

2013

# Annual Report

Creating community to drive operational  
excellence

## Table of Contents

### GMSG 2013 Report

Introduction: Creating Community to Drive Operational Excellence	2
Working Groups and Projects Highlights	2
GMSG Council and Awards	3
Overview	4
Vision and Mission	5
History	6
Membership	7
Sponsoring Companies	7
Partner Organizations	8
Other Associations	8
Working Groups	10
2013 Projects	12
2013 Events	14
Working Groups: 2013 Achievements	15

### GMSG 2014 Plan

Governing Council 2014-2015	20
Working Group Projects 2014	22

### Financial Report

Financial Report 2013	26
Budget versus Actual 2013	27
Budget 2014	28

## **Creating Community to Drive Operational Excellence**

The Global Mining Standards and Guidelines Group cemented its role as a networking and collaboration centre to identify and develop solutions to common challenges impacting the mining industry internationally. GMSG relies on the strong support of partner organizations, sponsoring companies, and voluntary participants.

Support for GMSG grew throughout 2013, with AusIMM and SAIMM joining CIM, SME, and SMART as Partner Organizations, providing funding and in-kind support. GMSG participated in, held workshops in conjunction, or exhibited at a number of conferences hosted by the Partner Organizations, including SME, CIM, World Mining Congress, the International Symposium on Automation and Robotics in Construction and Mining, MEMO, and World Gold.

Collaborative partnerships were developed with a number of mining and standards organizations, including EMESRT, The Open Group, The Standards Leadership Council, ISO TC 82, Canadian Standards Association, AMIRA, CRC Mining, CEEC, and of course, IREDES. In August, GMSG co-hosted a one day workshop with EMESRT in conjunction with the World Mining Congress, further demonstrating the GMSG objective to provide the bridge to bring the various mining and standards related initiatives together with the mining industry. A key priority throughout 2013 was collaboration with the Canadian Standards Association to establish Canada as a Participating Member of the ISO TC 82 (technical committee on Mining), which was achieved by November. Going into 2014, finalization of the process for GMSG to become a Liaison Organization to ISO TC 82 was underway.

### **Working Groups and Projects Highlights**

GMSG operates through working groups, established based on need and participation of industry volunteers. By year-end, there were six working groups in place: Situation Awareness, Technology and Connectivity, Underground Mining, Data Access and Usage, Operational Safety and Risk Management, and the most recent, a working group on Industrial Comminution Efficiency, with a first project focused on developing a guideline for the use of the Bond efficiency metric.

A number of projects were underway throughout 2013 and are entering next phases in 2014. A working prototype of a unified shovel interface display was unveiled in August at the World Mining Congress. Next phase work began in the autumn, with a priority placed on the development of the API to enable all on-board systems to connect through the interface, similar to the apps on a mobile phone. The various systems will be able to dictate how they display, and prioritization of alarms, alerts, and sequencing is underway, with a certain level of customization to be allowed for the individual operator.

The Underground Mining working group conducted a stakeholder survey during the spring/summer, and completed the first phase of a project on Communications Infrastructure Implementation, with a survey being executed in Q1 2014.

The Operational Safety and Risk Management working group executed a survey on Leading Indicators for Safety, to provide the backbone of a project to support the ICMM's document on leading indicators, published in November 2012.

Another project to note is the identification of common mining KPIs and development of standard data definitions for performance data in operations, building on work done by SMART about a decade ago. Throughout 2013, the project scope and deliverables were defined and first phase of data collection was completed. This project, part of the Data Access and Usage working group, complements other projects by the group focused on determining data availability from all heavy mobile equipment and the standards and protocols commonly in use.

### **GMSG Council and Awards**

GMSG is led by a dedicate Council of volunteers from throughout the global mining industry. The swift success of the Group is in large part thanks to the high calibre of that Council; many well-respected industry leaders are at the table. The Council is headed by Tim Skinner, SMART Solutions (Chair), and Andrew Scott, Barrick Gold (Vice-Chair), and includes leaders from mining companies, technology providers, consultants, and OEMs. The Governing Council includes the GMSG executive, as well as the working group leaders, and representatives from all Partner Organizations.

Two CIM Distinguished Lecturer Awards were bestowed on members of the GMSG Council, for topics in support of the GMSG mission. As well, GMSG is proud to note that of the 100 Global Inspiration Women in Mining, as selected in a global program spearheaded by Women in Mining UK, three sit on the GMSG Governing Council. Their selection as part of the Global 100 demonstrates their commitment to the advancement of the mining industry; their roles within GMSG reflect that dedication to operational excellence.

This document aims to share GMSG highlights from 2013 and outline the 2014 plans. The intention is to be transparent and to encourage greater participation in and support of GMSG to enable more projects to move forward.

For more information please contact GMSG Managing Director, Heather Ednie, at [hednie@cim.org](mailto:hednie@cim.org) or 514.984.8775.

## Overview

The Global Mining Standards and Guidelines Group is an international body to advance the utilization of standards and guidelines in the global mining industry. GMSG brings all stakeholders together, creating a collaborative knowledge repository and communications centre for mining standards and guidelines, and facilitating collaboration to enable the creation and application of new and existing standards and guidelines to meet industry's identified needs. These may be accomplished from within the mining industry or from standards and best practices that occur globally in other industries.

GMSG Members include mining companies, OEMs, technology suppliers, consultants, academics, and contractors; all mining industry stakeholders are welcome. GMSG spans the globe with members currently in six continents.

The need for and benefit of standards and guidelines for the mining industry is to facilitate improvement of safety, productivity, cost, and efficiency for common industry business and operating functions. The effort also facilitates the identification and utilization of beneficial developments of standards and best practices that occur globally in other industries that could be effectively applied in mining.

