C. CH. C., Chile

The industry’s perspectives: “How to achieve VISION ZERO?”

Participants:

“Safety Challenges in Open Pit Coal Mining”

- **Gabriel Martinez Ortega (tbc)**, Corporate H&S Training Manager, Prodeco Group, Colombia

“Peruvian Mining: Vision Zero Accidents at 2021”. Strategies to Reduce Fatal Accidents at Peruvian Bicentennial

- **Fernando Borja**, General Manager at the Mining Safety Institute of Peru (ISEM), Peru

“OH&S philosophy, Vision Zero and Wellness Program at Grupo Progreso”

- **Roberto Hermosilla**, Cementos Progreso S. A., Guatemala

10:30 h - BREAK

10:45 h - 11:30H

“Mining in High Altitude: Challenges for Health”

- **Mr. Manuel Guerra**, MD, Director of the Center for Services on Health and Safety for Mining of Mutual de Seguridad, Chile

Audience discussion

11:30 h - Initiative Launching – Video Series “100% Safe Mining”, Social Service of Industry (SESI)

Objective of session: The Series “100% Safe Mining” consists in 50 episodes that shows the most important tools to ensure the worker’s well-being are information, qualification and training. Each episode delves into the main activities in underground and open pits mines. Shows how mining companies and workers can work together to promote general safety.

Session Moderator: **Cláudia Pellegrinelli**, Coordinator of IBRAM Health & Occupational Safety Program, Brazil

- **Rafael Lucchesi**, Director Superintendent of Social Service of Industry (SESI), Brazil



October 19th 2016 - WEDNESDAY

The Conference with Plenary Sessions will be during the morning and the technical sessions in the afternoon

AUDITORIUM VALE/SINFERBASE

08:30 h - IBRAM/MAC Panel Session on Tailings Management

Objective of session: to provide a forum to discuss global and corporate developments to improve tailings management and safety, including emerging industry standards and regulatory approaches, and corporate and site-level practices for good governance and tailings management.

Session Moderator: Pierre Gratton, President and CEO, Mining Association of Canada (MAC)

Part 1: Emerging Industry Standards and Regulatory Approaches to Tailings Management

- **Tom Butler**, President and CEO, International Council of Mining and Metals (ICMM), UK: *The ICMM's role as an international representative body in undertaking an independent review of tailings management following the tailings dam failure in Brazil, with particular focus on the management of critical controls;*
- **Ben Chalmers**, Vice President, Sustainable Development, Mining Association of Canada (MAC): *The tailings management component of MAC's Towards Sustainable Mining program, and highlight some examples of progressive tailings management;*
- **Harvey McLeod**, Principal, Klohn Crippen Berger, Chair of the Tailings Committee, International Commission on Large Dams (ICOLD): *Canadian and international developments on tailings dam design and management practices that improve safety of tailings dams. The new changes to the Mining Regulations that have been implemented as a result of the Mount Polley tailings dam failure.*

- Comments from panelists, and then comments and questions from session attendees.

10:30 h - BREAK

10:45 h - CONTINUATION

Part 2: Good Governance and Tailings Management Practices at Corporate and Site Levels

- **Michel Julien**, Vice President, Environment, Agnico Eagle Mines Limited: *Tailings management across Agnico Eagle's operations, and share some experiences based on over 20 years designing tailings facilities, and on the evolution of tailings management in Canada;*
- **Dr. Caius Priscu**, Head of Mineral Residue Management, Anglo American: *Portfolio risk management and dam safety practice across Anglo American's operations.*

- Comments from panelists, and then comments and questions from session attendees.

AUDITORIUM ESMERALDA

08:30 h - The Swedish experience in creating an innovative and sustainable environment for a high performing mining sector

Objective of session: Sweden is today the main iron ore producer in Europe. The country has achieved a high technological development through government innovation incentives and partnerships with the industry and universities, which has led to increased productivity. For instance, the mining sector in Sweden produces today over 70 million tons of iron ore having only five active mines, compared to in 1960 when Sweden had 60 active mines but produced only 28 million tons. In this regard, the Vice Minister of Foreign Affairs, Mr. Oscar Stenström, accompanied by an official high-level delegation would like to present the Swedish experience in achieving remarkable results, not only regarding productivity and efficiency, but also in creating a sustainable environment where society and the mining sector can co-exist in harmony. The seminar will be divided in four panels that will focus on current topics for the mining sector: the next generation of autonomous vehicles, automation in the future, green mining and communication in the mines. Each panel will introduce success cases and ongoing research, elaborating on how to achieve a high performing sector. The panels will be presented by representatives from renowned research institutes, universities and the industry.

08:30 h - Opening remarks: Oscar Stenström, Vice Minister of for EU and Trade of Sweden

08:40 h - Mining Technology and Efficiency: a trade-off with society and environment

- **Mr. Diego Galar**, Professor PHD, Luleå Technical University, Sweden

09:00 h - Mining Innovation System

- **Ms. Charlotte Andersson**, Program Director, STRIM – Strategic Innovation Program for the Mining and Metal Producing Industry, Sweden

09:15 h - Panel 1: The Future of Automation

- **Mr. Diego Galar**, Professor PHD, Luleå Technical University, Sweden
- **Mr. Peter Wallin**, Technology Research Manager, Volvo Construction Equipment



October 19th 2016 - WEDNESDAY

10:00 h - Panel 2: Autonomous Vehicles for the Mining Industry

- **Mr. Laercio da Costa Barbosa**, Research and Development Engineer, Scania Latin America, Brazil
- **Mr. George Rizopulos**, Global Account Director, Scania Mining, Sweden
- **Mr. Marcus Mundim**, Director of Engineering, Intelligent Machine Systems, Hexagon Mining, Brazil

10:30 h - BREAK

10:50 h – CONTINUATION Panel 2: Autonomous Vehicles for the Mining Industry

- **Mr. Marcus Mundim**, Director of Engineering, Intelligent Machine Systems, Hexagon Mining, Brazil

MODERATOR: **Ms. Semida Silveira**, Professor PHD, KTH Royal Institute of Technology, Sweden

11:05 h – Panel 3: Communication in the Mines

- **Ms. Jenny Greberg**, Program Manager, STRIM – Strategic Innovation Program for the Mining and Metal Producing Industry, Sweden

MODERATOR: **Ms. Semida Silveira**, Professor PHD, KTH Royal Institute of Technology, Sweden

11:35 h – Panel 4: Safety in the Mines

Mr. Rodrigo Marinho, General Manager, Hexagon Mining, Brazil

MODERATOR: **Ms. Semida Silveira**, Professor PHD, KTH Royal Institute of Technology, Sweden

12:05 h - Panel 5: Mines of the Future

- **Mr. Nils Grafström**, Head of Invest Brazil, Business Sweden, Sweden
- **Mr. Magnus Ericsson**, Professor, Luleå Technical University, Sweden
- **Ms. Elina Rantanen**, Senior Project Manager, Business Sweden, Sweden

12:55 h – Final words

TECHNICAL LECTURE ROOM

13:30 h - Tribute to Prof. Roberto Cerrini Villas-Bôas (in memorian) – 40 minutes

Organizers:

- **Carlos Peiter**, Center of Mineral Technology [CETEM], Brazil;
- **Marcello M. Veiga**, University of British Columbia, Canada.

