

EQUIPMENT PERFORMANCE BENCHMARKING

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SMART



Surface Mining Association for Research and Technology

An association of surface mining companies formed in 1995 to develop a coordinated approach to technology development for the mining industry.

Members include many of the major North American and International surface mining companies.

BENCHMARKING PROJECT



Objectives

Establish information sharing between mines that can be used to benchmark operational and maintenance productivity and further identification of “best” mining and maintenance practices that can be utilized to increase mine productivity and hence lower costs/tonne moved.

PROJECT SETUP



- **Contract a 3rd party administrator (Marston)**
- **Establish confidentiality protocol**
- **Identify equipment to include**
- **Standardize KPI definitions**
- **Establish normalization procedures**
 - **Common metric for “pure” comparison**
- **Develop data exchange & reporting tools**

METRICS



➤ Observed/Monitored

- DELAY
- DOWN
- WAIT, STANDBY
- NOH
- DISTANCE
- TONNAGE
- NO. OF LOADS

➤ Calculated

- SCHEDULED HOURS
- MECH. AVAIL., OP. EFF.,
- PHYS. AVAIL., USE OF AVAIL.
- DELAY %, WAIT%, STANDBY %
- GOH, GOH%, WOH, WOH%
- TONNES/GOH, TONNES/WOH

BENEFITS



- **Analyze internal performance**
- **Compare performance against industry**
- **Identify underlying Best Practices**
 - Identify star performers (companies, equipment)
- **Exchange knowledge about common issues**
- **Increased management confidence**
- **Aid with equipment selection**
- **Establish clarity around data definitions**
- **Exchange new ideas around measurement techniques**