GMSG will develop guidelines but not standards. Rather, the Group has established collaborative relationships with many leading standards associations in mining and other industries to bridge the needs of the mining industry and bring forward guidelines to those organizations as the basis for standards development.

Working Groups drive specific and focused efforts within defined focus areas: asset management, mobile mining equipment data and access, technology and connectivity, situation awareness, underground mining, operational safety and risk management, industrial comminution efficiency, collision avoidance, and more.

## **Vision and Mission**

### **Vision**

To become a global organization for the mining community to develop, maintain, endorse, collaborate, educate, and communicate mining industry standards and guidelines which will be supported and used by mining stakeholders to improve the safety, operational, environmental, and financial performance of the mining industry.

### **Mission**

To facilitate and drive the application, utilization, and development of global mining standards and guidelines and enable a global community and knowledge hub to support standards and guidelines as positive tools for the global mining industry.

This includes:

- Provide an environment and an organization to support, encourage, communicate, assist, and continually improve the mining community in the development and applications of potential and existing standards and guidelines.
- Evaluate, approve, and endorse standard subject matter that will fall under the scope and management of the GMSG.
- Communicate, assist, and facilitate the mentoring, exchange, and use of standards information and knowledge for the global mining community, including the organizing of events and knowledge sharing opportunities.
- Develop strong relationships and collaboration with other related global, industry, and mining standards bodies.
- Develop, provide, and execute the required processes and mechanisms to develop, modify, maintain, execute, and terminate the standards and guidelines covered by the GMSG.
- Provide leadership and development on selected initiatives that are to the direct benefit to the industry as a whole.
- Maintain an active and strong collaborative and directional relationship with SMART.

## History

GMSG has evolved from efforts by the Surface Mining Association for Research and Technology (SMART) members, and is housed by the CIM Surface Mining Society. However, the GMSG mandate extends beyond surface mining, covering underground, and many aspects of the mining process. The launch of the Standards Committee is the result of 12 years' efforts by mining operators.

In 2000, as operators realized they were facing the same challenges, an informal effort began. By 2005, it was formally organized under the Surface Mining Association for Research and Technology (SMART) with a charter and a plan for the OEMs and OTMs. Over the following seven years, SMART members engaged the OEMs and OTMs, developed baseline standards and documentation, increased industrywide communications and engagement. As a result, most OTMs were onboard, but a number of OEMs and OTMs remained uncommitted.

In 2010, an industry summit was held by CIM, bringing together SMART members with the OEMs and OTMs. At that time, an agreement in principle was reached, though certain issues continued, including those pertaining to data ownership and access. It became apparent that a more official structure is required, to lend substance, organization, and commitment to the issues and have a greater impact in driving forward new standards for mining technology.

SMART faced a number of limitations that necessitated the evolution of a new organization to move the standards platform forward. These limitations include:

- SMART is a voluntary organization of surface mine operators
- The success of the technology standards relied on a group of volunteer mine operators, so its efforts and progress were inconsistent. The initiative requires dedicated time, effort, resources, and process
- SMART does not include OEMs, OTMs, vendors or suppliers, thus representing only part of the industry
- SMART had no structure for funding, resourcing, or process
- OEMs and OTMs question the credibility and commitment of the operators

The result was the creation of the Global Mining Standards and Guidelines Group under the CIM Surface Mining Society, at the end of 2011 to be officially launched in May 2012. SME quickly agreed to be a partner organization providing yearly funding and with a representative on the GMSG Council. Though part of the CIM Surface Mining Society, it was rapidly made clear that the GMSG would serve both the surface and underground mining community. In 2013, AusIMM and SAIMM also joined as a partner organization, facilitating the GMSG expansion globally.

## Membership

Throughout 2013, GMSG continued to expand its network of companies and individual participants.

Category	Jan. 2013	Target: end 2013	Target: end 2014	Q1 2014
Member Company	27	50	65	42
Participating Company	81	100	125	102
Members-at-large	235	400	500	483

*\*Note: Member Companies (those contributing financially to enable GMSG programs and projects); Participating Companies (those participating in GMSG programs, projects, working groups and network); Members-at-large (all individuals participating in GMSG activities).*

## GMSG Sponsoring Companies

Though participation in GMSG is not dependent on sponsorship, the Group relies on corporate support, both financial and in-kind, to enable its research activities and operating budget. GMSG had over 40 sponsoring companies in 2013 (as of March 31, 2014):

3D-P	Joy Global	RungePincocKMinarco
Agnico Eagle Mines	Kal Tire	SAFEmine Technology
Atlas Copco	KGHMi	Sandvik
Barrick Gold	Liebherr	SAP
BHP Billiton	Lieca	Schneider Electric
CheckMark Consulting	Metcom Technologies	Shell Canada
CNRL	Mine Ware	SMART Systems Group
CRC Mining	Mining International Systems	Suncor
Desert Falcon Consulting	Mosaic	Syncrude
Flow Partners	Motion Metrics	Teck
Freeport McMoRan	Newmont	Total E&P
Goldcorp	Newtrax	Vale
Guardvant	Peck Tech Consulting	Wenco
Hitachi	Rockwell Automation	Yamana Gold
Honeywell		

## Partner Organizations

GMSG relies on the support of five Partner Organizations to provide input into the group's direction, outreach opportunities, and both financial and in-kind support. All Partner Organizations have a Representative on the GMSG Executive Council.

**CIM:** GMSG is part of the Canadian Institute of Mining, Metallurgy and Petroleum through the Surface Mining Society and receives financial support and in-kind support from the CIM National staff, Council, and participation of many members in GMSG activities. GMSG help events in conjunction with a number of CIM events in 2013: the CIM Convention, World Mining Congress and ISAARC, and MEMO, and published a technical paper in the autumn issue of the CIM Journal.

