

# EQUIPMENT PERFORMANCE BENCHMARKING

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MARSTON

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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 3<sup>rd</sup> 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**

# 1<sup>st</sup> GENERATION

- Excel Reporting Format

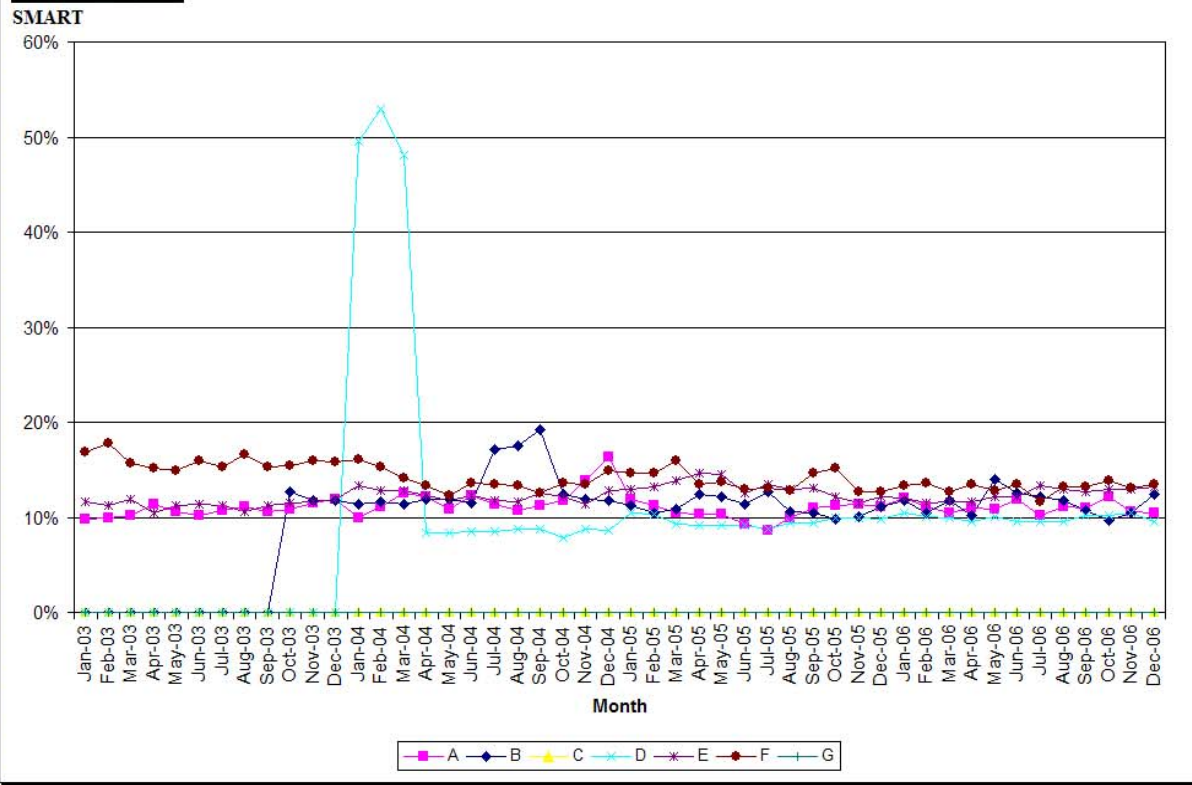


- **Access™ database driven**
- **Excel™ sheet deliverable**
- **Manual data collection**
- **Manual processing of data**

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
D1	=Equipment																			
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**

# 2<sup>nd</sup> 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

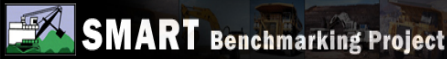
# PLATFORM CAPABILITIES



- **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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### 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.



**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



**Text here on About Us.**  
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



**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

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**

# CONTACTS



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