

Applying the Digital Twin to Hydrocracking Units

Petroleum 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 hydrocracking units.

Hydrocracking Modeling

Solutions for hydrocracking units include dynamic models of the following process areas:

- Feed Furnace
- Hydrocracker Reactor
- H₂ and Light Gas Recycle

Application Capabilities

- Dynamic real time mass and energy balances
- Dynamic Vapor Liquid Equilibrium Balance accounting for reaction mixture interaction with external streams, chemical transformations due to the reaction kinetics
- Configurable equation of state activities and enthalpy correction factors to account for mixture non-idealities
- Reaction modeling using the Power law dependencies with the Arrhenius type equation for reaction rate constants.
- Tunable reaction rate constants (Activation energy, Pre-exponential factor, and reaction order for the species) for both, forward and reverse reactions
- Instructor controls for hydrocracker operating conditions including temperature and pressure of the feed, natural gas supply, hydrogen and cooling water supply.

Mimic Simulation Software



Train operators on infrequent and dangerous process occurrences



Test control system enhancements



Transfer knowledge from seasoned to inexperienced operators

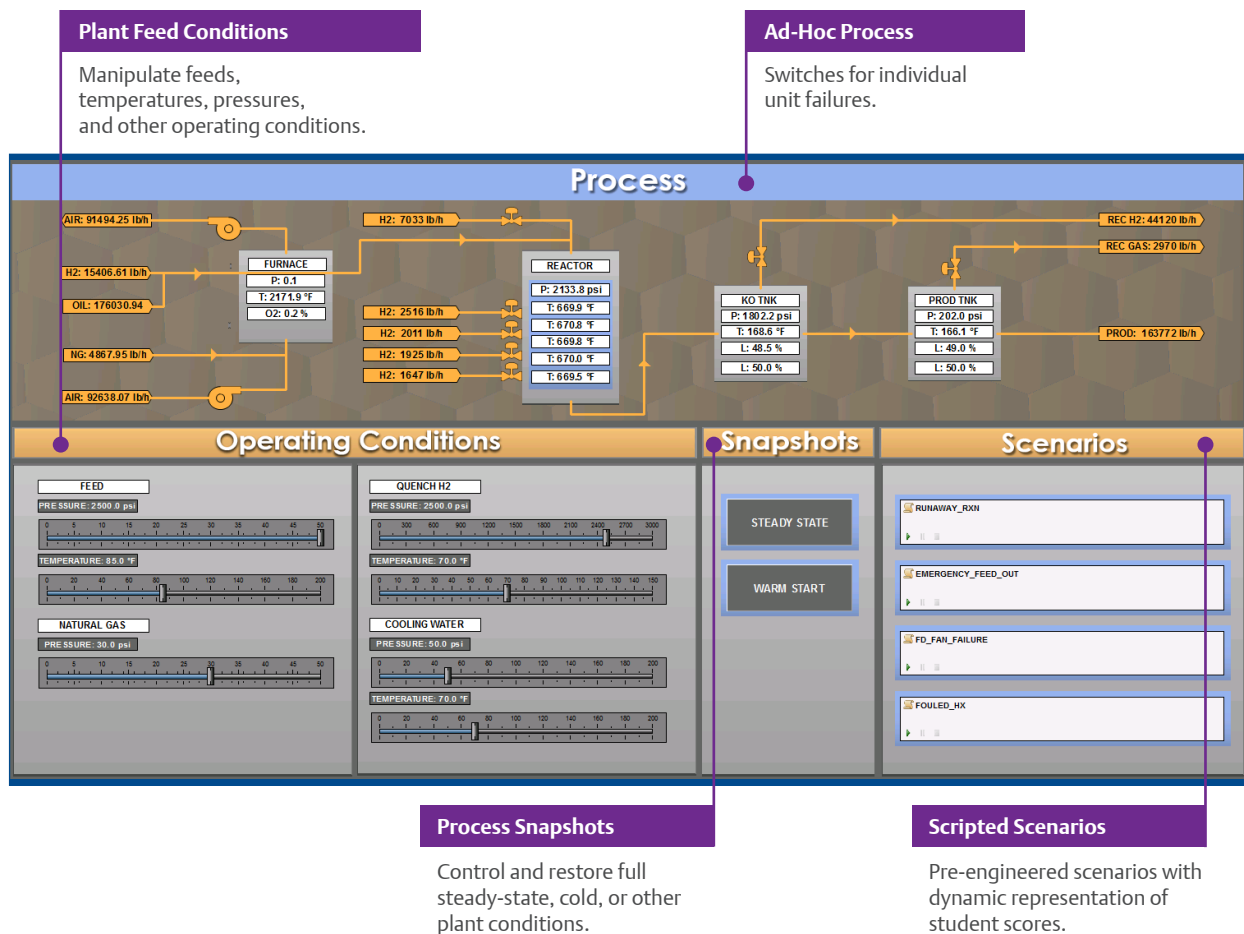


Increase overall plant safety

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.



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