**SME:** The Society for Mining, Metallurgy and Exploration in the USA contributes both financially and in-kind to GMSG, including on-site events and space at the SME Convention, and through articles in *Mining Engineering* magazine and the SME enewletters.

**AusIMM:** Financial and in-kind support from the Australasian Institute of Mining and Metallurgy is instrumental for GMSG outreach and expansion in Australia. GMSG held a workshop in conjunction with World Gold in Brisbane in the autumn, and participated in the conference plenary.

**SAIMM:** The Southern African Institute of Mining and Metallurgy became a Partner Organization during the first half of 2013, providing both financial and in-kind support to GMSG. The first GMSG event in the region was organized for January 2014.

**SMART:** The founding organization of GMSG, the Surface Mining Association for Research and Technology provides in-kinds support mainly through communications and outreach.

## Other Associations

GMSG collaborates with a number industry and standards organizations, to enable the bridge between mining and standards, and increase the knowledge sharing and networks throughout the industry. Some of these organizations include:

**Standards Leadership Council (SLC):** formed to streamline the standards efforts in the oil and gas industry, GMSG has become an observing member.

**Canadian Standards Association (CSA):** GMSG worked with CSA to establish a Canadian Mirror Committee and a US TAG committee for ISO TC 82 – Mining. As well, GMSG participates in the CSA Mining Panel.

**International Standards Organization Technical Committee 82 on Mining (ISO TC 82 – Mining):** The technical committee for mining standards of the International Standards Organization.

GMSG attended the TC meeting in Johannesburg, December 2013, and is underway to become an official Liaison Organization to bridge the committee and the global mining industry.

**Earth Moving Equipment Safety Roundtable (EMESRT):** GMSG held a joint workshop with the EMESRT in August 2013. Support of EMESRT remains a priority for the GMSG Operational Safety and Risk Management Working Group, and EMESRT representatives participate in the GMSG working group.

**The Open Group:** GMSG has developed a collaborative partnership with The Open Group to advance mining standards globally.

**IREDES:** GMSG continues to collaborate with IREDES through the Underground Mining Working Group and aims to develop greater communications links to help expand the awareness of IREDES protocols throughout the underground mining community.

**AMIRA:** The GMSG Industrial Comminution Efficiency Working Group collaborates with AMIRA to ensure the working group projects and complimentary to the AMIRA efforts, and for outreach purposes.

**Safety Roundtable:** GMSG and the Safety Roundtable are developing a collaborative arrangement to support each other's initiatives through communications and participation. The Safety Roundtable offers a large volume of mine safety intelligence that will be instrumental towards increased global mine safety.

**(CEEC):** GMSG is collaborating with CEEC to communicate each organization's news and activities, particularly surrounding activity related to comminution.

**International Council on Mining and Metals (ICMM):** The GMSG Operational Safety and Risk Management Working Group relies on the ICMM Safety resources, and is aligning their projects to support or compliment the work done by ICMM.

## **Working Groups**

GMSG Working Groups are responsible for special projects including research, development, and evolution of definitions, guidelines and standards. They are formed by stakeholder groups with a common field of interest where value may be derived through the development and promotion of standards and guidelines for mining.

Working Groups comprise members of the Council as well as interested stakeholders. There is no specific limit to the number of Working Groups for the Committee, and currently there are six active Working Groups advancing objectives for 2013.

### **Data Usage and Access**

In 2013, the Asset Management and Operations and the Mining Equipment Onboard Data & Access working groups were combined to form the Data Usage and Access working group. The purpose of the working group is twofold: to identify the information needed by stakeholders of mining equipment to monitor status and performance, to propose common terminology and data definitions, and identify key performance indicators, and to enable open access to data required for operations and maintenance.

### **Onboard Technology & Connectivity**

To define a connectivity standard for communication with all onboard devices for mobile mining equipment and to identify a pathway for the migration of existing technologies to the new standard.

### **Situation Awareness**

The scope of the SA (Situational Awareness) working group is to analyze the effectiveness of information delivery systems in mining equipment and develop a unified display design, to mitigate against the proliferation of screens within equipment cabs. This working group comprises a variety of stakeholders representing a cross-section of relevant mining and mining-related organizations. This stakeholder network will help guide the direction of the working group towards a common, mutually beneficial end.

For now, the focus is on shovel displays; however it should be noted that this work is expected to form the foundation for similar work with other equipment in the future.

### **Underground Mining**

The GMSG Underground Mining Working Group's scope will cover the transfer and protocols of moving data from both mobile and fixed location equipment throughout the entire underground mine. Key areas of focus will include retrieving data from all points of access, moving data to the surface and ensuring data is accessible for use post-collection within control systems as well as reporting and diagnostic tools.

### **Operational Safety & Risk Management**

A network for sharing operational safety standards, guidelines and best practices across mining jurisdictions, and identifying areas for further development.

### **Industrial Comminution Efficiency**

The objective of this group is to develop guidelines and tools to enable greater comminution efficiency. The working group launched in 2013 with a first project, to standardize the use of the Bond Work Index.

## **Two New Working Groups to be established in Spring 2014**

GMSG will announce two new working groups in Spring 2014:

- **Collision Avoidance:** aiming to support the volumes of effort by many large mining companies to develop the tools and expertise for effective implementation of collision avoidance systems in multiple mining applications
- **Integrated Operations:** supporting the seamless integration of the myriad systems and processes required to achieve operational excellence

## 2013 Projects

### Online Searchable Mine Standards Database

Hundreds of mining-related standards from both international and national standards bodies have been compiled in a database, to go live on the GMSG website before the AGM in May 2014. This tool will enable mine personnel to access existing standards for implementation and/or in their operations.

