
Abstract

Improved performance is the prime directive in today's industrial processes. Throughputs have increased drastically, decreasing the time available to detect and control upsets. Equilibrium has become the exception rather than the rule. Poorly tuned regulatory controllers would eventually integrate the errors to achieve steady state control, and variance caused by poorly implemented control strategies and improperly de-tuned controllers was considered part of the process. Inadequately designed control systems, malfunctioning control equipment, and poorly tuned and coupled loops could be tolerated in the past as plants were designed to operate at constant loads, but not today, this approach is no longer acceptable.

Introduction

Regulatory control systems employ the application of feedback and feedforward control loops to control various physical process properties. A regulatory control system may often contain hundreds, sometimes thousands, of individual control loops. For a control system to provide optimum control, it must be designed, installed, and tuned, to minimize variability, yet adapt efficiently to changing conditions. In a large system, where the dynamics are unknown, processes interact, measurements are noisy, valves stick, and load conditions vary, it seems a daunting task to optimize the control of the system. The purpose of this manual is to provide information on how to apply the Protuner™ WPSA and the Control System Analysis Procedures to:

- Define the individual unit operations that make up the overall control system
- Understand the control strategies employed to control each unit operation
- Inspect the field installation of the control and measurement equipment
- Develop a test sequence for testing each loop in the unit operation
- Test individual loops with a procedure which minimizes process upsets, yet provides the necessary dynamic information for analysis

ABSTRACT

- Analyze the test data to troubleshoot the system and optimize the tuning of each loop

One important advantage, that is frequently overlooked in the application of the Control System Analysis Procedures, is complete understanding of the process itself. More complete process knowledge often leads to changes in control strategies that result in significant improvements in production, product quality, and improved profitability.