Global Mining Standards and Guidelines Group

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SMART meeting

April 1, 2016

Andrew Scott, Chair

Mandate: Global mining collaboration on solutions to common industry problems, needs & technology through standards, guidelines & best practices.

- ✓ Regulators
- ✓ Researchers
- ✓ Mining Companies
- ✓ OEMs
- ✓ OTMs
- ✓ Academia
- ✓ Service Providers
- ✓ Standards Organizations

Global Mining Standards and Guidelines Group

Suncor
BHP Billiton
SMART Systems
Desert Falcon
Consulting

Collaboration

CRC ORE Optimising Resource Extraction

THE Open GROUP

CSIRO

ICMM International Council on Mining & Metals

AMIRA INTERNATIONAL

ISO International Organization for Standardization

MINING TRANSFORMING MINING

SLC STANDARDS LEADERSHIP COUNCIL

CEEC THE FUTURE

ASTM

IREDES INTERNATIONAL ROCK EXCAVATION DATA EXCHANGE FORMAT

Mine Safety Roundtable Group

2016 Strategic Objectives

- Guidelines publication
  - Progress guidelines in pipeline
  - Grow pipeline: launch new topics
  - Improve guideline procedures
- Globalization
  - Forums, events
  - Relationships with Partner Organizations
- Industry collaboration
  - Collaborative partner agreements
  - Roadmaps
- Sustainability
  - Financial model
  - Governance

Working Groups

9 Active Working Groups

- Data Access & Usage
- Situation Awareness
- Technology & Connectivity
- Underground Mining
- Operational Safety & Risk Management
- Industrial Comminution Efficiency
- Integrated Operations
- Reliability
- Common Reference Framework

Pending Working Groups

- Interoperability
- Autonomous Mining
- Mining Education
- Activity Based Costing

GMSG Guidelines Pipeline

2015 highlights:

- Launched Reliability Working Group
- Launched Common Reference Framework Working Group (in partnership with The Open Group)
- Mobile Equipment Open Data Guideline: held 4 regional workshops in 2015 (Denver, Montreal, Perth, Santiago). Guideline version 1 approved in January, publish this April.
- Comminution: one guideline completed; 2 more in final review/vote
- 6 guidelines currently in review
- Launch Autonomous Mining Sub-committee– first project: consensus based Vision of Autonomous Mining – to define and drive guidelines/standards requirements and align global efforts
- Launching Interoperability Working Group

GMSG Guidelines Pipeline

Published

- Mobile Equipment Open Data
- Methods to Survey and Sample Grinding Circuits for Determining Energy Efficiency
- Determining the Bond Efficiency of Industrial Grinding Circuits

In progress

- UG Communications Infrastructure
- Common Shovel Operator Interface Design
- Mining API
- Mobile Equipment Open Data – Version 2
- IREDES User's Guideline
- EMMM Model User's Guideline
- Data Exchange for Mine Software
- Operational KPIs and TUM
- Best Practices in Reliability in Mining
- Morrell Method User's Guideline
- Best Practice Framework for Integrated Operations
- Common Global Vision of Autonomous Mining
- Common Interoperability Reference Framework