### ISO TC 82 – Mining

The International Standards Organization reactivated Technical Committee 82 – Mining in 2013. Upon reactivation, Canada, the United States, and Australia were not participating members, but by April 2014 all had achieved that status. GMSG worked with the Standards Council of Canada to establish a Canadian Mirror Committee (and gain Canadian Participant Member status), and through activities and communications supported the efforts in the United States and Australia. By late 2013, GMSG was in final stages of the process to become a Liaison Organization with TC 82, which would allow the Group to bridge the Technical Committee work and the global mining community.

#### ISO TC 82 Background and Current Status (as of April 2014)

1. ISO/TC 82 was founded in 1955, became dormant in 1995, and was re-activated 2012 by Germany
2. The current Scope of TC 82 includes the standardization of:
  - Specifications relating to specialised mining machinery and equipment used in opencast mines (e.g. conveyors, high wall miners, rock drill rigs and continuous surface miners) and all underground mining machinery and equipment for the extraction of solid mineral substances, but excluding the preparation and processing of the minerals
  - Recommended practice in the presentation of plans and drawings used in mine surveying
  - Methods of calculation of mineral reserves
  - Mine reclamation management
  - Design of structures for mining industryExcluded:
  - Standardization of equipment and protective systems to be used in explosive atmospheres (dealt with by IEC/TC 31)
  - Earth-moving machinery dealt with by ISO/TC 127
3. While TC 82 was dormant, with respect to standardization, the majority of mining equipment was absorbed by TC127 Earth Moving Machinery and TC195 Building Construction Machinery and Equipment
4. Currently TC 82 has a strong leaning to underground mining, while it has a weak surface mining presence and weak operator presence – this partially reflects that the committee

participants which are mainly OEMs, suppliers, government/regulators, and from academia.

5. Members of TC 82 – Mining

- a. Participating Members (Voting-18) (corresponding member in brackets):  
Australia (SA), Canada (SCC), Chile (INN), China (SAC), Czech Republic (UNMZ), Finland (SFS), France (AFNOR), Germany (DIN), Iran, Islamic Republic of (ISIRI), Korea, Republic of (KATS), Mongolia (MASM), Russian Federation (GOST R), South Africa (SABS), Spain (AENOR), Sweden (SIS), United Kingdom (BSI), United States (ANSI), Zambia (ZABS)
- b. Observing Members (No vote-27): Austria (ASI), Bulgaria (BDS), Croatia (HZN), Cuba (NC), Ecuador (INEN), Egypt (EOS), Greece (NQIS ELOT), Hong Kong (ITCHKSAR) (Correspondent member), India (BIS), Indonesia (BSN), Japan (JISC), Moldova, Republic of (INS) (Correspondent member), Pakistan (PSQCA), Peru (INDECOPI), Poland (PKN), Romania (ASRO), Serbia (ISS), Tanzania, United Republic of (TBS), Thailand (TISI), Tunisia (INNORPI), Turkey (TSE), Ukraine (DTR)

## 2013 Events

<b>GMSG 2013 Events</b>			
<b>Event</b>	<b>Month</b>	<b>Location</b>	<b>Activities</b>
SME Conference	February	Denver, USA	GMSG workshop, working group meetings, SME Technical Program session
CIM Convention	May	Toronto, Canada	GMSG AGM and workshop, working group meetings, CIM Technical Program session
Mining Association of Canada	June	Ottawa, Canada	Presentation to MAC board
World Mining Congress & ISARC	August	Montreal, Canada	GMSG booth, GMSG workshop, working group meetings, ISARC Technical Program presentations
Joint EMESRT/GMSG Workshop	August	Montreal, Canada	Joint workshop on EMESRT EDEEP and GMSG projects
World Gold	September	Brisbane, Australia	GMSG workshop, Plenary speaker
MEMO	October	Kamloops, Canada	Technical Program session
ISO TC 82 - Mining	December	Johannesburg, South Africa	Participation in TC meeting, presentation of GMSG as potential Liaison Organization

## **Working Groups: 2013 Achievements**

### **Data Usage and Access**

Co-Leaders: Sean Fancey, Sherritt; Paul Roos, Vale; Zoli Lukacs, Taseko Mines

The Onboard Data and Access Working Group and the Asset Management and Operations Working Group were amalgamated during the summer to form the Data Usage and Access Working Group, representing both the availability of data and its applications in mining operations.

Two projects were underway in 2013:

- OEM Survey: building a database of all available mobile equipment data points and the standards or protocols currently in use
- Common mining KPIs and development of standard data definitions for performance data

Both projects were ready for roll-out at year end.

### **Situation Awareness**

Leader: Andy Chapman, Barrick (now Peck Tech Consulting)

The Situation Awareness Working Group marked a number of points of progress during 2013, as well as experiencing a significant growth in membership size. Participation in the group doubled over the course of 2013, demonstrating that the 'coalition of the willing' is growing!

Not only has this group increased in size, it continues to represent a wide-cross section of industry stakeholders, providing a platform for comprehensive dialogue, that covers numerous points of view. Participants cover a broad spectrum of companies: OEM's, OTM's, mining companies, Technical consultants, human factors consultants and military/marine expertise.

The year began with collection of feedback, with a Situational Awareness WG Survey that helped delineate priorities. Identified as the most pressing need was Prototype development, which became 2013's focus. What was truly remarkable and encouraging was the collaborative force of this project, and the way in which the project's common goal was able to override proprietary lines as several stakeholders lent support by loaning hardware.

Peck Tech Consulting provided a proposal describing two potential options. The group decided to go with 'Option B- develop a display manager'.

Peck Tech then moved ahead with the development of a working proof of concept (POC) software implementation of a Unified Shovel Interface which integrated multiple vendors' systems into a single interface using one-to-two displays. This was delivered and displayed at

ISARC/WMC, August 2013, in Montreal. It was very well received by industry members and the hands-on display at the GMSG booth was a head-turner.

