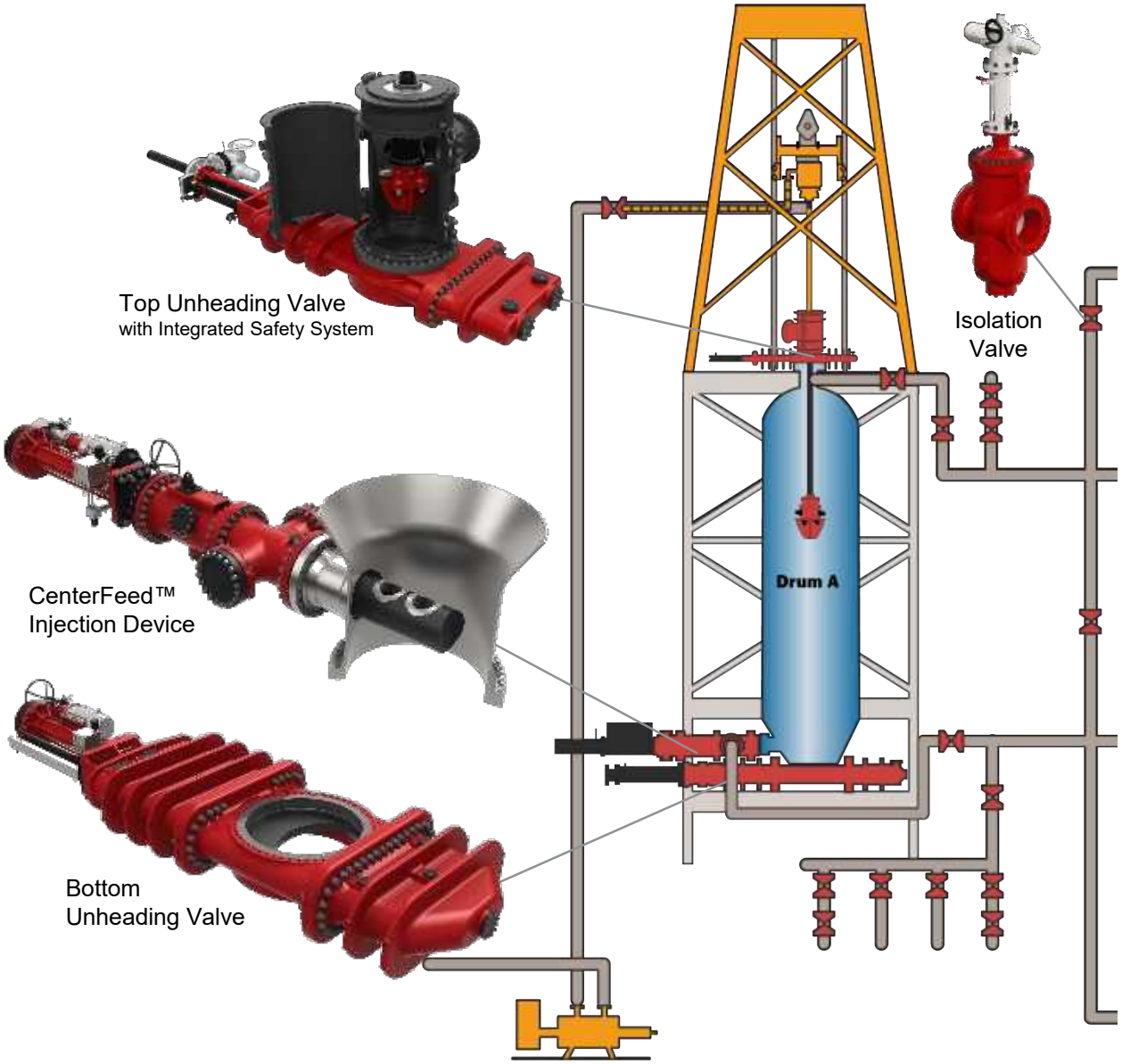
CIRCOR | DeltaValve TapcoEnpro

Innovation and Experience

RefComm Mumbai

November, 2019

Innovation and Experience



1,000+ Units Sold

100+ Refineries Satisfied

20+ Countries Served

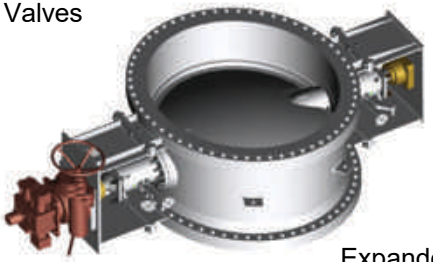
Millions of safe cycles

Leading Global Supplier

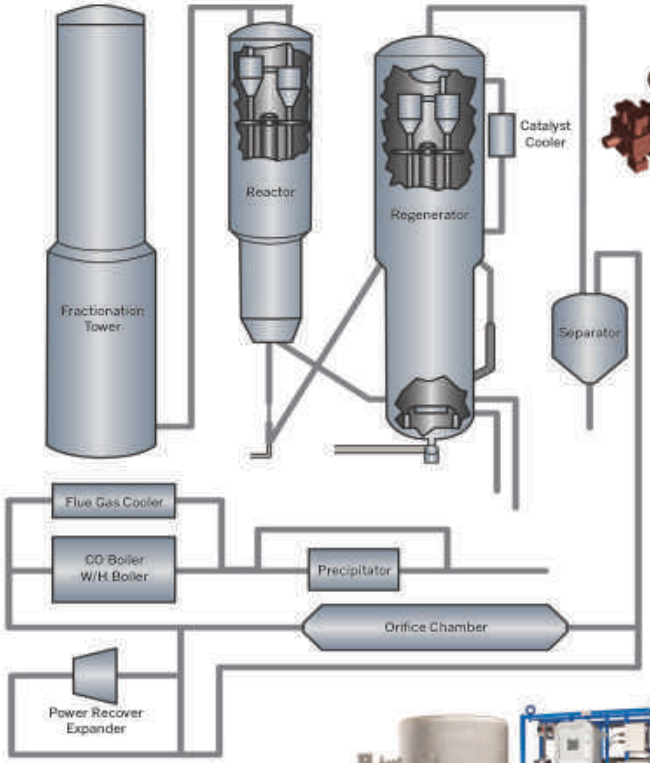
Process Knowledge and Technology

Valve Actuators

FCC Plug Valves



Expander and Flue Gas Butterfly Valves



FCC Reactor Isolation Valve

FCC Slide Valves and Controls

1,000+ Units Sold

200+ Refineries Satisfied

50+ Countries Served

Millions of safe cycles

Leading Global Supplier

Commitment to India Market

Commitment to India Market

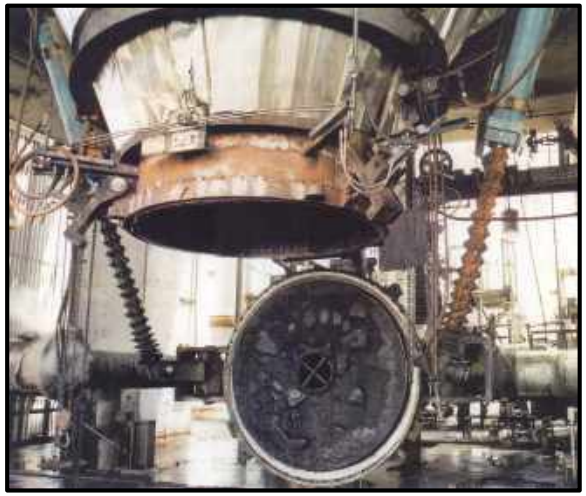
