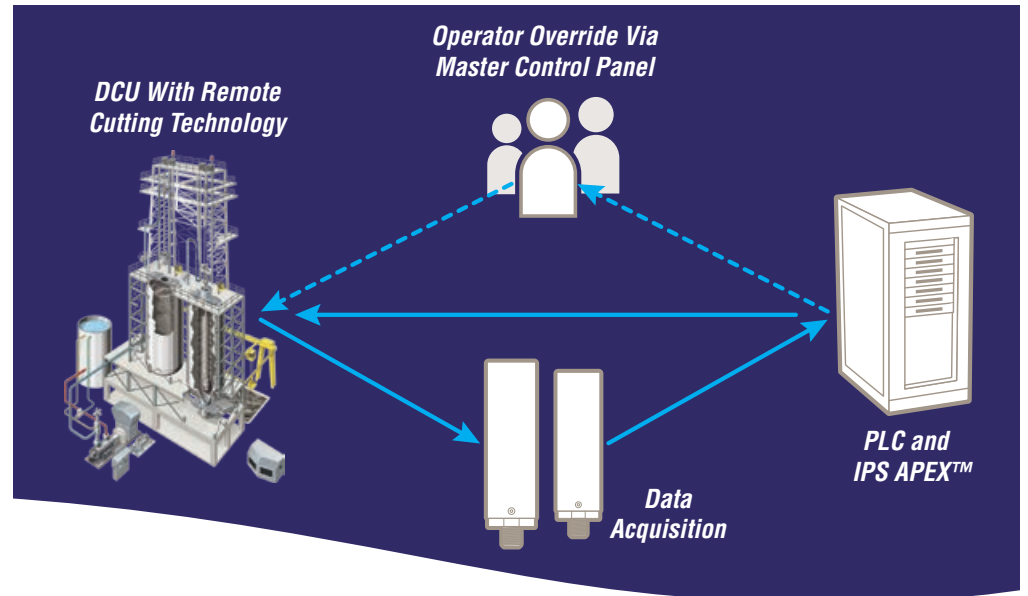


Automated Hydraulic Decoking Systems

Flowserve automated decoking systems take remote cutting to its ultimate destination: a new standard for DCU safety, availability and profitability.



Advancing Safety, Availability and Profitability

Flowserve automated decoking technology combines the capabilities of its remotely operated cutting equipment and drum monitoring systems with the embedded intelligence and advanced algorithms to control the cutting process. Controlled by the PLC, operator intervention is only required in the case of process exceptions. The pre-programmed cutting operations are customized to minimize cycle times while maximizing safety and reliability. The ultimate result is safer, faster, more efficient coke cutting.

Automated Systems Integration

All of the tools required for remote and automated coke cutting are available and field proven. Now, with their complete integration into a decoking control system, full automation of the cutting process is achievable.

Automated decoking takes Flowserve remote cutting technology to this ultimate step by capitalizing on the advanced monitoring, diagnostics, control and instrumentation capabilities of the Flowserve intelligent cutting systems. Flowserve can custom design and install the requisite computer software and algorithms, instrumentation and embedded intelligence to automatically operate the hydraulic decoking system while protecting it from unanticipated downtime.

A fully automated system features cutting control and continuous feedback signals for equipment and drum status. A single operator can monitor the entire process in safety, away from the cutting deck. Operator interface is only required for sequence exceptions. Safety is further improved by integrating an automated cutting system with PLC interlocks.

The Benefits of Automation

The benefits of automated decoking with fully integrated monitoring, control systems and access to a management portal are impressive:

- **Improved cutting personnel safety** as an automated cutting system with PLC interlocks minimizes the possibility of operator mistakes and eliminates operator shortcuts. Standardized cutting procedures also reduce the risk of aggressive cutting practices.
- **Process efficiency and consistency** are achieved since the cutting program advances as soon as possible with consistent cutting times and standardized cutting procedures.
- **Improved equipment reliability** as continuous condition monitoring results in predictive maintenance for the jet pump and other critical decoking equipment. Damage from aggressive or improper cutting techniques can be eliminated.
- **Data recording for process optimization and troubleshooting** is continuous. When properly analyzed, this data can be used to optimize cycle times, identify and prevent failure events and monitor performance for predictive maintenance.

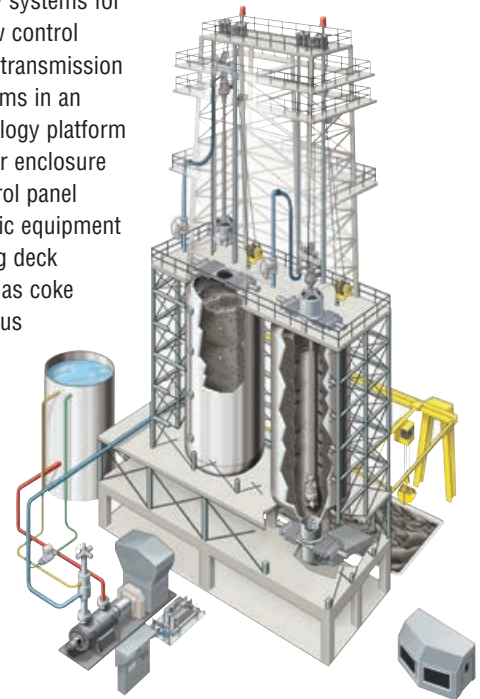
Available Portal Access

As an option, Flowserve is able to actively monitor for process and equipment problems that may lead to unscheduled downtime and reduced production. Using data acquisition tools and the Technology Advantage™ Portal, Flowserve experts from around the world – including DCU specialists and hydraulics engineers – can monitor, diagnose and communicate necessary solutions and corrective actions to increase unit uptime.

A Single Source Supplier

Flowserve can provide all the equipment necessary for DCU hydraulic decoking automation, including:

- The AutoShift™ coke cutting tool
- A remotely operated winch and rotary joint
- Automatic guide plate and tool enclosure
- Drum vibration monitors to determine tool position and cutting progress
- Cutting equipment sensors to monitor tool rotational speed, wire rope system tension, etc.
- Interlocked safety systems for cutting water flow control
- Data monitoring, transmission and control systems in an integrated technology platform
- A remote operator enclosure with master control panel
- Video and acoustic equipment to observe cutting deck activities, as well as coke chute and pit status



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