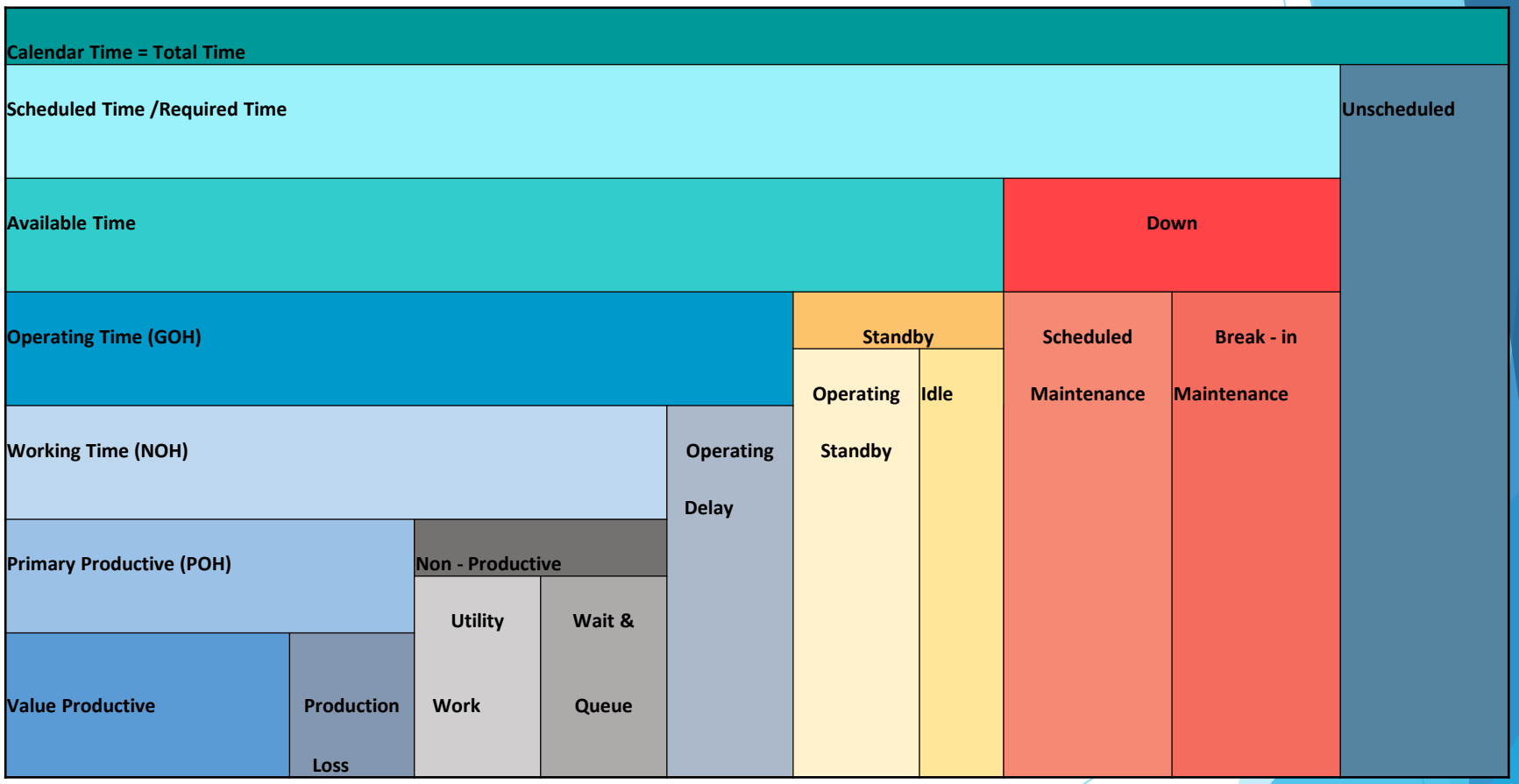
Project: Operational KPIs and Time Usage Model

- Focus on most commonly used KPIs from key activity areas of operations
- Summarize existing common data definitions for mining industry and propose standard definitions for performance
- Define information needed to support KPIs
- Focus on activities and events and the classification of events
- Initial model surface mining based; U/G, processing to follow
- Maintenance KPIs justified a dedicated project

Draft GMSG Mining Key Performance Indicators

Asset Utilization	Time the asset is being operated as a percent of total time available (Calendar)	**GOH / Calendar**
Operating Utilization	Time the asset is being operated when scheduled / Required / able to operate	**GOH/ Scheduled Time**
Effective Utilization	Time Asset is efficiently utilized to intended function	**NOH / Scheduled**
Use of Availability	Time the Asset is manned / Operating as a percentage of Available Time	**(GOH) / (GOH + Standby+ Idle)**
Physical Availability	Equipment is Physically Avaialble to perform when needed bby the operation	**(Scheduled - Down)/Scheduled** or **Available/Scheduled**
Mechanical Availability	Time the equipment is available as a percentge of time required (Manned) by the operation	**GOH / (GOH + Down)**
Uptime	Total time a unit is mechanically capable of operating, whether scheduled or not	**Available Time / Calendar(Total) Time**
Operating Efficiency	Operating time as a percentage of time equipment is manned.	**NOH/GOH**

GMSG Time Utilization Model (TUM)



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Future Mining

- Common Vision
- Increased Collaboration
- Tools, Building blocks to enable innovation
- Regulator Communication
- Requisite – to create innovation environment

Bridge to Formal Standards - ISO TC82 Mining

- GMSG is not a formal standards organization
- GMSG has official liaison status with ISO TC82

GMSG and SMART members

- Some SMART members very involved, some not at all
- Opportunity to influence, learn, develop tools
- Collaborative: achieve more through much less resources independently

GMSG events at CIM 2016

Vision of Autonomous Mining: lunch meeting (noon-2) at Teck offices Monday (must RSVP)

Activity Based Costing: 4-5 pm Tuesday, room 212

AGM and Networking Cruise: Tuesday, 5:30 – 8:30 (must RSVP)

Mobile Equipment Open Data Workshop: 9-4 Wednesday, room 212 (must RSVP; webex available)

Call for support and involvement

QUESTIONS?