DeltaValve Overview

- **100 +** refineries have DeltaValve equipment
- **1,000 +** Valves / Devices installed in Delayed Cokers in 22 countries
- **10,000 +** Personnel now working safer
- **100,000 +** Hours spent inventing and designing innovative systems
- **1,000,000 +** Safe and faster cycles
- **1,000,000,000 +** Dollars in refinery savings = reinvestment and growth

DeltaValve in India

- First BUDs installed in 2008
- BUDs = 34
- TUDs = 34
- CenterFeed = 14

DeltaValve Solved Major Industry Problem

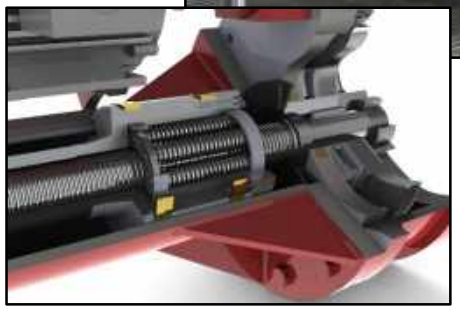


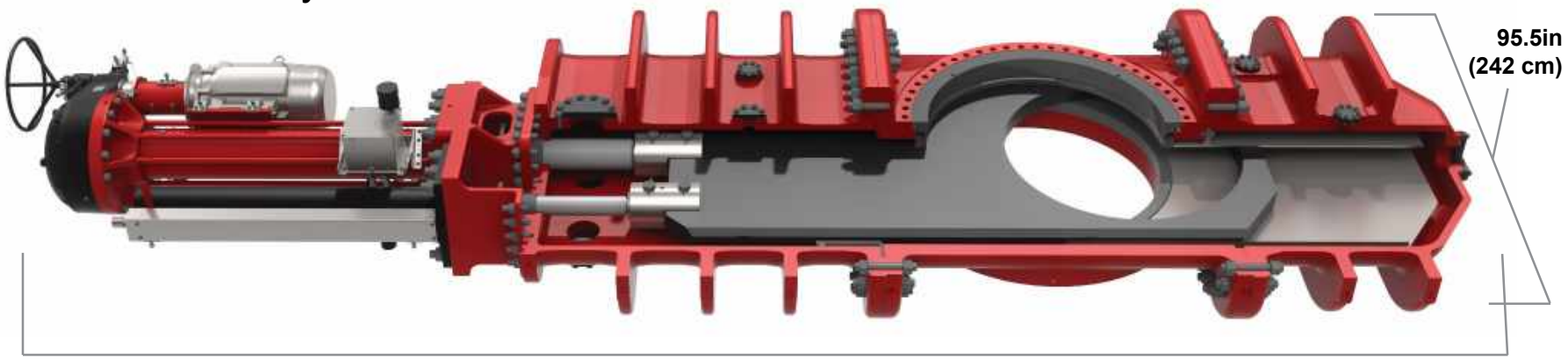
Manual Unheading

- Unsafe for Operators
- Longer Cycle Times
- Higher Maintenance Expenses
- Lower Unit Throughput