PARALELL PROGRAM

08:30 h – 13:00 h – University Award – Brazilian Association of Business Communication (ABERJE) / PUA (Prêmio Universitário ABERJE 2016) Organization: VALE S/A. **AUDITORIUM SAFIRA**

09:30 h – 12:00 h – Side Event - Meeting World Bank, only for guests - **AUDITORIUM ALEXANDRITA**

14:00 h – 17:00 h - Meeting GT COMUNICAÇÃO - Organization: IBRAM and VALE S/A. (ONLY FOR GUESTS) **AUDITORIUM ALEXANDRITA**

The Conference with Plenary Sessions will be during the morning and the technical sessions in the afternoon

October 20th 2016 - THURSDAY

AUDITORIUM VOTORANTIM METAIS

08:30 h - The Kellogg Innovation Network (KIN): Why Partnering For Development is the Future of Mining

Objective of session: This session will explore the social, economic and environmental dimensions that are so vital for a vibrant mining industry and a future that provides for an equitable distribution of benefits to all stakeholders. As the mining industry deals with the steep downturn in commodity prices and demand, they continue to face complex challenges especially maintaining their social license to operate in the face of increased community activism. The Development Partner Institute will discuss how the Development Partner approach, co-created by a multi-stakeholder group under the auspices of the Kellogg Innovation Network (KIN), can be an effective approach to create a new mindset and conversation.

The Preliminary Program can be modify by the Organizing Committee of the 24th World Mining Congress.

Venue: SulAmerica Convention Center Address: Av. Paulo de Frontin, 1 - Cidade Nova, Rio de Janeiro

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Version of October 17th-2016



October 20th 2016 - THURSDAY

Session Moderator: Kulvir Singh Gill, Senior Principal, Clareo and Collaborator at the Kellogg Innovation Network, USA

Participants:

- **Jon Samuel**, Group Head of Government & Social Affairs, Anglo American Plc, UK;
- **Antonio Werneck**, Executive Director, The Nature Conservancy Brazil (TNC), Brazil;
- **Sergio Andrade**, Executive Director Agenda Pública, Brazil;
- **Rev. Séamus Finn**, OMI is the Chief of Faith Consistent Investment, OIP Investment Trust & Chair, Interfaith Center on Corporate Responsibility, US;
- **Juan Eduardo Balmaceda**, Hatch, Environmental Services Group Lead, Peru.

10:30 h – BREAK

AUDITORIUM VOTORANTIM METAIS

10:45 h - Sustainability Governance Initiatives

Objective of session: In the past decade the mining industry has attempted to strengthen their corporate policies, increase their engagement with government, civil society and community actors, and improve their professional capability to respond to environmental and social challenges. But doubt still persists in the minds of those outside the minerals industry about the authenticity of such change. There is also increasing concern from civil society actors about the dramatic shifts in the scale, technology and location of mineral developments. Sustainability Governance Initiatives are increasingly being used by minerals companies and governments as a tool to demonstrate that they are operating responsibly. Some initiatives may also be used by civil society actors to hold mineral companies and governments to account and for companies and governments to demonstrate that they are operating responsibly. This panel session aims to identify what are the key components affecting effectiveness of such initiatives, highlighting their benefits, flaws and improvement opportunities considering the perspective of different stakeholders.

Participants:

- **Renzo Mori Junior**, The University of Queensland, Australia
- **Marcin Piersiak**, Deputy Director in the Alliance for Responsible Mining, Colombia
- **Dione Macedo**, Coordinator of Socio-environmental Development, Ministry of Mines and Energy, Brazil

Session Moderator: Cláudia Salles, Manager of Environmental Affairs, IBRAM, Brazil

AUDITORIUM SINFERBASE

08:30 h - Innovation in Mineral Exploration and the Development of Mineral Resources

Objective of session: Innovation has always been an intrinsic factor to success in Mineral Exploration, with new techniques, concepts, tools and procedures developed and tested by major, medium and junior companies supported by research centres, universities and service providers. Like many other areas in modern society, along the recent years we have experienced acceleration in this process but we are still to see the positive impact on new discoveries and cost reductions. This panel is dedicated to present real examples of innovation and how they were incorporated into operations.

Participants:

- **Edson Ribeiro**, Director of Mineral Exploration, VALE S/A, Brazil
- **Prof. Caetano Juliani**, Universidade de São Paulo, USP, Brazil
- **Olivier Bertoli**, CEO, Geovariances, France

Session Moderator: Prof. Onildo J. Marini, Executive Director, Agency for Technological Development of Brazilian Mining Industry [ADIMB], Brazil

10:30 h – BREAK



October 20th 2016 - THURSDAY

AUDITORIUM SINFERBASE

10:45 h – Productivity in mining operations: how new innovative approaches could revert the downward trends

Objective of session: The worldwide mining operations have faced a significant decline in the last decade. Many companies are now dealing with this substantial drop-off in productivity through a series of cost-cutting exercises or point solutions. However, the problem is too big only for point solutions to solve on their own and often they have the effect of simply moving the problem further down the supply chain. Real and sustainable productivity gains will only come from broad business transformation. The answer surely will come from new innovation approaches, but mining industry has spends less on research and development for innovation compared to other sectors, especially on mining and processing methods. This session will discuss how innovation could transform this reality.

Session Moderator: Dr. Michael Karmis, Stonie Barker Professor, Department of Mining and Minerals Engineering & Director, Virginia Center for Coal and Energy Research, Virginia Tech, US

Participants:

“Where do we go from here – learnings and options”

- Quest for productivity in Mining – key levers;
- Miners response – initiatives and results;
- Where do we go from here – learnings and options.
 - Afonso Sartorio, Mining Leader Brazil and South America, EY, Brazil;

“Productivity in Mining Operations: key levers”

- Richard Sellschop & Henrique Ceotto, McKinsey & Company, Inc, US;

“Leveraging productivity: A collaborative approach for business model and management model innovation”

- Understanding why innovation is imperative for the mining industry;
- Exploring the key elements of a model of success for making innovation happen;
- Real Case: A collaborative approach using design thinking for solving strategic problems focused on productivity and safety.
 - Rafael Laskier, Strategy & Innovation Manager, VALE S/A

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AUDITORIUM VALE

08:30 h - World Bank Energy and Extractives: Why Climate Change Matters for the Mining Industry?

Objective of session: It is increasingly evident that climate change – both the physical phenomena and developing policy responses to address it – will have a material impact on the mining and metals industry’s future.

This event will provide an introduction to the many ways in which climate change plays a role in shaping the industry’s future investments, with a particular focus on developing countries, including:

- heightened vulnerability to its future operations and supporting eco and water systems;
- increasing exposure to regulatory pressure to minimize environmental (including GHG emissions) and material impacts, such as energy use and water use, in its operations;
- the contribution the industry would be expected to make in supplying the clean technologies necessary for the goal of a ‘net zero carbon’ future be realized; and
- elements of a ‘climate smart’ approach to mining

Perspectives will be provided by the wide range of stakeholders directly implicated in the mining and metals operations including governments, MDBs, the private sector and civil society.

