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Drive Profit and Reliability via Regulatory Control

by

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Apex Optimisation

Agenda

- **Process Control in context**
- **Some Interesting Paradigms**
- **Sustaining Maximum Performance**

Apex Optimisation Overview

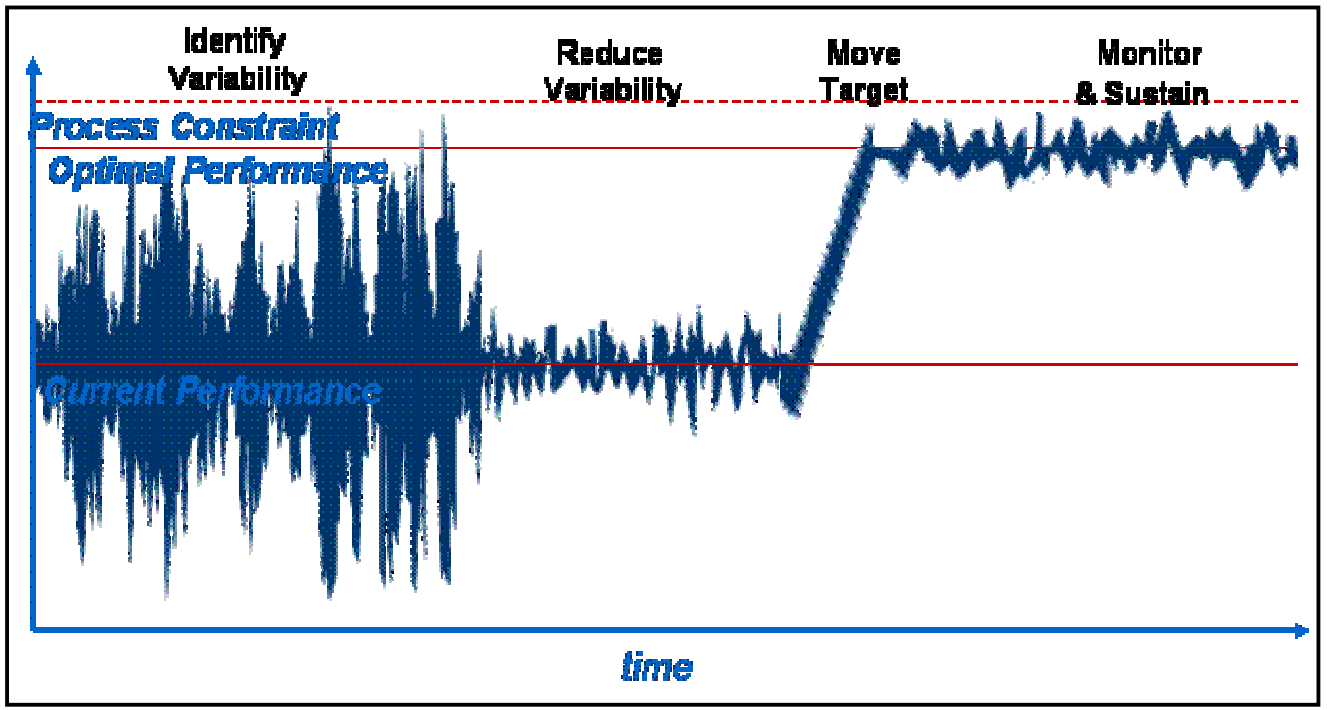
- **Based throughout Australia (and NL added recently)**
- **Provider of advanced process control design and implementation engineering and associated training**
- **Not aligned with any one technology company or DCS vendor**
- **Australian customers include BHP Billiton, Rio Tinto, Woodside Energy, Santos, Caltex, BP**

Process Control in Context

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**

Interesting Paradigm #1: Economic Framework

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**

Interesting Paradigm #2: Control Design *Gap*

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)

Interesting Paradigms: Answers?

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**

Sustaining Maximum Performance

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.

Sustaining Maximum Performance

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**

Sustaining Maximum Performance

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 **jsmuts@pas.com**

Any Questions / Comments?