DeltaValve's Bottom Unheading Valve Solution

- Invented Bottom Unheading Valve in 2001
- 400+ Units Sold World-Wide
- 100+ Refinery Installations
- Safe, Fully Automated, Simple Design
- Efficient Planetary Roller Screw Actuator
- Ultra-low Steam Consumption
- Zero Recordable Injuries
- Zero Incidents
- No Downtime
- 2+ Million Cycles





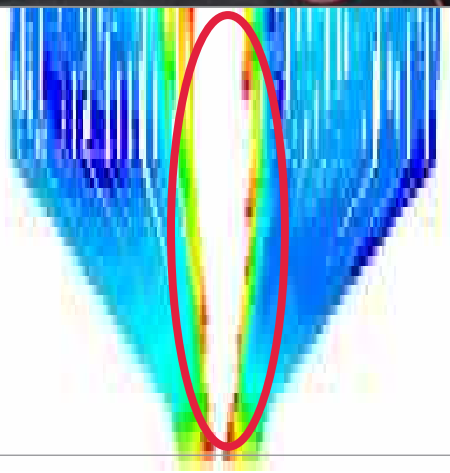
Traditional (Manual)
Coke Drum Top Unheading

DeltaValve Top Unheading Device/ Integrated Safety System Solution

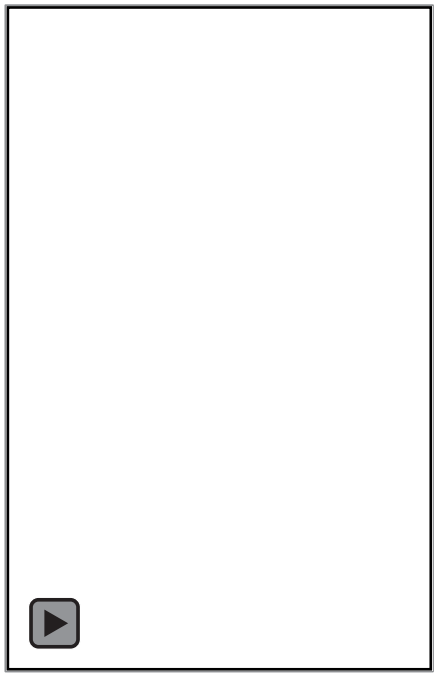
- 270+ Units Sold
- Electric and Hydraulic Actuation
- Built-In Drill Stem Guide/Blowout Diverter

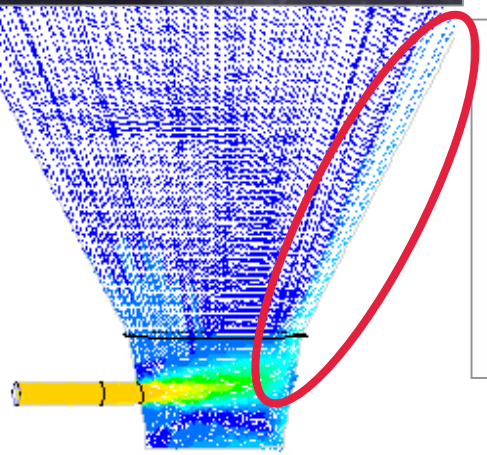
Transition from Bottom Feed to Side Feed

