Agenda

- Program Overview / Agenda
  - Discuss crushing station automation
    - Automation needs
    - Automation benefits
  - Show some examples & results
    - Pay backs
    - Data evaluation
Automation

Audience Survey

- How many of you have some form of automation in your plants today?
- How many of you have some form of automation on your cone crushers today?
- How many of you really understand how the automation works and the importance of it in your plants today?
Why Automation

- Repetitive conditions
- Free up man power
- Increase reaction time
- Control a system remotely
- Increase efficiency of a system
- Maximize efficiency of a piece of equipment
- Increase product quality
- Protect capital investment
- Optimize a particular product
- Monitoring operation
- Data gathering
From early dawn
WHY AUTOMATE YOUR CONE CRUSHER?

- Realize a higher return on your investment.
  - Higher net production of desired products
  - Optimum power utilization
  - Continuous generation of quality products

- Protection of your investment
  - Constant overload protection
  - Continuous adjustment compensating for changes in material characteristics
  - Ability to analyze operational data
Monitor and Control
Available at the push of a button
Monitor and Control
Available at the push of a button

- Closed Side Setting
- Horsepower in use
- Power consumption
- Load Time
- Operating time
- Hydraulic Pressure
- Lubrication Oil temperature
- Liner Wear
- Recorded data
- Graphing data
Automation

- Other things to consider
  - Automation mode vs Manual mode
  - Durability of use
  - Is the tool easily used
Historic Activity Logs
Detailed and comprehensive crusher data is easily available with a click of the mouse.
Crusher Automation and PLC System
Continuous Control with Automation
1. Switch gear unit
2. Stop signal to feeder
3. Control signal to feeder
4. Max. level in surge bin
5. Min. level in surge bin
6. Max. level in crusher feed hopper
Crushing force – Choke-fed chamber

Crushing force – Starve-fed chamber
Poor Feed
Better Feed
Quality = $
Automation can work for you

Without Automation

Case study

With Automation
Crusher Discharge
% available minus 1/2 "

- 50 hrs
- 150 hrs
- 250 hrs
- 350 hrs
- 450 hrs

Non Auto
Automated
The advantages

- Can operate choke-fed and utilize the maximum motor power.
- The reduction increases.
- The product shape gets better.
- The liner life increase.
- Mechanical life of components & machine increase.
- Overloading protections.
- An automated crusher looks after itself.

Automation crusher produces 10 tons more of desired product and 33 tons less over size.
One Hour time span
Loaded 66% of each hour
Summary

- In summary automation of a compression crushe will provide:
- Higher net production of desired products
- Optimum utilization of motor power
- Continuous adjustment of setting to compensate for feed conditions.
- Full utilization of the units capacity
- Constant overload protection
- The ability to analyze operating data
- The opportunity to monitor the unit from remote location.
FUTURE DEVELOPMENTS

The new handheld, high performance computers will give remote access and allow distant control through mobile phones and Internet. It may be possible to for example to control an automated mobile cone crusher from an office, using a hand held computer, on the other side of the globe.

(Bill Malone)
Future of Automation

There are many on-line size sampling systems available today. Whether by mechanical means, or by photo thechnology.

With this ability to sample it is possible to use a control loop in conjunction with an automated crusher station to complete the system and become closer to full automation.

Service in a box............?

Automatic wear indication........?

Automatic Parts Re-Order........?
Thanks