If you don’t grow it, you mine it

Global Mining Standards and Guidelines Group

Standards Leadership Council Forum
March 2014

Tim Skinner, Chair
**Mandate:** Global mining collaboration on solutions to common industry problems, needs and technology through standards, guidelines and best practices.

Members: 475; Contributing: 36; Participating: 75+; Partners: 5; Stds: 15
Membership
Contributors -

- 3D-P
- Agnico-Eagle
- Atlas Copco
- Barrick Gold
- CheckMark Consulting
- CNRL
- Freeport McMoRan
- Goldcorp
- Guardvant
- Hitachi
- Joy Global
- Kal Tire
- KGHMi
- Leica
- Liebherr
- Metcom Technologies
- Mining International Systems
- Mosaic
- Motion Metrics
- Newmont
- Newtrax
- Peck Tech Consulting
- Rockwell Automation
- RungePincockMinarco
- SAFEmine
- Sandvik
- Schneider Electric
- Shell
- SMART Solutions
- Suncor
- Syncrude
- Teck
- Total E&P
- Vale
- Wenco
- Yamana Gold
Partner Organizations

CIM

AusIMM

SMART

SME

The Southern African Institute of Mining and Metallurgy

Founded in 1894
# Other Standards/Industry Organizations Identified

<table>
<thead>
<tr>
<th>International Standards Organizations</th>
<th>Mining Associations &amp; Standards Organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSA</td>
<td>IREDES</td>
</tr>
<tr>
<td>SAE</td>
<td>ACARP</td>
</tr>
<tr>
<td>ISA</td>
<td>SPE</td>
</tr>
<tr>
<td>JAUS</td>
<td>CRC Ore</td>
</tr>
<tr>
<td>EDM Council</td>
<td>OPC</td>
</tr>
<tr>
<td></td>
<td>CRC Mining</td>
</tr>
<tr>
<td>Regional/National Bodies</td>
<td>IOM3</td>
</tr>
<tr>
<td>Issue/Technology-Specific Bodies</td>
<td>CEMI</td>
</tr>
<tr>
<td></td>
<td>EMESRT</td>
</tr>
<tr>
<td></td>
<td>IAARC</td>
</tr>
<tr>
<td></td>
<td>AEMP</td>
</tr>
<tr>
<td></td>
<td>MAE</td>
</tr>
<tr>
<td></td>
<td>CMIC</td>
</tr>
<tr>
<td></td>
<td>CAMESE</td>
</tr>
<tr>
<td></td>
<td>PDAC</td>
</tr>
<tr>
<td></td>
<td>ICMM</td>
</tr>
<tr>
<td></td>
<td>MIMOSA</td>
</tr>
<tr>
<td></td>
<td>SLC</td>
</tr>
<tr>
<td></td>
<td>IREDES</td>
</tr>
</tbody>
</table>
Working Groups

6 Active Working Groups
• Data Access & Usage
• Situation Awareness
• Technology & Connectivity
• Underground Mining
• Operational Safety & Risk Management
• Industrial Comminution Efficiency

4 Pending Working Groups
• Collision Avoidance Technology
• Remote Operating Centres
• Occupational Standards & Skills/Training
• Mine Planning & Engineering
Moving Material in 5 Dynamic Dimensions

Equipment

Location

Material

Activity

TIME

Load
Haul
Drill
Blast
Reclamation

Global Mining Standards and Guidelines Group
Strategic: Deposit, People, and Equipment

Plus today’s drivers

- Global competition
- Increasing difficult mining situations
- Customer product complexity
- Logistics and transportation
- Personnel shortages – the coming wave
- Shortages due to demand cycle – tires
- Environment and sustaining objectives
- Effectively manage thru the good times
Drive for Automation, Efficiency, and Productivity

Mining has been significantly behind other industries
Traditional improvement – iron over intelligence
Cost around $170 million

Consumes enough power to supply a town of 5000 people (25kV)
Mining innovation
the fly fishing method
New Drivers for Automation, Efficiency, and Productivity

Dell Computers – M. Dell: “In commodity based industries, competitive advantage and differential is gained by how you put it together”

W. Edwards Deming: Total Systems Thinking - “A system must be managed and organized for the best overall performance, which means that every part of the system must cooperate for the benefit of the system”

Rio Tinto - T. Albanese: “...to be a leader in integrated and automated mining and transport in the Pilbara iron ore region, leading to greater efficiency, lower production costs, and more attractive working conditions that will help it to recruit and retain staff in the highly competitive labour market”
“THE” Components of Integration

PEOPLE/ORGANIZATION

TECHNOLOGY

PROCESS

DATA
Remote Command & Control Centres:

- Centralized control centre for all activities within a mine;
- Staffed by SMEs;
- Visualization & manipulation capabilities;
- Applications:
  - Fuel & Lube management;
  - Consignment tracking and management;
  - Fleet management;
  - Process control supervision;
  - Tele-operation;
HOUSTON WE HAVE A PROBLEM!!