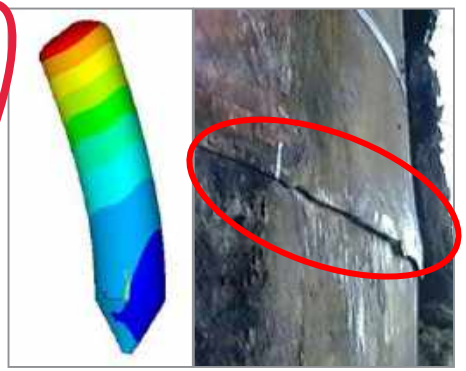
Bottom Feed Entry



Side Feed Entry

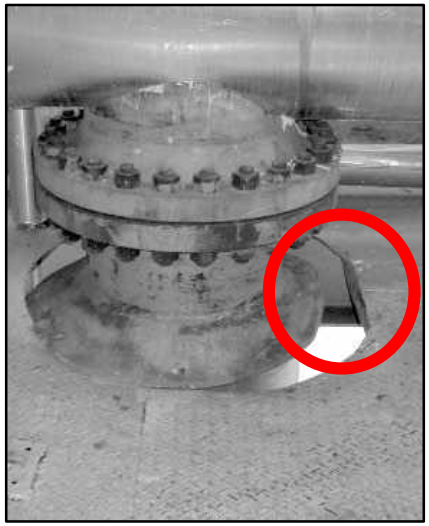




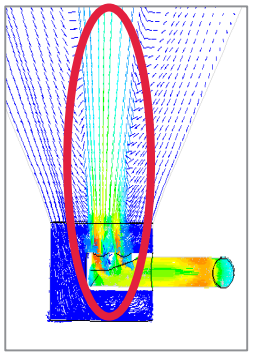


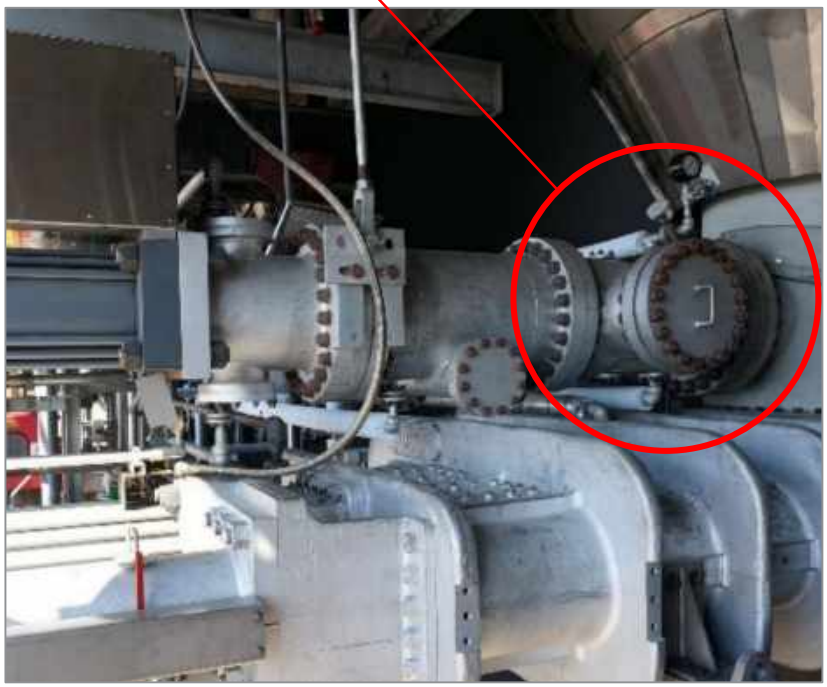
Side Feed Challenges

- Feed channeling against the drum wall causes the following:
  - Unsteady coke drum during feed
  - Drum tilt (banana effect)
  - Uneven quench
  - Localized hot spots
  - Top head steam geysers/blowouts
- Inconsistent rates of temperature change negatively impact drum fatigue life at the following locations:
  - Lower transition cone
  - Drum wall
  - Coke drum support skirt