1st GENERATION

- Excel Reporting Format

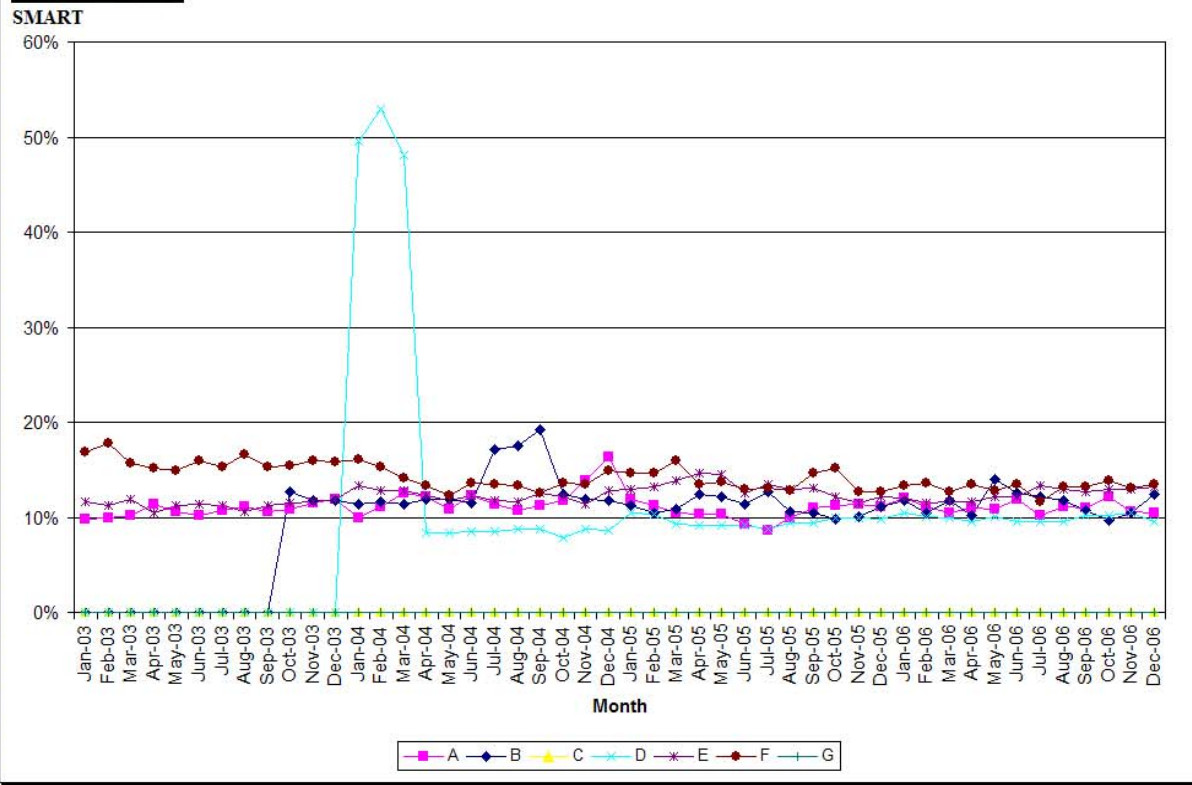


- **Access™ database driven**
- **Excel™ sheet deliverable**
- **Manual data collection**
- **Manual processing of data**

D1		=Equipment						
B	C	D	E	F	G	H	I	
1	Equipment:	Truck > 250t						
2								
3	Date	A	B	C	D	E	F	G
4	Jan-03	9.8%	0.0%	0.0%	0.0%	11.6%	16.8%	0.0%
5	Feb-03	9.9%	0.0%	0.0%	0.0%	11.2%	17.8%	0.0%
6	Mar-03	10.2%	0.0%	0.0%	0.0%	11.9%	15.7%	0.0%
7	Apr-03	11.4%	0.0%	0.0%	0.0%	10.5%	15.1%	0.0%
8	May-03	10.6%	0.0%	0.0%	0.0%	11.2%	14.9%	0.0%
9	Jun-03	10.2%	0.0%	0.0%	0.0%	11.4%	15.9%	0.0%
10	Jul-03	10.7%	0.0%	0.0%	0.0%	11.3%	15.3%	0.0%
11	Aug-03	11.1%	0.0%	0.0%	0.0%	10.6%	16.6%	0.0%
12	Sep-03	10.6%	0.0%	0.0%	0.0%	11.3%	15.3%	0.0%
13	Oct-03	10.8%	12.7%	0.0%	0.0%	11.5%	15.4%	0.0%
14	Nov-03	11.5%	11.8%	0.0%	0.0%	11.6%	15.9%	0.0%
15	Dec-03	11.9%	11.7%	0.0%	0.0%	11.9%	15.8%	0.0%
16	Jan-04	9.9%	11.4%	0.0%	49.5%	13.3%	16.1%	0.0%
17	Feb-04	11.1%	11.6%	0.0%	52.9%	12.8%	15.3%	0.0%
18	Mar-04	12.5%	11.4%	0.0%	48.1%	12.8%	14.1%	0.0%
19	Apr-04	12.2%	11.9%	0.0%	8.4%	12.3%	13.3%	0.0%
20	May-04	10.9%	11.9%	0.0%	8.4%	11.8%	12.3%	0.0%
21	Jun-04	12.3%	11.5%	0.0%	8.5%	12.3%	13.6%	0.0%
22	Jul-04	11.4%	17.1%	0.0%	8.5%	11.7%	13.5%	0.0%
23	Aug-04	10.7%	17.5%	0.0%	8.7%	11.6%	13.3%	0.0%
24	Sep-04	11.2%	19.2%	0.0%	8.8%	12.5%	12.6%	0.0%
25	Oct-04	11.7%	12.4%	0.0%	7.9%	12.1%	13.6%	0.0%
26	Nov-04	13.9%	11.9%	0.0%	8.8%	11.4%	13.5%	0.0%
27	Dec-04	16.4%	11.8%	0.0%	8.6%	12.8%	14.9%	0.0%
28	Jan-05	11.9%	11.3%	0.0%	10.5%	13.0%	14.7%	0.0%
29	Feb-05	11.3%	10.5%	0.0%	10.3%	13.2%	14.7%	0.0%
30	Mar-05	10.4%	10.8%	0.0%	9.3%	13.8%	15.9%	0.0%
31	Apr-05	10.3%	12.4%	0.0%	9.1%	14.6%	13.4%	0.0%
32	May-05	10.3%	12.2%	0.0%	9.2%	14.5%	13.7%	0.0%
33	Jun-05	9.3%	11.4%	0.0%	9.2%	12.6%	13.0%	0.0%
34	Jul-05	8.6%	12.7%	0.0%	8.7%	13.5%	13.1%	0.0%
35	Aug-05	10.0%	10.6%	0.0%	9.4%	12.9%	12.8%	0.0%
36	Sep-05	11.0%	10.5%	0.0%	9.4%	13.1%	14.6%	0.0%
37	Oct-05	11.3%	9.8%	0.0%	10.0%	12.1%	15.1%	0.0%
38	Nov-05	11.4%	10.1%	0.0%	9.9%	11.5%	12.7%	0.0%
39	Dec-05	11.1%	11.1%	0.0%	9.8%	12.1%	12.7%	0.0%
40	Jan-06	12.0%	11.7%	0.0%	10.4%	12.0%	13.3%	0.0%
41	Feb-06	11.1%	10.5%	0.0%	10.1%	11.5%	13.6%	0.0%
42	Mar-06	10.5%	11.8%	0.0%	10.0%	11.6%	12.7%	0.0%
43	Apr-06	11.0%	10.2%	0.0%	9.6%	11.6%	13.4%	0.0%
44	May-06	10.8%	14.0%	0.0%	10.1%	12.1%	12.8%	0.0%
45	Jun-06	11.9%	12.6%	0.0%	9.5%	12.2%	13.4%	0.0%
46	Jul-06	10.2%	12.1%	0.0%	9.6%	13.3%	11.6%	0.0%
47	Aug-06	11.1%	11.7%	0.0%	9.6%	12.9%	13.2%	0.0%



