Drive Profit and Reliability via Regulatory Control

by

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Agenda

• Process Control in context
• Some Interesting Paradigms
• Sustaining Maximum Performance
• Based throughout Australia (and NL added recently)

• Provider of advanced process control design and implementation engineering and associated training

• Not aligned with any one technology company or DCS vendor

• Australian customers include BHP Billiton, Rio Tinto, Woodside Energy, Santos, Caltex, BP
Business objective: Maximise profitability and reliable shareholder return on investment

• Plant Objectives
  • Maintain Health, Safety and Environmental standards
  • Meet Overall Production and KPI Targets
  • Reliably Maintain Minimum Cost Operation

• Process Control Objectives
  • Keep plant safe (within alarm / trip constraints)
  • Deliver predictable and steady operation whilst meeting product quality specifications
  • Facilitate plant optimisation (manage charge, product yields, energy consumption) to increase profit
How Does Process Control Deliver Benefits?

• Assuming that there is some economic advantage to pushing the process in an optimal direction...

• A reduction in variation (improved control) allows the average target value to be moved closer to constraints (process optimisation)
Interesting Paradigm #1: Economic Framework

**Business objective:** Maximise profitability and shareholder return on investment

In some organisations, a simplistic view that all costs can be reduced independently from revenue can produce both:

- A *cost reduction* culture as opposed to a *profit maximisation* culture

- A reluctance to invest in developments unless the payback period is *very well defined* and short
A cost reduction driven culture seeds one of the major issues facing industry today:

*The battle between “Hidden Costs versus Visible Costs”*

Relevant examples include:

- Project development costs versus operational production losses and the impact that this has on plant designs
- “I know how to optimise the plant, but my KPIs direct me otherwise”
- Maintenance cost KPI overriding Work Request priority set by Operations
Typically major plant projects are designed and built by Engineering Procurement and Construction (EPC) contractors:

- Stereotypical EPC companies employ instrument engineers who are good at sizing instruments but may have little operational experience.
- Process control designs are often developed by process engineers.
- A control design concept (narrative) can be given to inexperienced personnel to implement (fresh off the DCS training course?).
- As there are often a variety of ways to implement a control concept, a lack of site or DCS standards can result in implementation of poor quality control schemes.
- EPC contractors have limited interest in control engineering when their objective is to build the nameplate production capacity at minimum cost…
Interesting Paradigm #2: Control Design Gap

Great focus on the visible costs during project,
Little focus on the ongoing hidden operational losses you suffer!

But let’s not beat up on EPC engineers here – they are victims of the paradigm also...

Very rarely is there any dynamic stability criteria included in a acceptance test for a newly built plant!
(customers are not asking designers to focus on control aspects!)

Recent Australian example:
• Loops required redesign during commissioning
• New plant signed off – meeting production but still swinging
• Experienced process designer attended commissioning for the 1st time with the comment “I’ve learnt a lot”...
Interesting Paradigm #3: Reg Control Neglect

Industry has prioritised Condition Monitoring for rotating equipment for many years… despite this CM for regulatory control remains poorly subscribed… Why?

- The plant can be run (badly) with a high proportion of control in manual
- The cost of spare parts and improved maintenance can be easily calculated whereas the cost of the associated production losses is not easy to estimate
- Maintenance cost KPIs can dominate without consideration of the benefits

Tight resources and the legacy of design flaws are difficult to overcome:

- Site personnel have limited scope/mandate to improve control design within OPEX constraints (post project completion)
1. Understand your plant’s complete profit equation when designing your economic framework – don’t fall into the trap of only considering the easily identified costs.

2. Accept that the profit equation has a lifecycle which starts with the plant design during the construction project – poor design decisions will have long term effects.

3. Acknowledge the profit opportunity associated with maintaining good regulatory control performance.
Sustaining Maximum Performance

Important Considerations:

• Organisational Awareness
• Appropriate Support Tools
• Appropriate Monitoring and Maintenance Support
Organisational Awareness

• Process Control Engineers are as valuable as Process Engineers – their process optimisation objectives are common, the tools of trade differ.

• The value of appropriate process control needs to be understood at all levels and consistently supported. Do you have the right tools and training?

• The economics of the process should be transparent and well communicated.
Appropriate Support Tools

• Does your plant have PID feedback loops? *Where’s your tuning package?*
  • Select a package based upon usability and robustness as well as tuning performance
  • Don’t go overboard on process characteristic identification, focus more on robustness
  • Loop tuning is a core competency (not the domain of contractors)
  • Tuning skills are difficult to maintain as it is an infrequent activity
    • Don’t spread the responsibility too wide
    • Ensure access to training is easily available
Appropriate Monitoring and Maintenance Support

- Monitoring should be part of a regular routine to minimise loss of benefits (and identify maintenance needs).

- Automated condition monitoring tools can save time (if the output is assessed appropriately!).

- Automated performance assessment of regulatory control loops can feed Preventative Maintenance strategies to minimise benefit losses. **Follow through to instrument maintenance completion and retuning!**
Summary

• Regulatory Control performance affects profit and reliability
• Good regulatory control design often has to be demanded
• Appropriate instrument maintenance can be elusive

*The battle between “Hidden Costs versus Visible Costs”*

The challenge for Process and Control Engineers (and others interested in plant optimisation) is to ensure:

• **Significant project value is not lost by cheap construction**
• **Appropriate maintenance is completed in a timely fashion**
• **The wider organisation understands the real process economics**
Where to Get More Information?

Apex Optimisation  
www.apex-opt.com

- **TuneWizard Loop Tuning Tool**
- **ControlWizard Loop Performance Monitoring Package**

Both from PAS  
www.pas.com

or contact Dr Jacques Smuts via  
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