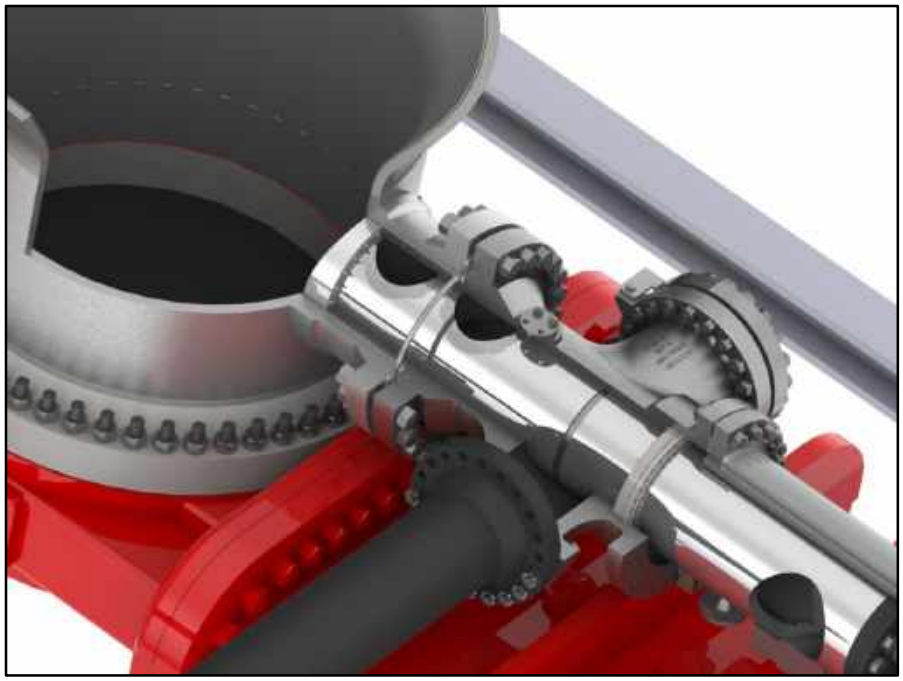


DeltaValve CenterFeed™ Injection Solution

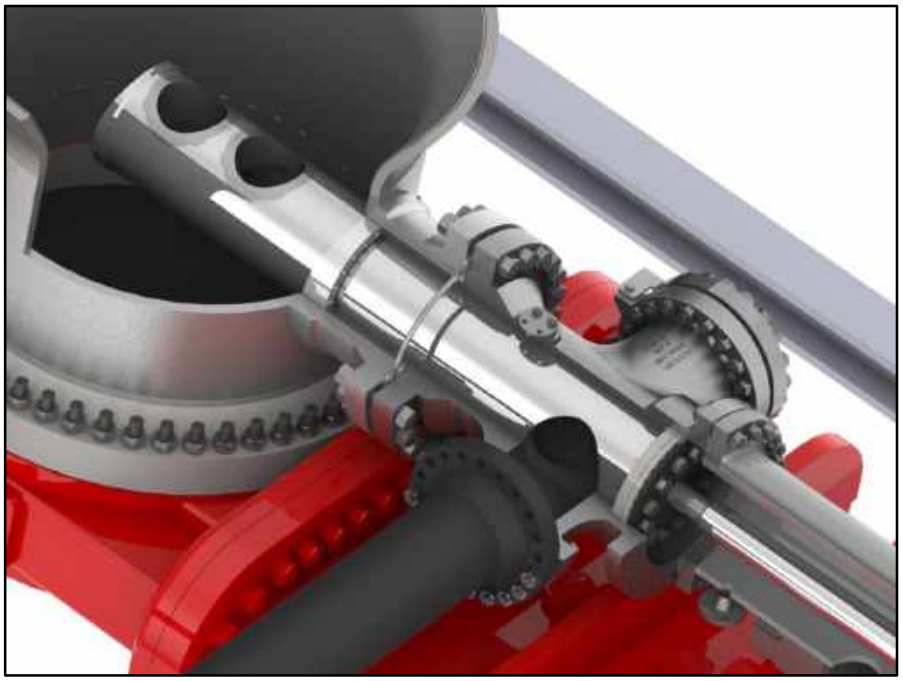




CenterFeed Functionality



Retracted Position



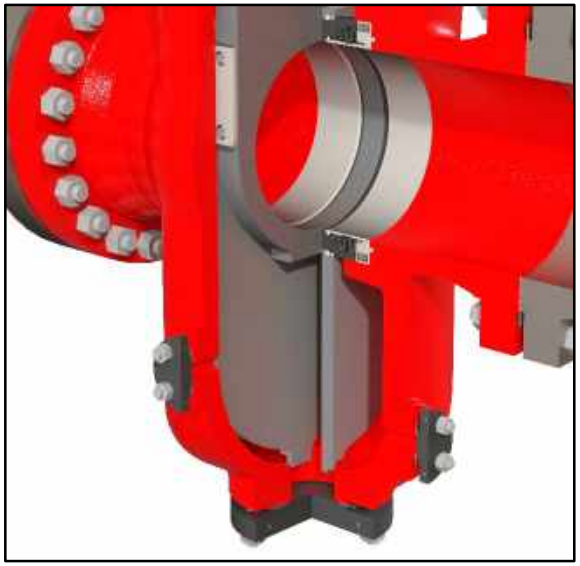
Extended Position

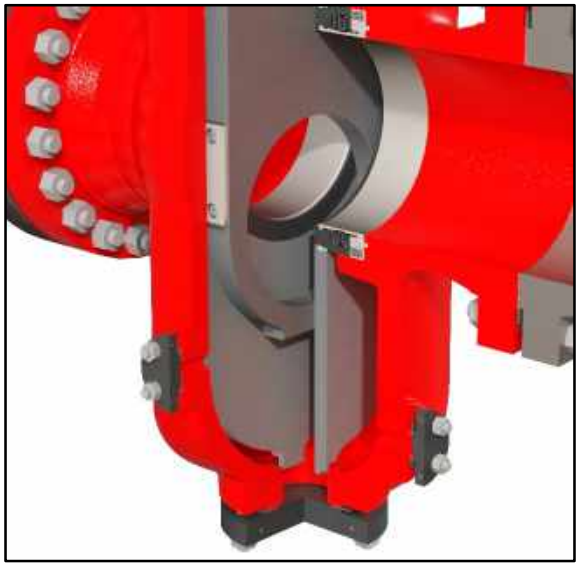
- Technology proven since 2011
- 66 units sold / 50+ in negotiations
- Improved feed and quench channeling
- Reduced drum stresses
- Increased drum life

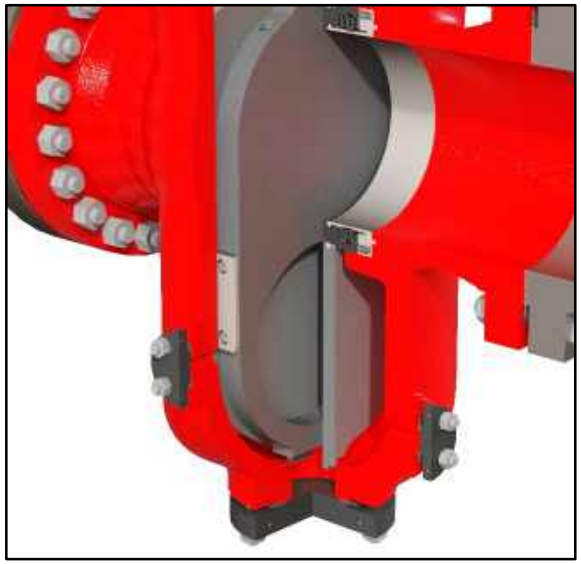
DeltaValve Delayed Coker Isolation Valves