Session Moderator: Daniele La Porta, Sr. Mining Specialist, World Bank, US

Part 1 - Setting the Scene:

“Range of implications of climate change for the mining industry: from physical impacts to commodity market opportunities”

- John Drexhage, Consultant at World Bank, Canada



October 20th 2016 - THURSDAY

“Impacts and relevance of climate change for the industry in Sierra Leone” - a Government Perspective

- H.E. **Abdul Ignosi Koroma**, Deputy Minister of Mines and Mineral Resources of Sierra Leone

“How Engaged is the Industry in addressing climate change?” - Perspectives from the Mining Sector

- **Tom Butler**, President and CEO, International Council of Mining and Metals (ICMM), UK

Part 2 - Roundtable Discussion: What role for the mining Industry in addressing climate change?

Chair: Kirsten Hund, Senior Mining Specialist, World Bank

Participants:

- **Pierre Gratton**, President and CEO, Mining Association of Canada (MAC). *Mining Association of Canada on Carbon Pricing*;
- **Jennifer Hooper**, Global Director of Health, Safety and Sustainability, VALE S/A
- **Stan Pillay**, Leader, Climate Change and Efficiency, Anglo American, South Africa
- **Virgílio Viana**, Superintendent General, Fundação Amazonas Sustentável, Brazil
- **Rinaldo Mancin**, Director of Environmental Affairs, IBRAM, Brazil
- **Tom Butler**, President and CEO, International Council of Mining and Metals (ICMM), UK

Part 3 - Conclusions and Closing Remarks

10:30 h – BREAK

AUDITORIUM VALE

10:45 h – Water, Mining and Communities

Objective of session: Water is critical to mining operations. While industry has taken steps to become more water efficient, water quantity and quality continue to impose technical challenges both in regions where new deposits are being found and for established mines. These technical challenges are exacerbated by the growing opposition to mining projects driven, in part, by the concerns of communities, government and other water users about issues related to availability and water quality. At the same time, national and regional governments are facing challenges on how to promote economic and sustainable development, and how to manage water resources to take into account the needs of different users. In some jurisdictions, public-private partnerships (PPP) are seen as opportunities to respond to some of these challenges. In others, participatory environmental monitoring groups have been established as a means to deal with conflicts, address societal concerns, and enable multi-stakeholder participation. This international panel will discuss leading practices, challenges, and opportunities related to integrated water management and the ways in which the mining sector might reduce conflict and contribute to the transition to a more sustainable approach to water management.

Session Moderator: **Andre Xavier**, PhD, University of British Columbia & Canadian International Resources and Development Institute (CIRDI), Canada

Panelists:

- **Tom Butler**, President and CEO, International Council of Mining and Metals (ICMM), UK
- **Manuel Bernal Pacheco** - Manager, Futuro Sostenible - a Peruvian NGO that works on Participatory Environmental Monitoring Committees, Peru
- **Jocelyn Fraser** - Senior Communications and CSR mining professional and PhD Candidate at UBC Mining Department, Canada
- **Ben Chalmers**, Vice President, Sustainable Development, Mining Association of Canada (MAC), Canada
- **Maria de Fátima Chagas Dias Coelho**, Director-General, Water Management Institute of Minas Gerais (IGAM), Brazil

AUDITORIUM ESMERALDA

10:45 h- Special Session

“The future of mining in Americas”

Objective of session: *The Presidents of the core mining associations analyzing the main challenges and opportunities for mining activity in Americas, under a discussion moderated by the Organismo Latinoamericano de Minería (OLAMI).*



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Session Moderator: Hugo Nielson, General Secretary of OLAMI

- Argentina
- Brazil
- Canada
- Chile
- Guatemala
- Mexico
- Peru

PARALLEL PROGRAM

ALEXANDRITA ROOM 10:30 h - Meeting Grupo de Diálogo: Mineração, Democracia e Desenvolvimento Sustentável

TOPAZIO ROOM 10:45 h - Academic Meeting – Organized by Prof. Jair Carlos Koppe - Congress Chairperson

October 21st 2016 - FRIDAY

AUDITORIUM VOTORANTIM METAIS

08:30 h - Mining and the Sustainable Development Goals (SDGs)

Objective of session: This panel will explore the mining sector potential contributions to the Sustainable Development Goals. The Agenda 2030 that defines the 17 SDGs envisages a world of universal respect for human rights, equality and nondiscrimination where no one will be left behind. A multi-stakeholder perspective in implementing Agenda 2030 suggests roles and responsibilities to all sectors. Through a global dialogue process mining industries potential contributions have been discussed and potential contributions SDG achievement. In this session we aim to operationalize these ideas and proposals within the sector. The suggestions, ideas and recommendations for implementation will be presented as businesses cases by different actors. Results of this debate will feed into on-going global dialogue on extractive industries and SDGs under the auspices of the United Nations, World Economic Forum and other partners.

Chairs:

- Gillian Davidson, Head Mining & Metals, World Economic Forum (WEF), Switzerland
- Ieva Lazareviciute, United Nations Development Program (UNDP)

Panelists:

- Rafael Luis Pompeia Gioielli, Instituto Votorantim, Brazil
- Dee Bradshaw, Cape Town University, South Africa
- Maria Jose Gazzi Salum, Ministry of Mines and Energy, Brazil
- Bruno Gomes, Executive Secretariat of Latin American Group of Dialogue, Brazil
- Roberto Sarudiansky, Director, Institute Mining Technology-INTEMIN, Argentina

10:30 h – BREAK

AUDITORIUM TOPAZIO

10:45 h - Using the social license to prioritize stakeholders

Objective of session: Companies face criticism for ignoring stakeholders, but which ones? Many want special attention while others demand equal treatment. The social license concept helps companies decide which stakeholder deserves more priority. Combined with information on the structure of the network of stakeholders, the win-win overlap between company interests and stakeholder concerns can be translated into strategies for stabilizing the socio-political environment. The panel will discuss practical advice for the prioritizing stakeholders and devising initiatives for engagement.

Session Moderator: Liliane Lana Liberato, Principal, Bridge Communication, Brazil.

Speakers:

- Dr. Robert Boutillier, Researcher, Simon Fraser University, President of Boutillier & Associates, Canada
- Othon de Villefort Maia, Manager of Communications and Community Relations, AngloGold Ashanti, Brazil
- Dr. Kieren Moffat, Senior Research Scientist, CSIRO, Australia
- Javier Diez de Medina, Corporate Affairs Manager, Minera San Cristobal SA, Bolivia

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October 21st 2016 - FRIDAY

AUDITORIUM ESMERALDA

08:30 h - Innovation in Blasting with ISEE - International Society of Explosives Engineers

Objective of session: Innovation, products, ANFO, energy and cost

Session Moderator: Prof. Enrique Munaretti (UFRGS), WMC2016 Congress Co-chair, Brazil

Speakers:

ISEE - International Society of Explosives Engineers, Institutional presentation

- **John William Eloranta (Jack)**, International Society of Explosives Engineers presentation, US

“Advancements in Terrestrial and Aerial Photogrammetry Applications for Blasting and Rock Mass Characterisation”

Stereo photogrammetry has proven its value in the blasting industry as an easy and cost effective way to profile rock faces for blast design and characterization. Minimizing flyrock and blast optimization have been two key areas that the value of this technology has generated immediate and significant returns on investment. Further enhancing the use and value of this technology is the introduction of unmanned aerial vehicles UAVs and advanced data processing. Both are proving their added value in the field. Greater flexibility in data processing is now being achieved using a technique called Structure from Motion. This technique enables the automatic computation of 3D images from a set of unorganised photographs. Data acquisition can be achieved by terrestrial applications, taking free-hand photos or by aerial applications which can provide a unique perspective of areas not accessible by terrestrial applications. Compared to classical photogrammetry the technique shows several advantages such as: (i) much more flexibility in the field procedure, i.e. image taking, (ii) much higher degree of automatism during processing, or (iii) more complete results without (data) gaps. Compared with laser scanning the approach stands out by its cost-effectiveness and data quality.