At year-end, the group was maintaining focus on the display manager proof of concept-continuing development, concentrating on alarm hierarchy/prioritization/delivery methods, as well as the look & feel of the GUI. They work closely with the Technology and Connectivity Working Group (T&C WG) to ensure parallel efforts remain aligned towards a common vision of an end-to-end solution for a unified shovel display.

The SA group received press attention, including several articles in Barrick's internal technology newsletter and a paper published in CIM Journal Vol. 4, #4, 2013 (available on CIM.org with membership), co-authored by Emrah Onal and Andrew Chapman. This paper was also boiled down to poster form and displayed at ISARC/WMC in Montreal. Andrew Chapman presented on this project at CIM 2013 & SME 2013.

This Working Group continues to lead R&D efforts to incorporate the elements of situation awareness into mobile mining equipment, leading to increased safety and operator performance.

Beginning with a focus on the development of an integrated common operator interface for shovels, SA applications could be developed for other types of equipment in the future.

### **Technology and Connectivity**

Leader: Peter Wan, Teck

2013 was a year of visible progress for the Technology & Connectivity Working Group, with on-going growing industry-wide appreciation in support of the group's direction.

Early in the year, the group identified the API model as having the potential to meet the needs for all mining user groups. To validate the model, we tested the API approach against the advantages/disadvantages of each user group (as had been previously documented by the T&C WG) – which further built our confidence that the API model would meet our needs. The API model was presented to the industry at the CIM National Convention in Toronto in May, with positive feedback and an increase in participation in the working group itself.

The next step in the development of the API model brought the group in very close alignment with the Situation Awareness working group as a Proof of Concept (PoC) Unified Interface (UI) was developed using an API framework. The PoC UI was demonstrated at the World Mining Congress in Montreal in August, again to a positive reception that resulted in feedback and increased enthusiasm for participation in the GMSG.

Following on from these successes, the Technology and Connectivity Working Group has commenced a project to define a detailed Functional Requirements document for a standard API to address both device and display management. Device management will enable seamless

connectivity with onboard devices, while the Display Management component will enable applications to be shared on a Unified Interface (which is the focus of the SA WG). This project is expected to be completed in time for the Requirements Document to be presented to industry for review and feedback by the 2014 CIM National Convention in Vancouver, May 2014.

## **Underground Mining**

Leader: Samantha Espley, Vale

The Underground Mining Working Group’s scope covers the transfer and protocols of moving data from both mobile and fixed location equipment throughout the entire underground mine. Key areas of focuses will include retrieving data from all points of access, moving data to the surface and ensuring data is accessible for use post-collection within control systems as well as reporting and diagnostic tools.

A stakeholder survey was completed by summer 2013, to help determine priority areas for the working group.

**Q11 Please rate the following topics where development of standard guidelines for data transfer would benefit your operations, from being of greatest benefit to being of least benefit.**

Answered: 36 Skipped: 2

	Greatest benefit	Strong benefit	Good benefit	Some benefit	Least benefit	Total
Physical connectivity setup	16.67% 6	30.56% 11	33.33% 12	16.67% 6	2.78% 1	36
Communication protocol with data loggers	27.78% 10	33.33% 12	30.56% 11	8.33% 3	0.00% 0	36
Data/file format of equipment data	19.44% 7	30.56% 11	36.11% 13	13.89% 5	0.00% 0	36
Format of data in historical repository	19.44% 7	30.56% 11	38.89% 14	2.78% 1	8.33% 3	36
Operator displays	2.78% 1	41.67% 15	41.67% 15	11.11% 4	2.78% 1	36
Equipment alarms/alerts	13.89% 5	52.78% 19	27.78% 10	2.78% 1	2.78% 1	36
KPI's/Equipment metric computations/formulae	16.67% 6	30.56% 11	41.67% 15	8.33% 3	2.78% 1	36
Communication infrastructure	33.33% 12	33.33% 12	22.22% 8	11.11% 4	0.00% 0	36
Technical skills / training	11.11% 4	50.00% 18	30.56% 11	5.56% 2	2.78% 1	36

Based on the survey results, Communications Infrastructure Implementation was identified as the first project area for the working group. A detailed survey was developed by the working group, under the leadership of a sub-committee headed by Brad Ford of 3D-P. Two students were engaged from Queen’s University to run the data collection and analysis in the first half of 2014. Results of the survey will be shared as a bank of case study information, and will be used to determine the next phase of the project.

**Operational Safety and Risk Management**

Leader: Gord Winkel, University of Alberta

The Operational Safety and Risk Management Group is a network for sharing operational safety standards, guidelines and best practices across mining jurisdictions, and identifying areas for further development.

The area of Leading Indicators was identified for further development, aiming to build on the work by the International Council on Mining and Metals. The working group executed a survey during the second half of 2013, to establish common uses of leading indicators and areas where guidelines and collaboration would be of highest value.

**Q7 How mature is your company / mine in implementing leading safety indicators:**

Answer Choices	Responses
Don't have any leading indicators	21.43%
A couple of basic leading indicators	39.29%
Actively monitoring a range of leading indicators	39.29%
Management's main focus is on leading indicators in preference to lagging	3.57%

By year-end, the working group had cemented plans for a number of projects through 2014-15, including:

1. Mapping the safety landscape: building a database of existing global mine safety organizations, their focuses, and identified potential overlap, gaps, and areas for collaboration
2. Leading indicator guidelines and knowledge development
3. Collaboration with EMESRT and other organizations
4. Benchmarking corporate safety management standard practices and procedures
5. Identification of global mining safety challenges where standards and guidelines efforts could help

## **Industrial Comminution Efficiency**

Leader: James Connolly, Barrick Gold

The Industrial Comminution Efficiency Working Group was launched in late 2013, with the objective to develop metrics, tools and capacity for the industry to increase comminution efficiency. The initial project of the group is to develop a guideline for the use of the Bond Work Index to help mining executives gauge their efficiency. Led by Robert McIvor, Metcom Technologies, the objective of the project is to “formalize and disseminate use of the Bond method to provide industry with a means to measure and compare comminution circuit efficiencies, including a reference data base,”

The Bond standard circuit was chosen because of its accuracy in representing an average circuit performance, and is therefore useful as a “meter-stick for measurement” and will address overall circuit efficiency.