- 125+ Units Sold
- Full Bi-Directional Isolation
- Dual Live-Loaded, Self Cleaning Metal Seats
- In-line Maintainable
- Ultra-low Steam Consumption
- Available in B16:10 Full Port Ball Valve, Gate Valve Short Pattern, and Full Port Wedge Plug Face to Face Configurations
- Customers and Licensors Approving 2 for 1 Configurations
- Electric and Hydraulic Actuation Options Available

DeltaValve Delayed Coker Isolation Valves







Service

- Overhead Vapor to Blow Down
- Overhead Vapor to Fractionator
- Hydrocarbon Liquids/Vapor Bypass to Fractionator
- Feed Line
- Coke Condensate
- Drain to Coke Pad
- Wax Tailings/Steam

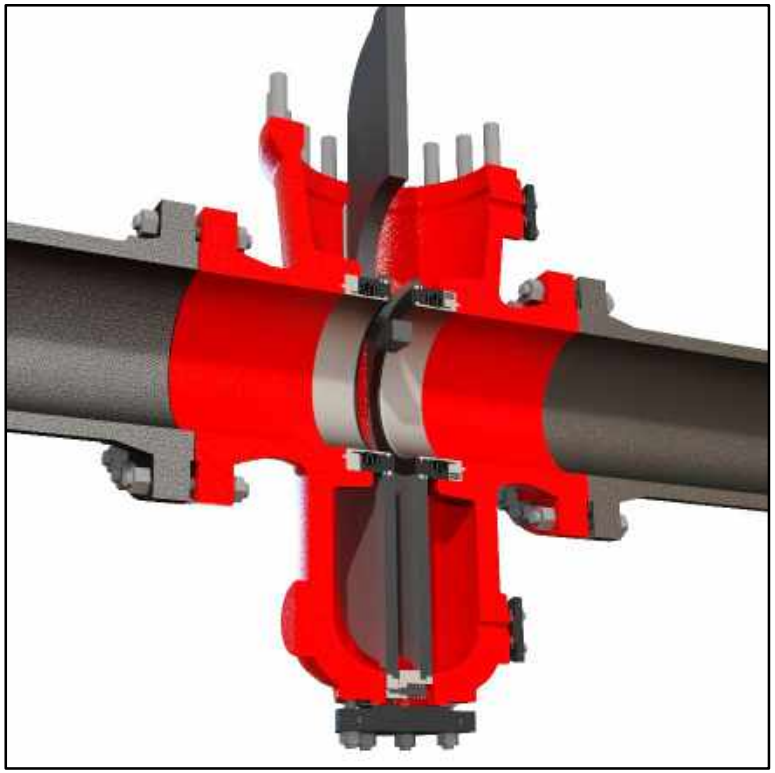
Environments

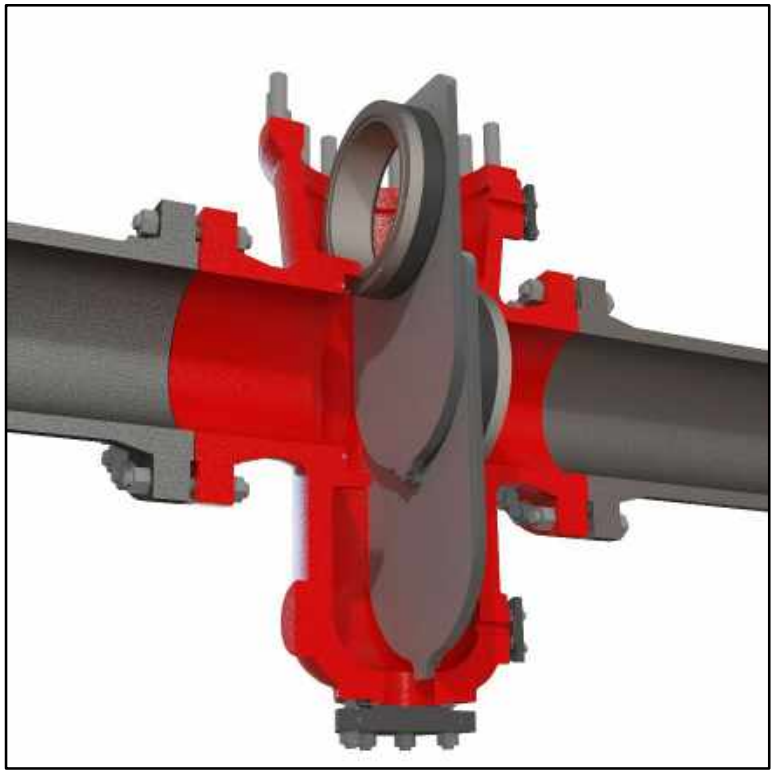
- Designed For Use In Challenging Environments
  - Hydrocarbon liquids near coking temperature
  - Solids laden hydrocarbon liquids
  - Dirty hydrocarbon vapor streams
  - On/off, throttling service

DeltaValve Isolation Valves

Top Entry / In Line Maintainable

- All Internal Components Accessible While Valve is Installed In Line
- Easy Disassembly and Re-assembly





