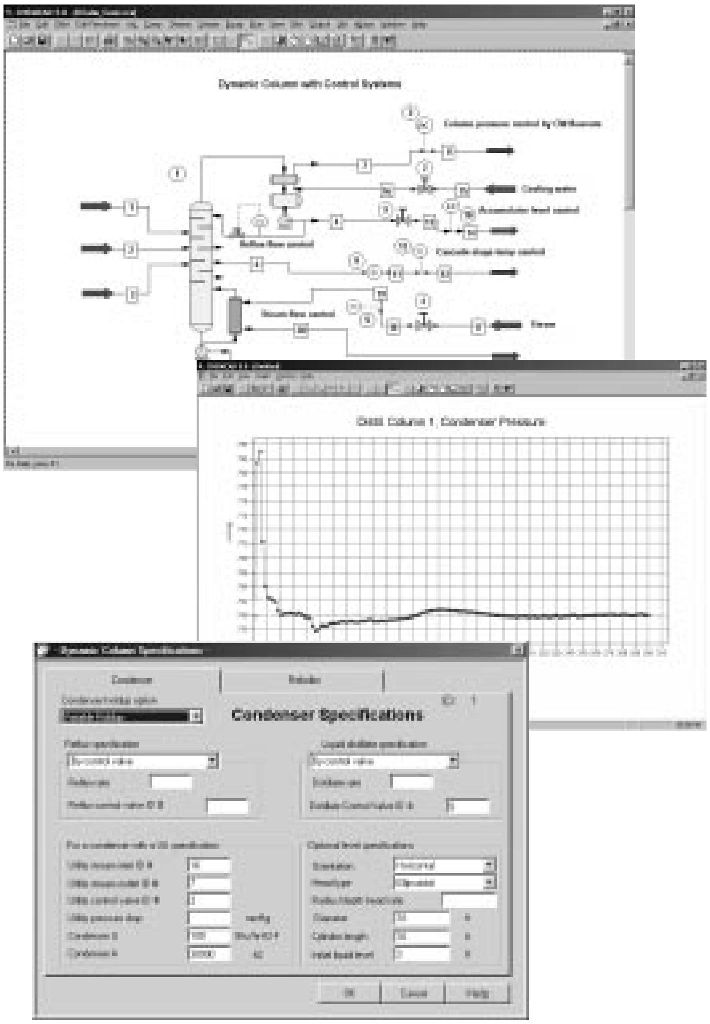
CC-DYNAMICS

Distillation software that bridges the gap between simulation and the real world.

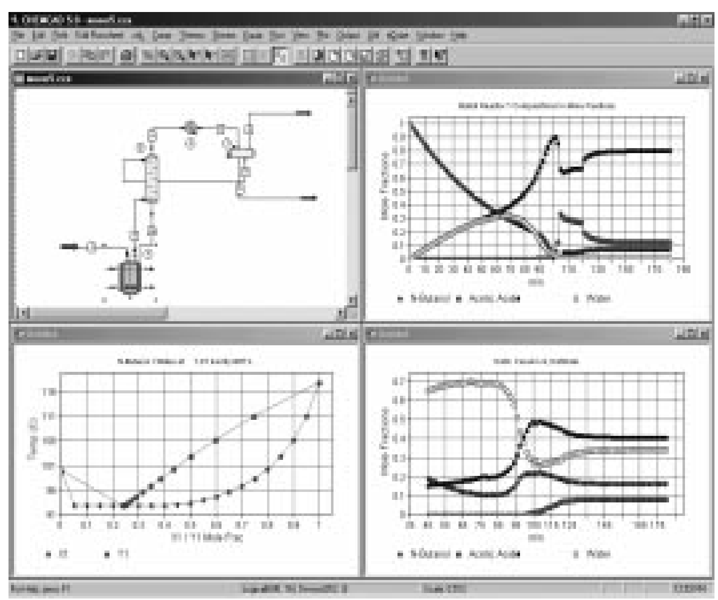
Dynamic Column Software



Steady state simulations miss the dynamic aspects of process design such as operability, the impact of disturbances, and many facets of safety issues. These are important selection criteria for any process and the inability to fully understand them generally leads to over designs which cost millions of dollars in both capital and operating costs.

For example, from a steady-state viewpoint, it is better to minimize holdup in processing equipment. Holdup means larger equipment, which results in larger fixed capital. From an operational standpoint, holdup can make the difference between a smooth working plant and an inoperable one. In operations,holdup means isolation from disturbances, and may mean being able to run one section of the plant when another is down. Too much holdup means long process cycle times causingcontrol delays. So there are important trade-offs to consider.

