



OMESOL

A Potential Hub To Deliver Dynamic Professionals

OCTAGON
MANAGEMENT
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SOLUTIONS

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Aspen Hysys For Oil & Gas People

Objectives

- Learn to build, navigate and optimize process simulations using Aspen HYSYS
- Learn how to use and apply advanced modeling techniques to enhance existing Aspen HYSYS flowsheets
- Learn the efficient use of different HYSYS functions to build steady state process simulations
- Develop the skills and techniques required for creating and running dynamic simulations
- Apply the best practices for transitioning from steady-state to dynamic modeling and discover shortcuts for efficient use of HYSYS Dynamics.

Who will benefit

- New engineering graduates/technologists who will be using Aspen HYSYS in their daily work
- Process engineers who need advanced skills for more complex modeling tasks
- R&D engineers and researchers using Aspen HYSYS for process synthesis, upgrade or modifications
- Process engineers doing process design and optimization projects and studies
- Plant engineers checking plant performance under different operating conditions
- Engineers with Aspen HYSYS experience
- Non-Engineers / Engineers with no or limited previous experience in process simulation



Course Agenda

- This course is designed to show you how to:
- Create custom column templates, including non-standard configurations
- Perform complex calculations on flowsheet variables using the HYSYS Spreadsheet
- Realistically simulate separator carryover and entrainment
- Perform process optimization in constrained and unconstrained systems
- Explore Dynamic models to introduce various real-life disturbances to a simulation and discover how different control strategies can mitigate these disturbances
- Learn pressure flow theory, column dynamics concepts, pipeline hydraulics, and basic process control theory
- Properly define and adjust pressure/flow specifications, strip charts, and controller parameters
- Use the Workbook and Process Flow Diagram (PFD) interfaces for quick and effective modeling

- Discover how multi-flowsheet integration can streamline and organize simulation efforts
- Explore different means of reporting results, including the use of Microsoft Excel VB macros
- Evaluate the performance of existing equipment by leveraging the rating capabilities of Aspen HYSYS
- Improve the convergence characteristics of columns and flowsheets; troubleshoot common problems
- Perform Case studies to determine the optimum operating point for a process
- Understand the pipeline hydraulics calculations used to assess the sizing requirements for a gas gathering system

Course Detail

Getting Started

- Create and define a fluid package
- Utilize the built-in expert system to choose an appropriate thermodynamic model
- Select components, including hypotheticals
- Install streams and attach stream utilities
- Customize the Workbook
- **Case Study:** *Introduce basic concepts necessary for creating simulations in Aspen HYSYS.*

Propane Refrigeration Loop

- Add and connect operations to construct a simple flowsheet
- Use the graphic interface to manipulate flowsheet objects and provide a clearer representation of the process

- Understand how process information is propagated both forwards-and backwards
- Convert simulation cases to templates
- **Case Study:** *Build and analyze a propane refrigeration loop simulation*

Oil Characterization and HP Separation

- Introduce Oil Characterization in Aspen HYSYS
- Use the Aspen HYSYS Spreadsheet and Case Study functionality
- **Case Study:** *Use the Oil Environment to characterize a crude assay and then employ the Case Study and Spreadsheet operation to determine how the Gas Oil Ratio (GOR) varies with pressure.*

Two Stage Compression

- Introduce the use of the recycle operation
- Recognize suitable recycle locations
- Implement performance curves for rotating equipment
- **Case Study:** *Utilize the recycle operation to build a two stage compression flow sheet; define and activate compressor curves.*

Natural Gas Dehydration with TEG

- Review the recommended methods to saturate single phase and two phase hydrocarbon streams

- Discuss the implications of hydrate formation and the different means available to avoid hydrate problems
- Model a typical TEG dehydration unit
- **Case Study:** *Model a typical TEG dehydration unit and determine water dew point for the dry gas; use the hydrate utility to investigate the effects of methanol injection on hydrate inhibition.*

Gas Gathering System

- Simulate a gas gathering system located on varied terrain using the steady state capabilities of Aspen HYSYS
- **Case Study:** *Use the pipe segment and the Hydraulics subflowsheet to model a piping network in Aspen HYSYS.*

Refrigerated Gas Plant

- Install and converge heat exchangers
- Use logical operations: Adjust and Balance
- **Case Study:** *Model a simplified version of a refrigerated gas plant.*

NGL Fractionation Train

- Model distillation columns with the assistance of the Column Input Expert
- Manipulate column specifications to better represent process constraints
- Evaluate utility requirements using the Process Utility Manager
- **Case Study:** *Model a two column natural gas liquid (NGL) recovery plant*

Transitioning from Steady State to Dynamics

- Provide a theoretical overview of the Aspen HYSYS Dynamics Pressure/Flow Solver
- Define dynamic pressure/flow specifications and equipment sizing data
- Review the solving strategy and degrees of freedom analysis of HYSYS Dynamics
- Utilize the Dynamics Assistant to check the preparedness of a simulation for dynamic calculations
- **Case Study:** *Convert a steady-state Aspen HYSYS simulation a HYSYS Dynamics simulation*

Controllers and Strip Charts

- Review basic process control theory and methodology
- Discuss the commonly used Controller operations in HYSYS Dynamics
- Add Strip Charts to monitor and graph key process variables
- **Case Study:** *Introduce PID controllers and Strip Charts to augment an Aspen HYSYS Dynamics simulation*

Dynamic Column Modeling

- Review the procedure for converting a steady state model into dynamics
- Prepare a distillation column for dynamic simulation by using a Tray Sizing analysis
- Model an LPG distillation column in dynamics and develop an effective control strategy

- **Case Study:** Set up a distillation column in steady state mode, transition back into dynamics, and operate the distillation column as a dynamic unit operation

- Use Aspen Simulation Workbook to deploy models in Microsoft Excel
- **Case Study:** Use the Report Manager, Excel utilities and Aspen Simulation Workbook to obtain custom reports.

Expanding the Model

- Follow best practices for adding dynamic specifications, unit operations and controllers in the dynamic mode
- Develop appropriate control strategies using split range and on-off controllers
- Install a relief valve for vessel overpressure protection
- **Case Study:** Add equipment, modify the control system and add a pressure relief valve to a simulation directly in dynamic mode

Column Pressure Relief

- Modify the condenser overhead section of a distillation column to include an Air Cooled Exchanger operation
- Further develop model-building techniques and best practices by adding operations and controllers in the dynamic mode
- Install a relief valve for protection of the column overhead system
- **Case Study:** Set up a customized distillation column overhead condenser system and protect it from overpressure with a relief valve

Reporting in Aspen HYSYS

- Create a variety of customized reports using newly added functionality in the Report Manager
- Access free Excel utilities designed to extract simulation data

Course Duration

15 days / Total 30 hrs

Training Mode

On-line

Fees

800 USD

Available Payment Methods:

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