TapcoEnpro FCC Reactor Isolation Valve

Technical Overview

- Proven technology based on coke drum unheading valves and isolation valves
- Simplicity of design with only one major moving part
- Ultra-tight seat seal
- Multiple actuation options available
- Minimal part requirements for complete seat and seal replacement
- Abrasion and heat resistant HVOF coating on wetted surfaces

Key Features

- Designed to accommodate extreme line loads without impacting purge steam usage or affecting actuation loads
- Fully steam purged with ultra-low steam consumption
- Flanged configuration for ease of future turnaround maintenance
- Visual valve actuation position indicator

Installation Services (Revamp Projects)

- As an integrated supplier, DeltaValve strives at providing a strategic fit to its clients, with single source responsibility and optimized costs.
- This can be achieved by performing the engineering, procurement and construction or construction management work associated with the installation of unheading devices and associated equipment with an EPC or EPCM approach.
- Keys to successfully pursue this approach:

  ➢*Establish strategic relationships with engineering and construction partners familiar with the customer.*

  ➢*Earn a consolidated position as Delayed Coker experts in design and installation of unheading devices, particularly with an immense knowhow that optimizes construction during Turnarounds.*

  ➢*Maintain a high value team focused on safety and on-time delivery, while being flexible and responsive to customer needs.*

A-la-Carte vs. Bundled Strategy

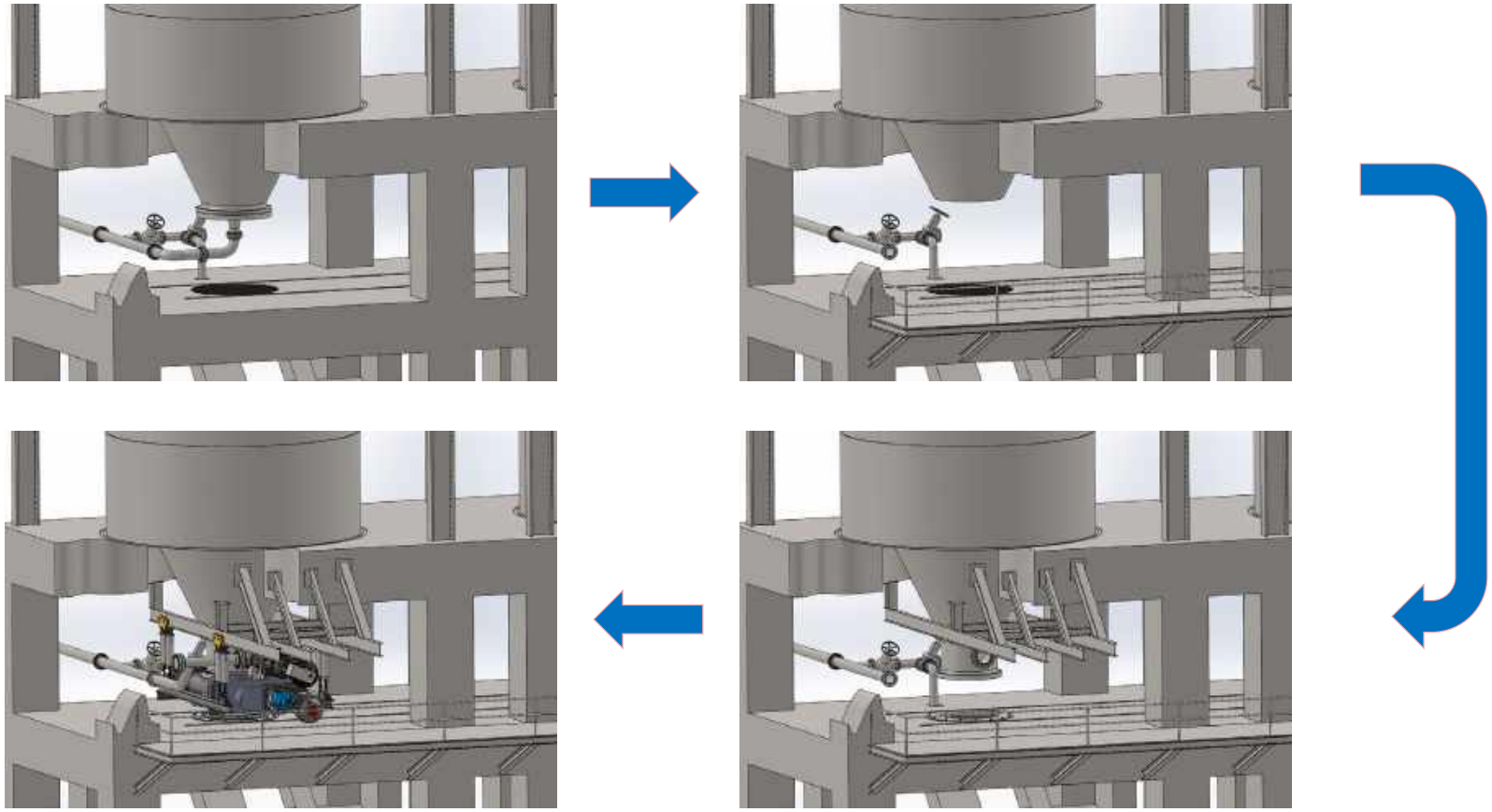
- LSTK unheading projects make sense as they allow for scope to be better quantified and priced early in the process.
- LSTK approach to unheading projects ultimately results in reduced capital costs:
  - *TIC on process unit equipment-related project generally estimate 35% for main and secondary equipment, while the remaining 65% account for engineering, construction (including bulks) and associated management services.*
  - *While the perception is that such ratio may be maintained regardless of the execution strategy, generally a single-source approach brings in a lower TIC.*
- LSTK projects offer greater total value to the customer:
  - *Single source responsibility in execution, reducing risk of budget and schedule (particularly significant on engineered materials)*
  - *Greater consistency and reduced uncertainties;*
  - *Reduced interfaces and predictable execution time;*
  - *All-inclusive system and performance warranty.*
- LSTK approach eliminates line-by-line (itemized) scrutiny, aiming at the ultimate on-time-delivery and total-quality objectives

