Addressing process control weaknesses with MetSMART

This short discussion will explain why your process plant need software that will help you understand the inner workings of your equipment pieces on a regular basis.

In a typical process improvement strategy you would stabilize the plant first and then use an expert system to control the plant in a clever way, hopefully helping your plant to perform well. The expert system uses real-time data to identify optimal set points for your plant variables.

Stabilizing the plant before installing the expert system is crucial because the system will not work without actual accurate real-time measurements.

In addition to inaccurate measurement instrumentation common destabilising issues on plants that often need fixing and maintenance are incorrect control loops, too many alarms going off, operator influence and manual driving of the plant from the control room without using the system.

How does MetSMART complement your Expert Control System?

MetSMART is a laptop application that guides engineering decisions. MetSMART guides the human decisions that your expert control system cannot make.

**EXPERT CONTROL SYSTEM**
Expert Control Systems set an optimum set-point on a specific parameter and then automatically adjust variables to maintain that set-point. For example, the Expert Control System sets the mill load set-point, and then adjusts the feed rate to maintain that load.

**METSMART SOFTWARE**
MetSMART can simulate the following scenarios, which the expert control system cannot:

- Changes in ore hardness on breakage equipment performance
- F80 changes on the feed belt
- Changes in blast patterns
- Increased / Decreased feed rates
- SAG Mill ball size, load and speed
- Change in mill discharge panels
- Changes in water additions
- Changes in cyclone vortex, spigot and number operating
- Ball mill top size and load
- Crusher speed, open side setting / closed side setting
- HPGR Speed
- Feed ore grades vs final product grades & recoveries
- Ore kinetics vs flotation performance
- Flotation conditions vs interaction between gangue & valuables
- Changes in flotation tank design & operating conditions
- Reagent vs ore kinetics
  
  ... and many more
When generic expert systems control plants they treat each equipment piece as a black box, herein lies the problem. The issue with this is that this approach is not accurate for complex systems. For example, the process in a SAG mill is chaotic so a deeper understanding of the SAG mill using a mathematical model as basis for this understanding is required.

Understanding the way the equipment piece behaves is required to check the way the expert control system is identifying optimum set points. For example, slurry pooling in a SAG mill cannot be measured and it will certainly reduce throughput. So, how will the expert system deal with this when choosing a set point?

Software that ‘understands’ the process is needed. Minerality’s answer to this requirement is MetSMART software. The plant’s flow sheet is pre-programmed into this intelligent system and using plant audit data the inner workings of the process is modelled. But, this model needs to be ‘aware’ of the chaotic system it is modelling. Therefore, the models must be stress-tested by reviewing and analysing historical data.

Having this ‘understanding’ on standby on a screen inside the control room is an excellent way to double-check the expert control system’s decisions. It is also an excellent way to simulate what you expect from a plant and to double-check this against plant measurements. For example, if MetSMART simulates recirculating load of 400 % around your cyclones but your instruments say its 200 %, which system is right and is your expert system perhaps using an inaccurate measurement?

Please contact us at info@minerality.com.au for a more specific analysis of your project.