Dynamic simulation with Mimic Simulation Software provides a high-performance solution for operator training and control system optimization. This Digital Twin technology delivers the complete environment for control system optimization and is an effective tool for teaching process and control engineers the control and operation of the fluidized catalytic cracker (FCC).

** Fluidized Catalytic Crackers Modeling **

Solutions for fluidized catalytic crackers include dynamic models of the following process areas:
- Riser reactor with spent catalyst separation cyclones
- Catalyst regeneration with cyclones
- Combustion air blower
- Customized valve characteristics to match actual plant controls
- Optional torch oil addition to maintain catalyst temperature

** Application Capabilities **

** Riser Reactor **
- Dynamic real time mass and energy balances
- Vaporization of the feed
- Cracking of hydrocarbons by reaction using the catalyst
- Coke production on the catalyst in the riser
- Spent catalyst separation from the product stream

** Catalytic Regenerator **
- Dynamic real time mass and energy balance
- Burning coke off the catalyst
- Combustion air feed via a blower
- Separation of flue from the catalyst
- Optional torch oil feed as needed to maintain catalyst temperature

** Mimic Simulation Software **

- Train operators on infrequent and dangerous process occurrences
- Test control system enhancements
- Transfer knowledge from seasoned to inexperienced operators
- Increase overall plant safety

Applying the Digital Twin to Fluidized Catalytic Crackers (FCC)
**Instructor Station**

Instructor controls in Mimic and instructor screens in Mimic Component Studio allow your training team to prepare for working with the control system and process. Any element in Mimic can be manipulated or controlled, and instructor screens provide easy access in one location. Typical controls allow instructors to manipulate operating conditions, such as boundary conditions and compositions, introduce ad-hoc device failures, control scripted training scenarios, and restore snapshots to steady-state operations.

**Plant Feed Conditions**
- Manipulate feeds, compositions, and other operating conditions.

**Ad-Hoc Process**
- Switches for individual unit failures.

**Process Snapshots**
- Control and restore full steady-state, cold, or other plant conditions.

**Scripted Scenarios**
- Pre-engineered scenarios with dynamic representation of student scores.

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