The ability to perform dynamic simulations means that these tradeoffs can be evaluated early in the design before any decisions have been made. Thus, from the beginning you will be able to quantify the requirements of operability, control loop tuning, changes in throughput or ambient conditions, safety demands, etc. This will save you money not only in capital investments, but also in production costs. A plant which is designed with operability in mind can produce considerably more than a plant where operability issues were never explicitly addressed.



Until now the dynamic simulation tools available to process engineers were so difficult to use they were applied only in the most critical cases. Companies simply cannot afford the time difficult simulators take to learn and use . Only when dynamic simulations carry near zero time penalties can you afford to look at the dynamic interactions of the entire process.

CHEMCAD-DCOLUMN is fast, accurate, applicable to a wide range of processes and easy to learn and use.

It is fully integrated with CHEMCAD, which can perform steady-state simulation, equipment design, and DIERS analysis. This allows you to move easily around and between all aspects of your design. Only in such an environment can you achieve significant paybacks that dynamic studies can provide.

Chemstations™

CC-Dynamics

GENERAL FEATURES:

1) Can begin the simulation as a startup or from a steady-state condition
2) Holdups can be:
   - ignored
   - constant or variable
   - liquid and/or vapor
   - specified in mass, molar or volumetric units
   - specified for the condenser, reboiler, or any stages
   - specified on each stage
3) Pressure can be fixed or calculated
4) Simulation can be performed using rigorous mass transfer analysis or using the equilibrium stage approach
5) Packed columns can be calculated using rigorous mass transfer analysis or assuming equilibrium stages
6) Multiple liquid phases
7) Discrete event scheduler
8) Pressure drop calculations included
9) Fully integrated with CHEMCAD, CC-ReACS, and CC-THERM

START-UP FEATURES:

1) Dry or Wet tray startups
2) Fixed or variable pressure
3) May specify startup duration time and reboiler duty
4) Open or closed loop control simulation

CONDENSER FEATURES:

1) Holdup:
   - Can be constant or variable
   - Specified in mass, mole or volume units
   - Set by a control valve
2) Reflux can:
   - Be specified in mass, mole or volume units
   - Set by a control valve
3) Distillate can:
   - Be specified in mass, mole, or volume units
   - Set by a control valve
4) Condenser U*A can be set. Cooling fluid flowrates can be fixed or controlled.
5) Condenser accumulator vessel specification options:
   - Orientation
   - Head type
   - Diameter and length
   - Initial liquid level

REBOILER FEATURES:

1) Holdup can be variable or constant
2) Bottoms liquid product rate can be:
   - Specified in mass, mole, or volume units
   - Set by a control valve
3) Reboiler U*A can be set. Heating fluid flowrates can be fixed or controlled.
4) Reboiler vessel options:
   - Orientation
   - Head type
   - Diameter and length
   - Initial liquid level

CONTROL VALVE OPTIONS:

1) Equal percentage or linear values
2) Valve coefficient (Cv)
3) Rangeability
4) Critical flow factor
5) Valve position function

CONTROLLER OPTIONS:

1) PID (proportional, integral, derivative) action can be specified
2) Controller set points can be purity, temperature, pressure, level, flow, or any other flowsheet variable
3) Cascade and split range controllers can be used
4) Sensor functions can be specified
5) Controller limits may be set:
   - With or without upper or lower limits
   - Relative to the set point
   - At a specified value

MASS TRANSFER ANALYSIS:

1) Automatically calculates the component diffusivities
2) Rigorous calculation of the mass transfer coefficient

REACTIVE DISTILLATION:

1) Reactions can be kinetic or equilibrium
2) Multiple rate forms available
3) Vapor and/or liquid reactions are permitted

SIMULATION WITHOUT CONTROLLERS:

1) Condenser specification options:
   - Reflux ratio or rate
   - Heat duty
   - Temperature
   - Distillate flowrate
   - Distillate component flowrate
   - Distillate purity
   - Distillate recovery
   - Distillate component recovery
   - Component ratios
2) Reboiler specification options:
   - Reboiler ratio or flow
   - Heat duty
   - Temperature
   - Bottoms flowrate
   - Bottoms component flowrate
   - Bottoms purity
   - Bottoms recovery
   - Bottoms component recovery
   - Component ratios
3) Side product specification options:
   - Liquid or vapor flows
   - Liquid or vapor draw ratios

DYNAMIC COLUMN OUTPUT:

1) Complete stage information
2) Time history reports and plots for:
   - The condenser and reboiler
   - Any stage
   - Controllers and control valves
   - Product streams

Chemstations™

www.chemstations.com