- **Robert McClure**, President at R.A.McClure Inc. , US

“Blasting Strategies for Increased Mill Productivity” - The current environment for energy usage is ripe for optimization of energy usage in mining and milling. The 1988 paper by Revnitsev, “We Really Need Revolution in Comminution” offered a number of observations that demand close examination given the rising cost of electricity and petroleum fuels. Mineral processors have watched the advancement of products and methods that can now reduce energy usage and operating costs. However, commodity prices have been dropping and capital for new equipment and plant flowsheet changes has not been available. Now, ‘push has come to shove’. In a backhanded way, higher energy bills have made it easier to justify outlays for changes. Many iron ore companies need payback periods of less than 24 months to get funding approval. Today’s higher energy bills now shorten up the payback period.

- **John William Eloranta (Jack)**, International Society of Explosives Engineers, US

“Decking using bulk explosives, problems and their solutions” - Decking has long been used in construction blasting to control ground vibrations. Many mines now have urban encroachment and pits expanding towards neighbors and are looking towards decking as an option. Construction blasting traditionally uses shorter holes than mining and ANFO or cartridge product, whereas mining in the USA has almost exclusively moved to bulk product. Traditionally the sequence of initiation has been different for construction *versus* mining blasting. Stemming materials react differently upon loading with emulsion explosives and with ANFO in angled holes causing mixing of stemming and explosives reducing the effectiveness of the deck material. Problems in mining include sympathetic detonation of decks or dead pressing which significantly affect the outcome of blasting. The causes of these problems are discussed and the solutions presented.

- **Dr. Paul N. Worsey**, Professor of Mining Engineering at Missouri University of Science and Technology; Discovery Channel Series “*The Detonators*”, US

10:30 h – BREAK

October 21st 2016 - FRIDAY

10:45 h – Continuation Innovation in Blasting with ISEE - International Society of Explosives Engineers

“The question: Which explosive to use? ANFO, Emulsions or Blends?” - Traditionally ANFO has been used for dry holes and emulsion for wet conditions. ANFO is less dense so is loaded in a condensed pattern whereas emulsions are significantly denser which allows expanded patterns. Traditional economic analysis has pitted drilling against explosives costs. However, when using ANFO conditions are not always completely dry and wet holes have to be loaded with emulsion. In this paper an economic analysis is provided based on the percentage of wet holes encountered. Actual costs from the mid 2000’s are used for a crushed limestone operation as an example. At less than 8% wet holes emulsion on an expanded pattern is more economically attractive. In this scenario using emulsion on an expanded pattern eliminates risk and simplifies the charging process. The adoption of this strategy has made certain blasting contractors very successful. The effect of cost differential between ANFO and emulsion is explored along with variation in drilling cost which moves the transition percentage. In addition the use of dry and wet blends on an expanded pattern is explored which can provide additional cost savings.

- **Dr. Paul N. Worsey**, Professor of Mining Engineering at Missouri University of Science and Technology; Discovery Channel Series *“The Detonators, US*

“The impact of explosive selection on the generation of post blast fume

Bulk commercial explosives are non-ideal and their performance is influenced by the conditions under which they are used. Explosive performance information is supplied to users in the form of Technical Data Sheets which provide details about the explosive’s properties and its suitable application. This information is usually generated using laboratory techniques which may not accurately reflect the quality and performance of the product in the field.

The production of post blast fume is attributed to a range of causes including:

- The quality of the explosive used in the blast
- The formulation of the explosive
- Explosive selection, matching product to the ground conditions
- Blast design
- On-bench operating and loading practices
- Blasthole condition
- Mining method
- Rock mass conditions

A large scale review has been made of actual explosive quantities loaded into holes compared with the expected loads and shows some interesting trends as more emulsion is added to the mixture. Blast measurements, including VOD, provide insight into the performance of these explosives in soft ground and indicate that the blast outcomes may not be as expected if reliance is solely made on published technical information.

- **Dr. Alastair C. Torrance**, Kilmorie Consulting Pty Ltd, Vice President, Technical, International Society of Explosives Engineers, US

Audience discussion and Closing remarks

Followed by papers of blaster issues in the afternoon

AUDITORIUM VALE

08:30 h – MINING ECONOMICS

Objective of session: Mining investment has grown exponentially over the past decade, especially in reason of the “boom” in terms of commodities prices, leveraged mainly by the China’s growth index. However, the significant decline of prices imposes new challenges to the mining industry development continuity .The panelists will talk about the ways, challenges, tendencies and opportunities to the mineral sector for the next years, under a global and regional focus.

KEYNOTE SPEAKER

“Global mining - when will we see light at the end of the dark tunnel?”

- **Prof. Magnus Ericsson**, Luleå Technical University, Sweden

09:15 h - KEYNOTE SPEAKER

“Investment Projects in the Peruvian Mining”

- **Rómulo Mucho Mamani**, Instituto de Ingenieros de Minas del Perú, Peru



24th World Mining Congress

MINING IN A WORLD OF INNOVATION

October 18-21, 2016
Rio de Janeiro/RJ • Brazil



IBRAM
INSTITUTO BRASILEIRO DE MINERAÇÃO
Brazilian Mining Association
Câmara Mineira de Brasil

October 21st 2016 - FRIDAY

09:45 h - MINING INNOVATION KEYNOTE SPEAKER

Disrupt or Disrupted: The Imminent Digitalization in Mining - As the mining industry continues to face challenges from market uncertainty, lowered global demand, and the possibility of increased regulation and investment costs, mining companies must shift their strategies and adopt new business and operating models faster than ever before. To seize this opportunity, and unlock the value-at-stake, miners are embracing digital tools and capabilities, including cloud-enabled mobility, data driven analytics and the Internet of Things (IoT).

- **Rachael Bartels**, Global Mining Lead, Accenture, UK

10:30 h – BREAK

AUDITORIUM SINFERBASE

08:30 h - Developing the right approach to drive innovation in mining

Objective of session: The actions for attitudes’ creation to boost research, development and innovation (RD & I), in order to increase the competitiveness of the mining industry at international scale, demand a set of scientific and technological platforms that enables a qualitative leap, raising the competitive level of companies worldwide. These platforms cover areas and strategic sectors and aiming to stimulate the capacity of positive impacts generation on the social and economic conditions in a country. Therefore, technologies are the main agents of change in the modern world. Although, not without risks, a technological advance promise innovative solutions for the most pressing global challenges of our time. Emerging technologies offer a clear view of the power of innovation to improve life’s quality, transform companies and protect our planet.