Why is the Bond Work Index valuable as a business tool? Simply, miners need to cut costs wherever they can. When looking for the potential for profitability, it only makes sense to approach the greatest cost centre aggressively with a tool that is proven and proactive by nature through its efficiency.

McIvor states that the group will adopt the “90/10” business rule” in a bid to make the project most effective. “The Bond method can be used to quantify the energy efficiency of over 90% of industrial comminution energy usage, from most primary grinding circuits to most separation circuit feed sizes, but excluding coarse crushing and very fine regrinding.”

## **Governing Council 2014-2015**

Comprised of the Executive Council and the Stakeholder Council.

### **Executive Council**

<b>Chair</b>	Andrew Scott, senior director, mining information technology, Barrick Gold
<b>Vice Chair</b>	Heliuss Guimaraes, General Manager, Information Systems and Technology, Rio Tinto
<b>Past Chair</b>	Tim Skinner, president, SMART Solutions
<b>SMART Vice Chair</b>	Jason Wood, froth maintenance manager, mine technology manager (interim), Shell Canada
<b>Treasurer</b>	Bruce Bernard, General Manager, Maintenance, KMC Mining
<b>Secretary</b>	Peter Becu, Information Systems and Technology Consultant
<b>External Coordinator</b>	Vivien Hui, strategic account manager, 3D-P
<b>CIM Representative</b>	Jim Popowich, director, Mosaic
<b>SME Representative</b>	Mark Bartlett, Desert Falcon Consulting
<b>AusIMM Representative</b>	Jamie Ross, head of safety, risk, and security, Newcrest Mining
<b>SAIMM Representative</b>	Jim Porter, owner and principal consultant, Jim Porter Mining Consulting, and director, Centre for Mechanised Mining Systems, University of the Witwatersrand
<b>Managing Director</b>	Heather Ednie

### **Stakeholder Council**

<b>South American Representative</b>	Laura Mottola, manager, business improvement technology, Sierra Gorda, KGHMi, and president and CEO, Flow Partners
<b>Situation Awareness</b>	Andy Chapman, Technical Manager, Mining Solutions, Peck Tech
<b>Technology and Connectivity</b>	Peter Wan, principal advisor, mining technology, Teck
<b>Data Access and Usage</b>	Paul Roos, process superintendent, Vale  Sean Fancey, manager, reliability maintenance engineering, Sherritt Coal  Zoli Lukacs, Taseko Mines

**Underground Mining**

Samantha Espley, general manager, mines and mills technical services, Ontario operations, Vale

Riaan van Wyk, chief technical officer, DetNet South Africa

**Operational Safety and Risk Management**

Gord Winkel, chair and industrial professor for the safety and risk management program, Faculty of Engineering, University of Alberta

**Industrial Comminution Efficiency**

James Connolly, senior manager, metallurgy and process development, Barrick

## Working Groups Projects: 2014

As of March 31, 2014

### Situation Awareness Working Group

The scope of the SA (Situational Awareness) working group is to analyze the effectiveness of information delivery systems in mining equipment and develop a unified display design, to mitigate against the proliferation of screens within equipment cabs. The Group is working towards publishing their very first GMSG guideline about display sizing, configuration and placement within large shovel cabs and are hopeful to have this finalized by the end of April.

Steps are also being taken to develop and distribute a "Shared Services" survey for tech vendors with cab presence. The aim is to collect information to produce a comprehensive list of data 'tags' available from the various systems and have vendors indicate which are of use to them (i.e., GPS, tooth status, proximity alarms, etc.). This will help identify which are the most common overlaps and which data 'tags' should be focused on in terms of making them available for subscription on the API. The survey will be finalized by the end of March with a vendor completion deadline of end of April.

The display manager Proof of Concept project is ongoing, with steps being taken towards making the system more robust and reliable going forward. They anticipate being able to soon demonstrate vendor integration, where two vendors will share data on a single display.

### Technology and Connectivity Working Group

The objective of the Technology and Connectivity Working Group is to define a method for enabling seamless provision of and access to onboard data. Currently the group is developing the connectivity requirements to enable a common interface in the cabs onboard mobile machinery. At their recent meeting in February, the Group articulated their problem statement, namely: *"How do we define a standard mechanism for devices/apps to publish data that other devices/apps can subscribe to?"*

With this problem statement as the guiding force behind determining and developing solutions next steps include:

- Scope of Work document revision by Peck Tech to reflect the above problem statement and the limitation of the scope to shovel, truck and drill connectivity. This document is expected to be completed by the end of March, early April.

- When this revised document is completed, the WG will schedule a teleconference to review the revised Scope of Work. The hope is that they can move forward quickly with Peck Tech actually starting to solicit requirements from industry stakeholders.

### **Underground Mining Working Group**

The area of underground communication infrastructure implementation has been identified as a priority. In order to better understand the challenges, the common practices, and a path forward to develop some tools to assist the underground mining community, the working group has developed a survey to gather information on underground communication systems.

Results from the survey will be a valuable resource in terms of identifying and driving projects and studies for solutions, standards and guidelines- as well as serve as a platform from which to share best practices. In order to derive the most accurate results, and to actively contribute to finding common solutions, participation in the survey is crucial.