Project Early Execution Sequence

- Timely clarification of all terms and conditions during the tender process to consider the following:
  - *Specialized equipment (unheading valves, retractable center feed devices and control system);*
  - *Detailed engineering deliverables, including construction scope of work, constructability evaluation and cost estimate;*
  - *Construction management resources to support the installation and start up all new equipment and associated utilities.*
- Support contractors in the early identification and qualification of registered and customer-preferred in country E&C suppliers, stimulating the establishment of partnerships when possible.
- Establish during the tender process clear boundaries of responsibility, as well as the necessary milestones for equipment delivery and provision of services that are fair to both customer and contractor.
- It is key to consider all local laws involving goods and services.

Streamlined Approach

- Leveraging lessons learned from **100+** world-wide installations
- Coordinated engineering, procurement, and construction management
- Lower cost installation during turnaround

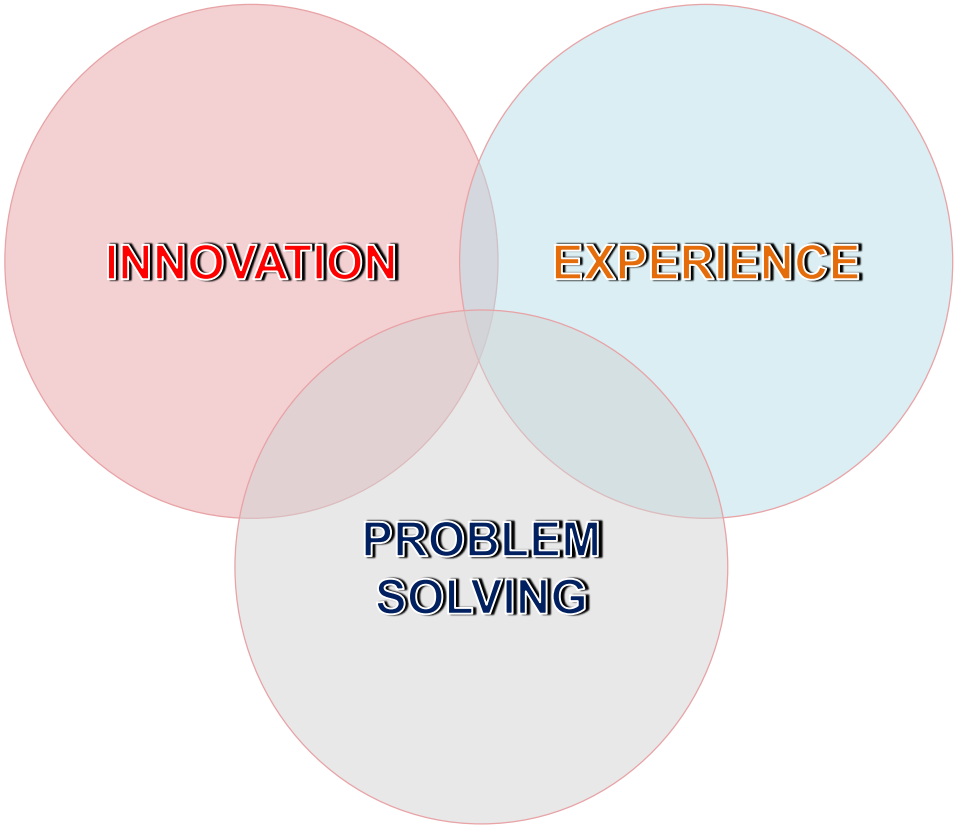


Why Choose DeltaValve?

Experience: Lessons learned from 100+ installations

- Every coker unit is unique (performance expectations are different)
- Single unit – 2 drum, to multi-unit, multi-drum combination
- Slow or fast cycle time
- Small or large drums
- Small or large diameter feed lines
- Shot coke or anode grade coke
- Various deck/structure constraints
- Preference for electric or hydraulic actuation systems
- Challenges of hot/humid or cold/dry climates
- Cutting into pits, sluice ways, rail cars, etc. (capability to throttle)
- Economical and safety driven projects
- Turnaround planning and site audit expertise

Invitation



What is the biggest problem at your refinery?
DeltaValve can help you solve it!
Thank you!
QUESTIONS?