Session Moderator: **Luiz Eugênio Mello**, Instituto Tecnológico Vale (ITV), Brazil

“Defining innovation for mining sector: trends and outcomes”

- **Andrew F Swart**, Partner | Monitor Deloitte, Deloitte Touche Tohmatsu, Canada

“Project MACKGRAPHE: applied research to new graphene uses”

- **Prof. Dr. Sergio Humberto Domingues**, Researcher Mackgraphe - Graphene and Nano-Material Research Center at Universidade Presbiteriana Mackenzie, Brazil

“Project Rare Earths of CBMM”

- **Clovis Antonio de Faria Sousa**, Superintendent of Production, CBMM – Companhia Brasileira de Metalurgia e Mineração, Brazil

10:30 h – BREAK

10:45 h –KEYNOTE SPEECH: INOVA MINERAL PROGRAM, FINEP & BNDES, BRAZILIAN GOVERNMENT

Objective of session: The “Inova Mineral” is a joint initiative of the BNDES & FINEP intending to foster and select investment’s plans that includes technology development, production and marketing of products, innovative and more sustainable processes, aiming at the development of Brazilian companies and technologies in the production chains of the mining and mineral processing industry.

- **Pedro Sérgio Landim de Carvalho**, Manager at Department of Mining and Metals, BNDES, Brazil
- **Henrique Vasquez Féteira do Vale**, Manager at Department of Petroleum, Mining and Steel, FINEP, Brazil

AUDITORIUM SINFERBASE

17:00h – CLOSING CEREMONY

Closing Session with Scientific Committee and Ceremony of the “Falum Lamp” (symbolizes the granting of the right to organize the next WMC) in Astana 2018.

Keynote Speech:

- **José Fernando Coura** – CEO, Brazilian Mining Association (IBRAM), Brazil
- **Prof. Jair Carlos Koppe**, WMC 2016, Chairperson, Brazil
- **Prof. Józef Dubiński**, Chairman World Mining Congress, Poland
- **Kanat Kurmashevich Baitov**, IOC Member from Republic of Kazakhstan

PARALELL PROGRAM - TOPAZIO ROOM

17:00 h - Meeting ABEE - ISEE Brazil Chapter

The Preliminary Program can be modify by the Organizing Committee of the 24th World Mining Congress.

Venue: SulAmerica Convention Center Address: Av. Paulo de Frontin, 1 - Cidade Nova, Rio de Janeiro

[CONFIRMED SPEAKERS CLICK HERE](#)

Version of October 7th -2016

TECHNICAL LECTURE ROOM

SCHEDULE	OCTOBER 19 - WEDNESDAY	OCTOBER 20 -THURSDAY	OCTOBER 21- FRIDAY
13:30 - 15:00h	Tribute to Prof. Roberto Cerrini Villas-Bôas (<i>in memorian</i>)	SIB - Space Imaging Brasil - Speakers: Múcio Roberto Dias – CEO of Space Imaging Brasil; Paulo Fernando Moura da Costa – Technical Manager of Space Imaging Brasil; Tata Lacale Canal – DigitalGlobe’s Sr Channel Sales Manager – South America	Haver & Boecker Latinoamericana - Speaker: Oswaldo Delfim , Department of Mineral Processing
15:00 - 16:30h	Bosch Solutions for Mining Industry - Speakers: Alberto Abdu , Business Development Senior Executive for Mining & Metals at Robert Bosch Latin America; Ronal Balena , Head of Mining Solutions at Bosch Integrated Solutions Brazil	FLSmidth - Speakers: Oliver Jakobs - Area Sales Manager for Europe, Middle East and Africa, FLSmidth®BulkExpert™ Bruno Costa – Area Sales Manager for Americas, FLSmidth®BulkExpert™	Motion Metrics - Speakers: Dr. Shahram Tafazoli and Mr. Miguel Franca
16:30 - 18:00h	Saint Gobain - Speaker: Rodolfo Fischer Moreira de Oliveira , Commercial Sales Manager, Zirpro (Saint-Gobain) for South America	GEOBRUGG - Speaker: Sergio Mark	MMD Mineral Sizing (South America) Ltda - Speakers: Andrew Dodman and Pablo Orozco
18:00- 19:30h	MAXAM - Speaker: Santiago Burgada –Technical Director of LATAM	AMANCO - Speaker: Jorge Solorio , Industrial Americas Business Manager, Lubrizol, EUA.	

Program of the TECHNICAL LECTURE AUDITORIUM available at <http://www.wmc2016.org.br/lecture.asp>

TECHNICAL LECTURE ROOM OCTOBER 19 – WEDNESDAY – 15:00 – 16:30H

BOSCH: BOSCH SOLUTIONS FOR MINING INDUSTRY

OBJECTIVE OF SESSION: To present Bosch solutions for mining that bring productivity and security to the operations. Bosch Brazil has different products and solutions for mining, for example, security systems for monitoring all areas and processes, which allows immediate detection of emergencies, fire or threats. Thus, if necessary, the operation can be evacuated in a quick and safe way. It also develops facilities management system integrating protection solutions, security and communication. The company also offers drive systems and hydraulic control, mainly used in drilling operations, rotation, crushing and transport, which enable better performance and higher productivity. To them are added the thermals high efficiency solutions in heating water and / or steam generation. Bosch also makes available for the mining professionals, almost all the power tools they might need, from wireless equipment powered by Lithium-Ion batteries until products leaders in its market segment, powered by electricity. Finally, to meet specific demands, Bosch began work in technological partnership with customers, solutions focused on connectivity machinery and equipment (IoT), which will contribute significantly to the economies of scale and productivity in operations.

Speakers:

Alberto Abdu, M.Sc. in Mechanical Engineer, Specialist in Combustion Engines, Specialist in Project Management, MBA in Marketing 8 years’ experience as Professor at mechanical engineering universities, teaching Project Management and Combustion Engines Technologies. 21 years’ experience in the local as well as in international markets, developing products and businesses in Latin America and other regions. Current Position: Business Development Senior Executive for Mining & Metals at Robert Bosch Latin America



BOSCH CONTINUATION

Ronal Balena, Major in Business Administration and Control and Automation Engineering (Mechatronics), Project Management Professional (PMP) Certified. Works for Bosch since 2004 as trainee for Energy and Body Systems Division; Process Engineer, responsible for Alternator Rotor and Rectifier Lines; Project Manager for Energy and Body Systems Division; Platform Project Manager at Bosch China, Head of Starters and Generators Division Development Center in China; Senior Manager Engineering and Project Manager at Bosch for Starters and Generators Division. Partner at Confraria da Barba. Current Position: Head of Mining Solutions at Bosch Integrated Solutions Brazil

TECHNICAL LECTURE ROOM OCTOBER 19 – WEDNESDAY – 16:30 – 18:00H

SAINT-GOBAIN: CERAMIC BEAD BEHAVIOR IN ULTRA FINE GRINDING MILLS

OBJECTIVE OF SESSION: With the evolution of the technology in grinding processes and to achieve high volumes in production with excellent cost benefit, and also to achieve high volumes when grinding fine particles, this presentation gives the new vision to the future of processes that are requiring to mill very different kind of materials under a severe environment, as large particles and hard materials, by comminution. The new design of vertical mills combined with balls, sphere or beads (as the names are different around the world), that are ceramic, very hard and stable, that are fully competent to grind with low wear, is creating a new age of ultra-fine grinding in the market. As the mining operations are continuous and the comminution takes place, the combination of new vertical mills and ceramic beads are the key to achieve grinding targets.