### **Operational Safety and Risk Management Working Group**

The Operational Safety and Risk Management Working Group is working towards mapping what exists in the Safety Association landscape, to help best determine who is doing what, what gaps need to be serviced and to minimize overlaps. In order to do so, they are extending a call for information to determine what organizations are most useful and why.

Another project is focused on Leading Indicators. A sub-committee will focus on developing a body of case studies and lessons learned, and creating a guideline for implementation of leading indicators.

Later this year work will begin on developing mining company safety management standards best practices, extracting from the safety management policies and procedures established in mining companies worldwide.

### **Industrial Comminution Efficiency Working Group**

The Industrial Comminution Efficiency Working Group's first project is to standardize the use of the Bond efficiency metric. The project objective is to formalize and disseminate use of the Bond method to provide industry with a means to measure and compare comminution circuit efficiencies, including a reference data base. Currently, the group is working on developing a project scope and plan outline, through which they hope to produce a business tool for senior management, plant management and metallurgical to assist in understanding, measuring and communicating performance in this cost-centric area of their business.

It is important to note that the aim of this project is not research or theory based (as technology and methodology already exists), but rather is business-based in motivation and expected outcome.

James Connolly, Barrick Gold, will become the Leader of the Industrial Comminution Efficiency working group, while Rob McIvor, Metcom, will continue to share his expertise and lead the Bond metric project. The working group will aim to develop a number of guidelines over the next year, spanning the most accepted measurements for comminution efficiency.

### **Data Access and Usage Working Group**

This working group has a two-pronged focus, on both enabling operators access to onboard data from their mobile equipment, and establishing guidelines for operational and maintenance/reliability KPIs and definitions, and establishing a common set of operator data requirements. An OEM survey is underway to establish the current baseline of all data points available onboard mobile equipment, and the standards and protocols used onboard that equipment. A draft operational KPIs and definitions document will be circulated by Q2 this year for review and consensus, while a similar maintenance/reliability document will be circulated by Q3.

### **Collision Avoidance Working Group**

The new working group will launch by May 2014, to develop guidelines for the testing, selection, and implementation of collision avoidance systems in mine operations. The creation of the working group was requested by industry stakeholders; many major mining companies have done extensive in-house testing and development in this area, but with impending regulatory decisions about collision avoidance, those companies are seeking a venue to work together and establish clear guidelines and criteria.

<b>GMSG 2014 Projects (Working Groups)</b>				
<b>Working Group</b>	<b>Project</b>	<b>Deliverable</b>	<b>Start</b>	<b>Deadline 1</b>
Technology & Connectivity	API interface development: phase one	Scope of work document that will cover voice of customer gathering and a first draft of a functional requirements document for a common API interface for mining equipment	14-Jan	14-Mar
	API interface development: phase two	Requirements document: Functional and Non-Functional requirements for an API to provide both Device Management and Display Management capabilities for Heavy Mining Equipment technology	14-Apr	2014
Situation Awareness	Final work: 2013 project	Peck work on shovel interface POC, final phase as agreed	13-Jun	Jan-13
	Alarm hierarchy			
	Interface development	Definition of API document and incremental implementation (thumbnail screen, multiple related screen display, configurable screen, security)		
	Extended functionality	Potential grad thesis: biometrics, speech recognition, speech output		
	Display manager POC	Development, hardware, shipping, exhibition,		
Underground Mining	Communications Infrastructure: Phase One	Execute detailed survey of operations, generate case studies database, analysis and report	13-Dec	14-May
	Communications Infrastructure: Phase Two	To be determined by outcome of Phase One. Options: standards/protocols dictionary, cross-systems integration, tiered guidelines	14-May	
Data Access and Usage	KPIs and Definitions	Develop strawdog; series of workshops to develop draft; review and final KPIs and Definitions guideline	14-Feb	
	OEM Survey	Map existing data points available and systems/standards used	12-Sep	14-May
Operational Safety	Leading Indicators: Phase 2	Develop a handbook to support ICMM document, enable leading indicators implementation, and cross-company comparisons	14-Feb	
	Mapping global safety organizations	Develop a database of all mine safety-related organizations, who's doing what, for the GMSG website	14-Jan	14-Aug
	Corporate Safety Standards: Benchmarking for Excellence	Collect mine company corporate safety standards, analyse for benchmark/best practice guideline	14-Feb	14-Nov
Comminution	Bond Work Index guideline	Refine and formally standardize (industry best-practices for) the Bond method of quantifying industrial comminution efficiency, as applied to various equipment and circuit configurations	13-Dec	14-Dec
	Morrell Method guideline	Develop a guideline for the use of the Morrell Method of measuring industrial comminution efficiency	14-Apr	14-Dec
Integrated Ops Centre				

## **Financial Report 2013**

Details of the GMSG budget and revenues for 2013 and 2014 are located on the following pages.

### **Key drivers of the GMSG budget**

The GMSG budget can be summarized into three main categories:

- Staffing
- Travel and events
- Research and development

Approximately 40 % of the budget is allocated to R&D, another 40 % to staffing, and the remainder to travel and events.

### **2013 budget variances**

The 2013 budget was set at \$258,000, while actual spending totalled \$202,000. The difference is attributable primarily to the Research and Development budget. Whereas approximately \$100,000 was budgeted for R&D, the projects were not ready in 2013, and a total of \$34,000 was spent in this cost area.

Other factors that contributed to the variance between budget versus actual for 2013 include Facilities, as the cost of an exhibition booth for Expomin 2014 was an additional expenditure in Q4. As well, under staffing costs, the part-time communications officer contract was extended from its initial six month trial period, through the end of the year.

### **Increased 2014 budget**

GMSG is experience fast growth, which is reflected in the 2014 budget, with an increase of \$70,000 over the 2013 budget. A number of research projects are underway across all working groups. As well, due to increased participation, sponsoring members, and industry interest a number of new working groups are launching, beginning with the Industrial Comminution Efficiency group (launched December 2013), and others including Collision Avoidance and Integrated Operations launching in Q2 2014. Increased outreach and activities to expand awareness of GMSG globally and increase participation are also reflected in the budget.

