Control Loop Performance Optimization

Solutions for Optimizing Oil & Gas Operations
Introduction

INTECH’s Control Loop Performance Optimization (referred to as CLPO) is an operations improvement framework to optimize and streamline plant performance, which contributes to smoother process operation and higher overall productivity.

INTECH’s applications add value through role based security, event triggered KPI’s and multi variable loop and process analysis. INTECH provides advanced diagnosis, tuning, performance optimization and routine monitoring of control loops as part of its focus on lifetime asset and facility performance. This ensures timely identification and rectification of control problems before they adversely affect process profitability. This also makes sure that benefits of optimal loop performance do not diminish over time.

Sub-Optimal Control-Loop Performance Factors

Of the four elements that make up a control loop, i.e. process, measurement, controller and control element, changes in any one can affect the performance of control loops and cause improper functioning. Factors that typically contribute to suboptimal control loops are:

- Equipment Wear/Aging
- Changes in Operating Conditions
- Modifications to Plant
- Varying Unit Loads

This lack of properly functioning control loops disrupts plant operation and affects productivity, thus requiring continuous monitoring and improvement of control loops throughout the plant/facility’s lifetime.

Steps to Improve Control Loop Performance

INTECH follows a systematic approach to improve control loop performance based on the DMAIC process, and which consists of seven steps as defined by our solution vendor partners, who are also industry standard leaders.

Continuous Improvement

- Establish Philosophy
- Measure Performance
- Compare of Diagnose
- Optimize Controllers
- Optimize & Maintain
- Modify Objectives
- Improve Hardware
Why do you need Control Loop Performance Management?

Control Loops are an integral part of any automated process and define how efficiently a plant, facility, filed or sub-system operates. Poor control loop performance can go undetected indefinitely and adversely affect productivity, having a negative impact on bottom line.

INTECH’s Loop Tuning helps identify origins of poor control loop performance and facilitates their remediation. It analyzes loops for problems like hysteresis, stiction, process non-linearity, and poor tuning; it then identifies and models processes’ dynamic response to calculate suitable loop PID controller settings. It also provides a choice of tuning objectives, and simulates loops’ response to visualize effects of parameter changes prior to applying them.

Custom Reporting Solution
INTECH’s custom reporting solution gives automatic loop performance reports, event-triggered reports & shift schedule based reports via email. These reports can also be accessed, customized and shared online and over the cloud.

Loop Monitoring
INTECH’s solution acquires real-time data via OPC and a time-series of data for analyses. OPC read rate is user-defined so that Loop Analysis does not overload the OPC server or underlying systems.

Process Analysis
INTECH’s Process Analyzer helps find, explore, and understand plant-wide oscillations & their interactions with multiple plant/process variables. This helps ensure operation at 100% capacity.

Symptoms of Control Loop Malfunction

Poorly configured control loops are a serious damper to productivity and lead to issues like:

- Unnecessary and excessive alarms
- Frequent process upsets
- Reduced output and quality
- Increased operator loading
- Increased output variations
- Stiction, non-linearity or hysteresis in control elements
- Gradual decrease in overall productivity

Classical Optimization Method

- Controllers are tuned during commissioning
- PI/PID parameters are initially set based on experience
- Setpoint changes are made to test performance
- Problem control loops are mostly tuned via trial & error
- Plants may run for their lifetime with sub-optimal controls

INTECH’s Real-Time Optimization

- Control Strategy Design
- Control Element Performance
- Controller Tuning according to Specific Objectives
- Continuous monitoring of under-performing loops
- Model-based process configuration

Benefits of Control Loop Optimization
“I commend you on your efforts in customizing the business analysis software for deployment for a Web Based Alarm Management Dashboard. It meets our objectives and has produced the desired results.”

Central Maintenance Coordinator

End User

Instrument Superintendent CM

Control & Automation Leader

INTECH personnel have the correct skills & knowledge to enable them to carry out all tasks and additional works... full training and familiarization of Control Loop tuning software has been carried out to our complete satisfaction.”

“[We] commend INTECH’s knowledge of alarm management, dedication, commitment and effort. Most importantly, works have been completed safely and INTECH has been able to work successfully in our diverse environment.”