Speaker: Rodolfo Fischer Moreira de Oliveira, Commercial Sales Manager, Zirpro (Saint-Gobain) for South America

TECHNICAL LECTURE ROOM OCTOBER 19 – WEDNESDAY – 18:00 – 19:30H

MAXAM: RIOFLEX- APPLIED TECHNOLOGY FOR INTEGRATED BLASTING SOLUTIONS –GOLD ORE MINING CASE

OBJECTIVE OF SESSION: Promote the discussion about the best practices and results for the blasting operations. Present a successful business case of the ultimate blasting technology in the world, when applied on Gold Ore Mining. Introduce the hydrogel RIOFLEX® its benefits and technology, since the improvement of blasting itself, until the improvement of carrying and handling material process. It will be detailed its features as rock fragmentation, high blasting energy and how the whole package can reduce TCO's and at the same time, improve plant operation safety.

Speaker: Santiago Burgada, Spanish mining engineer with over 14 years international experience into the explosives sector, having commissioned several international explosives facilities and managed diverse field and technical applications teams. Since 2007 is responsible for the general coordination of Maxam Brazil operations, including key accounts management, planning and mobilization of new company projects as well as responsible for its yearly budget adherence, including nowadays the management of a + 100 committed workforce. Santiago has supplied his services to top mining clients like Vale (23 Iron Mines supply contract at Vale South System, Carajas and Salobo projects in Pará), gold mining clients like Kinross and Yamana, Holcim & Lafarge into the quarrying sector, Odebretch & OAS into the civil works, among others. During five years at Africa Santiago was acting as technical manager and deputy managing director of Maxam Ghana Ltd, including the direction of a +/- 75 workforce operation under the African Regional division, supporting the growth of sister companies at Mali, Ivory Coast, Angola and Tanzania for clients like AngloGold Ashanti, Rangold and Red back mining. At earlier career stages Santiago worked in Australia and Spain, being trained and committed since then on the application of the highest industry standards. Last but not least Santiago is actually involved on the huge challenge of assuming the position of Technical Application Director for Latam, with the main goal of introduce the best practices and optimize results generated from Blasting Application on Mining.

TECHNICAL LECTURE ROOM OCTOBER 20 – THURSDAY - 13:30 - 15:00H

SPACE IMAGING BRASIL: SATELLITE IMAGES AND DIGITAL ELEVATION MODELS – DIGITALGLOBE'S SOLUTIONS FOR MINING

OBJECTIVE OF SESSION: The session will explore the new remote sensing technologies and digital surface and terrain modeling for the mining industry. DigitalGlobe's portfolio of products and services includes WorldView-3 satellite with 30cm spatial resolution and 16 bands, including SWIR – Short Wave Infrared – bands. The elevation products of DigitalGlobe are the best models extracted through orbital images with resolutions that can reach 50cm and absolute accuracy of 2m. Also will be presented case studies applied to the production, monitoring, environment and other issues.

Speakers: Múcio Roberto Dias – CEO of Space Imaging Brasil; **Paulo Fernando Moura da Costa** – Technical Manager of Space Imaging Brasil; **Tata Lacale Canal** – DigitalGlobe's Sr Channel Sales Manager – South America



TECHNICAL LECTURE ROOM OCTOBER 20 –THURSDAY - 15:00 - 16:30H

FLSMIDTH : ADVANCED AUTOMATION OF STOCKYARD MACHINES - UNLEASHING THE FULL POTENTIAL OF DRY BULK EQUIPMENT

OBJECTIVE OF SESSION: Advanced automation of stackers and reclaimers can bring to stockyard's operation a significant reduction of costs by reduction of labor and skill dependencies and reduction of maintenance and energy costs up to 40%. At the same time, it can bring important benefits by maximizing area utilization up to 15%, boost reclaiming throughput up to 20%, faster stacking up to 10% and reduction of flow deviation up to 40%. FLSmidth's® BulkExpert™ is an unmanned control system consisting of high-precision RTK GPS receivers and 3D laser scanners that has enabled costumers around the globe to operate their stockyard machines in an unmanned mode and to achieve the highest possible utilization of their machines and stockyard area. BulkExpert also includes a stockyard management system which provides an operator with full control and detailed real-time monitoring of the entire stockyard. Being able to keep track of exactly where different grades and quantities of materials are located is vital in order to schedule and optimize a combined stockyard operation. In addition, the operator can schedule and queue individual tasks for each autonomously operated stockyard machine. BulkExpert also includes a material tracking database which keeps track of all material handled by the stockyard machines. Material properties, such as density, grade and type can be added and customized, and data can be exchanged with other information systems.

FLSmidth's BulkExpert system's also offers solutions of unmanned operation for portal reclaimers, tripper cars and train loading. For train loading, BulkExpert takes into account the actual state and condition of each wagon by performing a full sectional and cross-sectional scan. It then adjusts the loading accordingly to optimize the process for full wagon utilization without running the risk of overfilling. BulkExpert can handle the challenges and requirements of transporting bulk material on today's modern railway systems. Benefits include lower transport costs and shorter loading time per wagon.

Speakers:

Oliver Jakobs - Area Sales Manager for Europe, Middle East and Africa – FLSmidth®BulkExpert™

Bruno Costa – Area Sales Manager for Americas – FLSmidth®BulkExpert™

TECHNICAL LECTURE ROOM OCTOBER 20 –THURSDAY - 16:30 - 18:00H

GEOBRUGG: APPLICATION OF FLEXIBLE FACING FOR UNDERGROUND EXCAVATIONS - EXPERIENCE IN ROCK BURST ZONES

Speaker: Sergio Mark, Graduated on Civil Engineering and specialization on Geotechnical Engineering by the Catholic University of Chile, with experience in tunnels and underground mining engineer Sergio Mark is part of the technical team of Geobrugg in Chile.

TECHNICAL LECTURE ROOM OCTOBER 20 –THURSDAY - 18:00- 19:30H

AMANCO CORZAN – THE INDUSTRIAL CPVC COMBATING INTERNAL AND EXTERNAL CORROSION

OBJECTIVE OF SESSION: The line of pipes and fittings, Amanco Corzan, it is an Industrial CPVC and can be applied in multiple markets, for example: Mining, Chemical industries, Paper and Pulp, etc. It has longer life, with excellent hydraulic capacity, and with excellent resistance to temperature and pressure. Combating internal and external corrosion, thus minimizing the maintenance of your system. Highly resistant to corrosive fluids, such as sulfuric acid. Full range of pipes and fittings.

Speaker: Jorge Solorio, Industrial Americas Business Manager, Lubrizol, EUA.

TECHNICAL LECTURE ROOM OCTOBER 21 –FRIDAY - 13:30 - 15:00H

HAYER & BOECKER LATINOAMERICANA: ELIMINATION OF TAILINGS DAMS BY USING SCREENING AT NATURAL MOISTURE

OBJECTIVE OF SESSION: Due to the increase in iron ore exports to Asian markets, and the resulting new specification parameters, mainly granulometric characteristics, important changes are made possible, in the production process, such as the classification of the ore in its natural moisture. This process change, which got started with the higher purity ore, is also expanding to mines with lower level purity (below 62%), having as a major consequence the elimination of water in the process route, and, therefore, the elimination of tailings dams. Other benefits that we must also consider in this new process condition are:

- Increased production capacity (mass recovery);
- Better viability of lower purity ores, by homogenization of these with those of higher purity, which are usually blended in storage yards;
- Lower investment in Capex and Opex;
- Greater facility in obtaining environmental licensing.