The 2014 budget is based on an increased revenue base. This increase reflects the growing numbers of sponsoring member companies (increased from 27 to 42 companies throughout 2013, with an additional increase committed in 2014).

# Budget versus Actual 2013

## Global Mining Standards and Guidelines Group Budget vs. Actual

2013

	JAN	JAN	FEB	FEB	MAR	MAR	APR	APR	MAY	MAY	JUN	JUN	JUL	JUL	AUG	AUG	SEP	SEP	OCT	OCT	NOV	NOV	DEC	DEC	2013 Budget	Actual	
<b>Summary:</b>	8,525	24,576	48,425	2,137	9,650	26,142	22,350	13,780	34,400	16,200	34,365	11,279	26,775	13,950	20,450	12,430	17,865	15,759	13,275	13,598	12,375	22,483	8,025	30,064	258,500	202,378	
<b>OPERATING EXPENSES:</b>																											
<b>Routine Items:</b>																											
Staff	8,400	0	8,400	0	8,400	21,473	10,900	8,525	10,900	10,150	10,900	10,525	10,900	11,525	10,900	11,137	10,900	11,075	10,900	12,675	8,400	11,475	7,500	16,113	117,500	126473.47	
Office Supplies	25	0	125	24	50	0	25	0	50	23	25	192	25	0	50	0	25	0	150	0	25	0	25	0	800	236.99	
Professional Services	0	0	1,000	0	0	0	25	0	0	79	150	219	550	0	0	0	340	2,738	525	0	0	0	0	0	2,500	3025.75	
Computer HW/SW	0	0	0	0	0	0	0	0	0	0	0	0	1,400	0	0	0	0	0	0	0	0	0	0	0	1,400	0.00	
Marketing	0	0	500	0	0	0	0	0	1,000	0	0	86	0	225	0	0	1,000	0	0	0	500	0	0	0	0	3,000	320.00
Conferences	0	0	1,500	540	200	737	0	543	0	0	0	0	0	0	0	85	1,000	0	0	0	0	0	0	0	0	2,700	1905.29
Facilities	0	0	2,000	0	0	0	2,109	750	0	0	0	0	0	2,400	1,500	1,060	0	0	0	0	1,250	825	0	6,912	8,900	13296.41	
Travel Airfare	0	0	2,000	1,401	0	1,180	700	1,424	1,000	1,887	1,900	0	1,500	0	2,500	0	3,000	1,998	1,000	530	1,500	0	0	3,495	14,700	11872.43	
Travel Hotel	0	0	1,500	0	500	1,855	300	0	1,000	2,317	400	0	0	0	1,100	0	1,300	0	300	345	300	303	0	1,115	6,700	5835.98	
Travel Transportation	0	0	100	142	200	272	100	1,159	100	758	100	332	100	0	100	148	100	0	100	0	100	0	100	156	1,200	2676.97	
Travel Meals	0	0	1,200	31	200	619	200	0	1,500	975	200	0	200	0	200	0	200	0	200	47	200	0	200	272	4,500	1846.13	
Travel Other	100	0	100	0	100	106	100	0	100	0	100	16	100	0	100	0	100	0	100	0	100	0	100	0	1,200	121.77	
R&D	0	24,576	30,000	0	0	0	10,000	0	18,000	0	21,000	0	14,000	0	4,000	0	0	0	0	0	0	0	10,000	0	0	97,000	34576.00
<b>Total Routine:</b>	8,525	24,576	48,425	2,137	9,650	26,142	22,350	13,780	34,400	16,200	34,365	11,279	26,775	13,950	20,450	12,430	17,865	15,759	13,275	13,598	12,375	22,483	8,025	30,064	258,500	202,378	

## Global Mining Standards and Guidelines Group Budget

2014

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	2014 Budget
<b>Summary:</b>	11,385	26,265	12,490	30,240	35,940	39,625	14,015	16,090	57,205	30,915	46,965	11,665	332,780
<b>OPERATING EXPENSES:</b>													
<b>Routine Items:</b>													
Staff	11,240	11,240	11,240	11,240	11,240	11,240	11,240	11,240	11,240	11,240	11,240	11,240	134,880
Office Supplies, Services, Equipment:	25	625	50	125	50	25	25	50	25	150	25	25	1,200
Professional Services	0	500	0	25	0	160	550	0	240	1,025	0	0	2,500
Computer HW/SW, Sup,Maint	0	0	0	0	0	0	0	0	0	0	0	0	0
Marketing & Advertising	0	1,000	0	250	750	0	0	0	1,000	0	500	0	3,500
Conferences, Training, Prof Development	0	0	200	0	0	0	0	0	0	0	0	0	200
Facilities Rental and Meeting Expenses	0	2,400	0	1,500	1,500	0	1,500	1,500	0	0	0	0	8,400
Travel AirFare	0	1,500	0	700	1,000	1,500	0	2,500	3,000	2,500	0	0	12,700
Travel Hotel	0	2,500	500	300	2,500	1,400	0	300	2,500	500	0	0	10,500
Travel Transportation	0	200	200	300	300	100	100	200	100	100	100	100	1,800
Travel Meals	0	1,200	200	700	1,500	100	500	200	1,000	300	0	200	5,900
Travel Other:	100	100	100	100	100	100	100	100	100	100	100	100	1,200
Research & Development	0	5,000	0	15,000	17,000	25,000	0	0	38,000	15,000	35,000	0	150,000
<b>Total Routine:</b>	11,385	26,265	12,490	30,240	35,940	39,625	14,015	16,090	57,205	30,915	46,965	11,665	332,780