Incompatible Islands of Equipment Systems & Technology

- High Cost & Time
- Vendor Barriers
- Data Access Restriction
- Operator Impact
- Safety
- Stifling performance, Opportunities & Innovation

Unsustainable - Mine Operators future at risk
Proprietary Multi-independent System Architecture

NO UNIFIED OPERATOR INTERFACE
Multiple Uses of Onboard Mining Equipment Data

- Materials Management
- Maintenance
- Operational Statistics
- Activity Based Costing
- Finance
- Engineering
- Environmental
- Payroll
- Personnel
- Safety
And site and geographical connectivity needs
We need standards - but the barriers

- OEM proprietary solutions, thinking Beta not VHS, technology graveyard
- See business advantage by locking out/selling owner/operator data
- No consideration of multi fleet environment, retrofit, or “upgrade” – just don’t play nice with others – no plug and play
- No understanding of the whole mine (no total system thinking)
- Technology centered design: solution=new sensor+computer+screen
- Little user center design, total system design, integration design
- Equipment autonomy developments making things worse
- Lack of mine operator integration, coordination, design, understanding of technology, and the master integrator – silo mentality
- Accept what they are given from OEMs – Insufficient push and demand on OEMs, who are unresponsive
- Commodity cycle drives “off/on” approach
- IT/IS usually out of sync, not engaged with mining
- Low appreciation of the role and benefits of standards
Current Working Groups & Activities

- Unified Shovel Interface and API

- Access to onboard real time systems and data
- Operational data requirements and common KPIs
- Underground Communications Infrastructure
- Leading Indicators practical guidelines to support ICMM document
- Energy consumption in communication
- Strategic development
- Aggressive events calendar
ISO TC 82 - Mining Restarted 2012

- Responsible for 36 International Standards on
  - Graphical symbols (maps, plans & geological cross-sections)
  - Chain conveyors
  - Wire ropes for mine hoisting
  - Rotary core diamond drilling equipment
  - Rock drilling equipment
- Equipment Challenge
  - ISO/TC 127 Earth-moving machinery
  - ISO/TC 195 Building construction machinery and equipment

First meeting: South Africa, December 2013

12 participating countries:
- Chile, China, Finland, France, Germany, Iran, Russia, South Africa, South Korea, Spain, Sweden, UK

25 observing countries:
- Austria, Bulgaria, Croatia, Cuba, Czech Republic, Ecuador, Egypt, Greece, Hong Kong, India, Indonesia, Japan, Moldavia, Mongolia, Pakistan, Peru, Poland, Romania, Serbia, Tanzania, Thailand, Tunisia, Turkey, USA, Ukraine

ISO/TC 82 recognizes the need to attract other important mining countries as Australia, Canada, Brazil
• Rookie Observation – there appears to be duplication, activity, and agenda happening at industry, formal standards bodies, regulators

• Cross Industry Subject Matter Opportunities
  ▫ Maintenance: data, reliability, health & condition monitoring
  ▫ Safety: Personnel tracking, collision avoidance/proximity detection, data definitions and measures
  ▫ Cold climate operations – clothing, emergency response, escape, evacuation, rescue, equipment operation
  ▫ Equipment: LNG engine, drilling, exploration, technology
  ▫ Environmental & Reclamation monitoring and impact
  ▫ Technology and Remote command and control centers
  ▫ All this is happening in upstream oil sands
GMSG believes:

- Standards and industry guidelines are a fundamental platform for improvement and innovation,
- GMSG has wide business scope challenge in a lagging industry – also a target rich environment,
- There are a lot of common subject matter of mutual interest,
- In collaboration and participation – connect the experts
- Needs to mature its organization and governance
- It must and needs to, learn from, and work with others, especially navigating the standards world
- It needs to mature its organization and governance

GMSG appreciates and wants to continue to build a relationship with SLC – there are mutual benefits

Significant benefit for all to collaborate
Information and to get involved

Contact: Heather Ednie, Managing Director
hednie@cim.org
514.984.8775

www.globalminingstandards.org
Thanks to the SLC for their assistance

.....and Thank You
Environment, Reclamation, Community
Value of a Converged Experience
one device-common platform, many “apps”
Unified Shovel Operator Interface

Derived from operator situation awareness analysis
Driver for industry API development – coalition of the willing