Speaker: Oswaldo Delfim, Department of Mineral Processing, **Haver & Boecker Latinoamericana Máquinas**



TECHNICAL LECTURE ROOM OCTOBER 21—FRIDAY - 15:00 - 16:30H

MOTION METRICS: HOW MOTION METRICS IS USING “MACHINE LEARNING”, “3D IMAGING” AND “BIG DATA ANALYSIS” TO IMPROVE SAFETY, EFFICIENCY, AND CONNECTIVITY THE OF MINES AROUND THE GLOBE?

OBJECTIVE OF SESSION: To familiarize audience with new technological advances that are happening in various sectors and to review how Motion Metrics is using these techniques to address mining challenges.

Speakers:

Dr. Shahram Tafazoli. Shahram studied control systems and robotics prior to starting a one-man consulting company 16 years ago (Motion Metrics) after receiving his PhD degree from University of British Columbia. The company has since grown and currently employs 50 engineers in Canada, South America, and Africa. Motion Metrics used advanced camera and sensor based monitoring solutions to make mining shovels and loaders safer and more productive. The company also recently introduced a patented portable solution for fragmentation analysis which employs 3D imaging. Shahram is an entrepreneur, a technology enthusiast, and an angel investor. He has co-authored several patents together with other engineers of Motion Metrics. Shahram is also an Adjunct Professor with the University of British Columbia’s Electrical and Computer Engineering Department. Dr. Tafazoli is a member of the Creative Destruction Lab at the University of Toronto. (speaks English)

Mr. Miguel Franca (speaks English and Portuguese), Motion Metrics International Corp. Miguel Franca has a bachelor degree in business from the FUMEC University and a CBA in Business Management from IBMEC in Brazil. With an extensive knowledge of the mining industry in the Americas, Miguel Franca has been with Motion Metrics for 2 years overseeing the Americas and with a special focus in Brazil. Miguel has seen first-hand the benefits that the advanced Motion Metrics technology brings to the mines improving safety and efficiency, and is happy to share his knowledge with other technology enthusiasts.

TECHNICAL LECTURE ROOM OCTOBER 21—FRIDAY - 16:30 - 18:00H

MMD: MMD SIZER TECHNOLOGY: UNDERGROUND AND IPSC APPLICATIONS

OBJECTIVE OF SESSION: To explain the principles behind the MMD Mineral Sizer environment-friendly innovative technology and its advantages, as compared to existing crushing technologies available, applied to sticky materials, hard materials, or a combination of both. Additionally, the session will address the use of MMD Mineral Sizer technology in unique applications, such as underground operations as well as In-Pit Sizing & Conveying (IPSC) systems.

Speakers:

Andrew Dodman, is a Mechanical Engineer. He has been with MMD Design & Consultancy Ltd. for the last 20 years. Currently, he is Project Director for the MMD Americas.

Pablo Fuenzalida Orozco, is a Mining Engineer graduated from Universidad de Santiago de Chile. He also has a Master Degree in Mining from Universidad de Chile. His areas of expertise/research interest are: New systems of Material handling and innovation projects. He is currently Sales and Project Manager at MMD Chile.”



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Câmara Mineira de Brasil

19 a 21.outubro.2016 | October 19th to 21st, 2016

TECHINICAL PROGRAM

The WMC and Expo is a preeminent international event that brings together the world's leading experts on the mining, energy and mineral processing industries. This high-level congress gives mining professionals the opportunity to share insight into the innovations, advances and trends that are shaping the industry's future.

The World Mining Congress 2016 also will have a Mining Exhibition and a Congress, in addition to the technical sessions (oral and poster sessions). The oral session will be with 20 minutes for the presentation and 5 minutes for a question and answer period.

The Mining Exhibition will have free entrance the Congress and Technical Sessions are exclusively for the delegates of the 24th edition of World Mining Congress. Simultaneous interpretation will be available in English and Portuguese.

Register yourself and became a delegate

PROGRAMA TÉCNICO

O WMC e a Exposição de Mineração são eventos internacionais que reúnem os líderes mundiais e especialistas das indústrias de mineração, de energia e de processamento mineral. Este Congresso de alto nível dá aos profissionais de mineração a oportunidade de compartilhar *insights* sobre as inovações, avanços e tendências que estão moldando o futuro desta indústria.

O Congresso Mundial de Mineração 2016 também terá uma Exposição de Mineração e um Congresso Internacional, além das sessões técnicas (sessões orais e pôsteres). A sessão oral será com 20 minutos para a apresentação e 5 minutos para um período de perguntas e respostas.

A Exposição de Mineração terá entrada gratuita, já o Congresso Internacional e as Sessões Técnicas são exclusivamente para os congressistas da 24^a edição do Congresso Mundial de Mineração. A tradução simultânea estará disponível em Inglês e Português.

Registre-se e torne-se um Congressista

TECHNICAL SUBJECTS FOR AUTHORS / TEMAS TÉCNICOS PARA AUTORES DE TRABALHOS:

- [Mineral Exploration](#) / Pesquisa Mineral
- [Surface Mining](#) / Mina a Céu Aberto
- [Underground Mining](#) / Mineração Subterrânea
- [Mineral Economics](#) / Economia Mineral
- [Sustainability in Mining](#) / Sustentabilidade na Mineração
- [Mineral Processing](#) / Processamento Mineral
- [Automation and Robotics](#) / Automação e Robótica
- [Mining Innovation](#) / Inovação em Mineração

Oral Sessions will be a maximum of 25 minutes each, total of 10 per room in the afternoons from 18th to 21st October 2016.

Beginning of the Oral Sessions:

1st at 14:00; 2nd at 14:25. 3rd at 14:50; 4th at 15:15; 5th at 15:40; Break at 16:05; 6th at 16:25; 7th at 16:50; 8th 17:15; 9th at 17:40, and 10th at 18:05 ending the day at 18:30

*Day 18th October 2016 maximum 5 Oral Sessions per room due the Opening Ceremony

*Day 21st October 2016 maximum 5 Oral Sessions per room due the Closing Session at 17:00



Sessões Oraís serão com duração máxima de 25 minutos cada, total de 10 por sala nas tardes de 18 a 21 de outubro/2016.
 Horários de Início das Sessões Oraís: 1ª às 14:00 ; 2ª às 14:25. 3ª às 14:50; 4ª às 15:15; 5ª às 15:40 ; Intervalo às 16:05; 6ª às 16:25; 7ª às 16:50; 8ª às 17:15; 9ª às 17:40, e 10ª às 18:05 finalizando o dia às 18:30

*Dia 18 de Outubro/2016 máximo de 5 sessões oraís por sala devido à Cerimônia de Abertura

*Dia 21 de Outubro/2016 máximo de 5 Sessões Oraís por sala devido à Cerimônia de Encerramento às 17:00

Any doubt, please read the [Author's Guideline](#)

The Authors will receive a notification informing the schedule (date and hour) of presentation, from September 20th.