SMART BENCHMARKING
DELAY TIME / SCHEDULED HOURS



DELAY - (Shovels)

Machine is available and not on standby but not NOH. Power cable moves are an operating delay.

DELAY - (Trucks)

Machine is available and not on standby but not NOH. Standard fuel and lube are considered as operating delays. Overheating is an operating delay. Trucks packing (i.e. Syncrude) is a delay.

Scheduled Hours = Down + Delay + Standby + WOH

LIMITATIONS



- **Limited visualization and reporting**
 - View all data and total timeline
- **No interactive client interface**
- **No real-time access**
- **No user based querying and visualization**
- **No security to overall metrics database**

2nd GENERATION

- Web-based System



Technology

- Industry Standard Tech Platform
- SQL Server 2005 Database
- Microsoft/SQL & Dundas Charts for Reporting Services

Status

- Internet site is in final beta testing stage
- Security probes being conducted
- Currently hosted at Marston's office

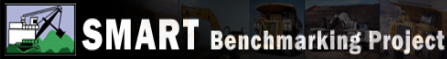
PLATFORM CAPABILITIES



- **Easily extended reporting format**
 - **Views**
 - **Graph types**
 - **Participants**
 - **Metrics**
 - **Equipment**
- **Scaleable**
 - **High performance with large numbers of users**
 - **Enterprise configuration of database/web server**
 - **Load balancing – database/server**
- **Security**
 - **User ID and Password**
 - **Site hardening against outside probes/threats**

DEMO



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User Name:


Password:

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Welcome to SMART Benchmarking Project - Home

Text here on SMART Benchmarking.
The benefits of the section. Description of the measures. What you are seeing represented by the color bubbles. Text here on how to use this section. The benefits of the section. Maybe a [link to another](#) part of the site. What you are seeing represented by the color bubbles.


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Other Interesting Topics on SMART.
The benefits of the section. Description of the measures. What you are seeing represented by the [link to another](#). Text here on how to use this section. The benefits of the section. Maybe a link to another part of the site. What you are seeing represented by [link to another](#) bubbles. Maybe a link to another part of the site



Text here on Benefits for your company.
The benefits of the section. Description of the measures. What you are seeing represented by the color bubbles. Text here on how to use this



The benefits of the section. Description of the measures. What you are seeing represented by the [link to another](#). Text here on how to use this section. The benefits of the section.

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SMART in conjunction with Marston & Marston 2008

ACCESSING THE BETA WEB SITE



- **Participants**

- A user name and password will be sent to the contact at each participating mine/company

- **General Public**

- URL: <http://smarttest.marston.com>
- A dummy dataset will be set-up so anyone can try out the system

NEXT STEPS



- **Site Additions**

- **Based on user feedback**
- **Requests will be prioritized**
- **Go live in June – replace spreadsheet reporting**
- **Marketing animated FLASH® demo being finalized**

Phase II - Future Enhancements

- **Streamline data processing into the SQL Server database – Integration Services**
- **Automated and streamline data processing**
- **Expand viewing capabilities - Profiles by industry**

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