IMPROVING COKER STRUCTURE AUTOMATION

Jerry N Waggoner
Process Operations Advisor

Coking.com
2007 Delayed Coking Seminar
Calgary, Alberta, September 17-20, 2007

Overview

- Automation history
- Foster Wheeler in automation
- Where is the industry headed
- Design for total automation
Automation History

- Coker #1 – 1929 Standard Oil of Indiana
- Coker of the 1990's
- Today's typical automation (16 valves per drum)

Coker #1 – 1929 Standard Oil of Indiana

- All Manual Operation
- Switch valve – manual
- Wedge plugs used for isolation
- Total manual deheading
- Blowdown vent stack
- Relief to atmosphere
- Coke drum pressure 60 PSIG
- NO SHOT COKE
FW 1990's Coker

- Some Motorized Valves
- Switch Valve Motorized Ball Valve
- Some Valves Interlocked
- Blowdown to Flare – Some Recovery
- Relief System to Flare
- Coke Drum Pressure 15 PSIG
- Shot Coke becoming A Normal Operation
- Automatic Deheading Appearing on Some Units
- First Automated Crane

2005 Typical FW Coker Design

- More motorized valves
- Switch valve motorized
- More valves interlocked
- More double block valves
- Slide valve deheading
- Blowdown recovered to compressor
- Pressure in drum 15 PSIG or less
- Shot coke normal
**Program Logic Control**

![Program Logic Control Diagram](image)

**FW Current Design**

- All motorized valves interlocked
- Switch valve motorized
- Batch controller monitors system
- Interlocked process permissives for safe operation
- Operator permissive to move valves
- Slide valve deheading
- Blowdown recovered to fuel gas
- Coke drum pressure 15 PSIG
- Shot coke normal
- Cut coke remotely

© 2007 Foster Wheeler USA Corporation. All rights reserved.
Foster Wheeler in Automation

- All valves used in normal operation motorized
- Batch controller controlling batch operation
- Valves sequenced by batch controller
- Knowledge-based advisory on out-of-synchronizaton steps
- Remote cutting – can be automated
- Fully automated top and bottom deheading devices

Where is the industry headed?

- Automation of Cutting
- Automated batch operation.
  - Switch
  - Blowdown
  - Quench
  - Drain & dehead
  - Rehead and test
  - Preheat
Current technology will allow Cokers to operate from the control room just as other refinery units do today.