TECHNICAL SESSIONS/ POSTER PRESENTATIONS DURING THE AFTERNOON

The poster session will be presented from **October 18th to 21th**.

When presenting posters at the 24th World Mining Congress, the presenter usually stands next to the poster, thus allowing passers-by to engage in one-on-one discussions with the presenter. The Author will receive a notification informing the schedule (date and hour) of presentation, from September 20th.

The final printed version should be delivered on the first day of WMC 2016, October 18th, in Rio de Janeiro, with the removal of the credential/badge to be received at the Registration Desk in the Congress. The Secretariat will not print any poster.

Venue: SulAmerica Convention Center Address: Av. Paulo de Frontin, 1 - Cidade Nova, Rio de Janeiro

Important - Please be informed that the presentation and publication of a poster in the congress is only possible if at least one of the authors is fully registered as Author by **September 18, 2016**.



CONFIRMED SPEAKERS available at http://www.wmc2016.org.br/img/Confirmed_Speakers.pdf

E-mail WMC Secretariat ✉ secretary@wmc2016.org.br



Short Communication – 24th World Mining Congress event APP

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Detailed Instructions

Step by Step Instructions

- Search the “Accenture Events” app on the [App Store](#) for iPhone, or [Google Play](#) for Android.
- Download the app in your device. Once it's installed go to your apps and click on the “Events” icon.
- Select the “24th World Mining Congress” event from the list.
- **Log in** to enter the event (every delegate fully registered will receive an email with the login information for the APP)
- Navigate the app, and get the most out of your experience at the 24th World Mining Congress!

WMC 2016 Synthetic Program View

See completed List of Technical Papers identification with this [link](#)

October 18 th - TUESDAY				
PLENARY SESSION				
MAIN AUDITORIUM				
09:30	Opening Ceremony			
12:30	Opening The EXPO			
	LUNCH			
14:30	Talk Show With CEO's			
16:00	REFRESHMENT BREAK			
16:15	Keynote Speaker			
17:00	Plenary with Chairpersons			
TECHNICAL PAPERS GRID IDENTIFICATION (NUMBER) *				
ROOM	ESMERALDA	TOPAZIO	SAFIRA	ALEXANDRITA
AXES	Innovation	Mineral Processing	Sustainability	Automation and Robotics
13:00 to 14:00				GERDAU reservation
16:30	214	95	160	187
16:55	173	45	201	
17:20	38	121	227	161
17:45	51	82	167	20
18:10	114	195	137	31

* See completed List of Technical Papers identification with this [link](#)
All the Sessions will run simultaneously, from October 18 to 21, mornings and afternoons.

WMC 2016 Synthetic Program View

See completed List of Technical Papers identification with this [link](#)

October 19 th - WEDNESDAY								
PLENARY SESSION								
ROOM	VOTORANTI M METAIS	VALE/SINFERBASE		ESMERALDA		SAFIRA		
08:30	ISSA Mining Symposium on Safety and Health in Mining	IBRAM/MAC Tailings management		The Swedish experience in the mining sector		PUA University Award (Prêmio Universitário ABERJE 2016) Organization: VALE S.A		
10:30	REFRESHMENT BREAK							
10:45	ISSA Mining Symposium on Safety and Health in Mining and SESI - Brazil	IBRAM/MAC Tailings Management		The Swedish experience in the mining sector		PUA (Prêmio Universitário ABERJE 2016) Organization: VALE S.A		
12:30	LUNCH							
TECHNICAL PAPERS GRID IDENTIFICATION (NUMBER) *								
ROOM	VOTORANTIM METAIS	VALE	SINFERBASE	ESMERALDA	TOPAZIO	SAFIRA	ALEXANDRITA	
AXES	Mineral Processing	Surface Mining	Sustainability	Underground Mining	Automation/Innovation	Mineral Economics	GT IBRAM	
14:00	8	22	3	14	1	24	RESERVED 14h to 17h GT Comunicação IBRAM (Only for Guests)	
14:25	11	170	4	13	17	28		
14:50	180	50	33	16	94	32		
15:15	35	60	37	21	197	34		
15:40	193	63	62	25	2	147		
16:05	Refreshment Break							
16:30	43	66	188	65	6	49		
16:55	231	106	98	29	140	81		
17:20	55	115	105	30	23	139		
17:45	202	122	111	46	191	168		
18:10	36	239	251	27	26	149		

* See completed List of Technical Papers identification with this [link](#)

All the Sessions will run simultaneously, from October 18 to 21, mornings and afternoons.

WMC 2016 Synthetic Program View

See completed List of Technical Papers identification with this [link](#)

October 20 th - THURSDAY							
PLENARY SESSION							
ROOM	VOTORANTIM METAIS	VALE		SINFERBASE			
08:30	The Kellogg Innovation Network	Climate Change and Mining Industry		Mineral Exploration			
10:30	REFRESHMENT BREAK						
ROOM	VOTORANTIM METAIS	VALE		SINFERBASE	ESMERALDA		
10:45	Sustainability Governance Initiatives	Water, Mining and Communities		Productivity in mining operations	The future of mining in Americas		
12:30	LUNCH						
ROOM	VOTORANTIM METAIS	VALE	SINFERBASE	ESMERALDA	TOPAZIO	SAFIRA	ALEXANDRITA
AXES	Innovation/ Automation	Sustainability	Surface Mining	Mineral Exploration/ Mining Innovation	Underground Mining	Mining	Coal Session
14:00	54	212	128	163	67	123	19
14:25	69	74	134	174	73	183	39
14:50	107	148	135	5	76	184	40
15:15	230	213	138	15	96	196	53
15:40	233	87	142	99	97	192	77
16:05	Refreshment Break						
16:30	221	185	79	159	110	68	86
16:55	108	189	146	162	117	12	112
17:20	206	245	154	250	178	156	116
17:45	248	246	155	127	125	219	152
18:10	131	169	235	7	130	120	228

* See completed List of Technical Papers identification with this [link](#)

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Câmara Mineira de Brasil

WMC 2016 Synthetic Program View

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October 21 th FRIDAY							
PLENARY SESSION							
ROOM	VOTORANTIM METAIS		VALE		SINFERBASE	ESMERALDA	
08:30	Mining and Sustainable Development Goals		Mining Economics		Developing Innovation in Mining	Innovation in Blasting with ISEE	
10:30	REFRESHMENT BREAK						
ROOM	TOPÁZIO			SINFERBASE		ESMERALDA	
10:45	Using social license to prioritize stakeholders			INOVA MINERAL PROGRAM - BRAZIL		Innovation in Blasting with ISEE	
12:30	LUNCH						
ROOM	VOTORANTIM METAIS	VALE	SINFERBASE	ESMERALDA	TOPAZIO	SAFIRA	ALEXANDRITA
AXES	Blasting Session	Sustainability	RESERVED	Mineral Processing	Sustainability	Surface Mining/Mineral Economics	Underground Mining
14:00	84	158		59	203	243	132
14:25	85	157		58	204	172	133
14:50	92	141		104	222	126	144
15:15	143	145		57	119	47	176
15:40	166	199		224	232	101	177
16:05	175	200		80	217	190	226
16:30	205	216		89	198	244	249
17:00	CLOSING CEREMONY AT SINFERBASE ROOM						

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All the Sessions will run simultaneously, from October 18 to 21, mornings and afternoons.