

# Applying the Digital Twin to Fluidized Catalytic Crackers (FCC)

Refining

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

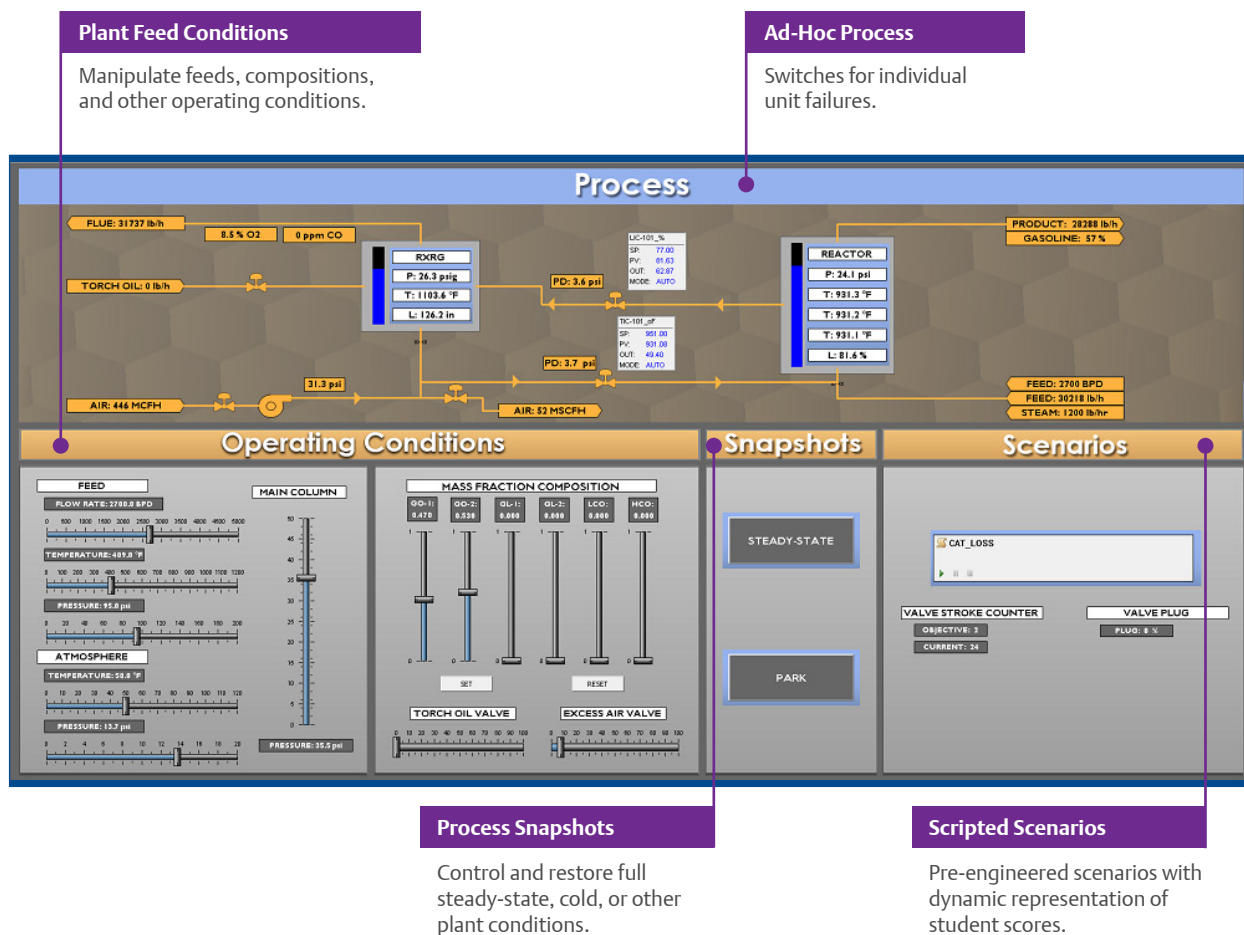


Increase overall plant safety

## 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.



**Emerson**  
North America, Latin America:

+1 800 833 8314 or  
+1 512 832 3774

**Asia Pacific:**

+65 6777 8211

**Europe, Middle East:**

+41 41 768 6111

[www.emerson.com/mimic](http://www.emerson.com/mimic)

©2019, Emerson. All rights reserved.

The Emerson logo is a trademark and service mark of Emerson Electric Co. All other marks are the property of their respective owners.

The contents of this publication are presented for informational purposes only, and while diligent efforts were made to ensure their accuracy, they are not to be construed as warranties or guarantees, express or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available on request. We reserve the right to modify or improve the designs or specifications of our products at any time without notice.