

A 3 Day Hands-on Course on DESIGN GUIDELINES FOR UTILIZING PROCESS ENGINEERING SIMULATION SOFTWARE IN THE REAL WORLD OF DISTILLATION

Organised by :



Your quality chemical partner

venue/ UTM City Campus, KUALA LUMPUR
date/ 28-30 November 2005



■ **Introduction** The success of every company depends of each employee's understanding of the business's key components. Employee training and development will unlock the companies' profitability and profitability. When people, processes and technology work together as a team developing practical solutions, companies can maximize profitability and assets in a sustainable manner. There are times when the virtual world of computers needs to be taken to the real world. It should be remembered that machine calculations are for the purpose of improving only the speed of the calculation – the engineer must supply correct input data and correct judgement of results. Without the key concepts of the correct input data and estimates of the results, the two worlds may collide.

■ **Course Objectives** This course will guide the participants to develop key concepts and techniques to confirm that their process engineering simulation software result can be utilized in the field (real world). A converted solution can be very far from reality. The correct selection of actual field efficiencies, vapor and liquid equilibrium data, feed modelling, and hydraulic behaviour will influence the accuracy of the model's results. These key concepts can be utilized to make process engineering simulation software a troubleshooting tool to help solve distillation tower problems. The key concepts thought in this course are independent of the client chosen software and will apply to all the industry standard simulation packages.

What Can You Expect To Gain ~ An overview of distillation, practical solutions as well as theory. ~ Development of key concepts for simulation in the real world. ~ How to select the proper input data. ~ How estimates realistic stage efficiencies, variables affecting separation. ~ Proper selection of VLE Data. ~ Feed modelling techniques. ~ How to make difficult operations converge. ~ Hydraulic analysis techniques. ~ Methods to cross check the results. ~ Troubleshooting guidelines. ~ Workshops based on your plant's tower.

■ **Course Content** The goal of the course would be to refresh the knowledge of those who have a basic understanding of process simulation software techniques and to build a foundation to those who are new to the process simulation software.

A. General Introduction 1. **General Column Design**: The components of a distillation system; more than just a tower – it is a system of different components; History of distillation; Different types of distillation columns; Differences among batch, flash, and multistage distillation process; Relative advantages of tray and packed columns; Steps in process design; The keys of column inlets and outlets; 2. **Tray Column Design** : The major design differences between tray types; The operational limits for trays – operating window; Size of distillation column for a given vapor rate; Calculate the turndown ratio; Calculate the tray pressure drop; Calculate a tray downcomer capacity; 3. **Packed Column Design** : The different types of packing and their characteristics; The best types of packing for a given system; Size of packed column diameter; Calculate the packed bed pressure drop; Design and effective distributor system for both liquid and vapor handling; 4. **Distillation Column Control** : Typical process variables in a distillation column; Select appropriate composition and column pressure control schemes; Process settings during column operation.

B. Thermodynamics and Equilibrium 1. **Vapor Liquid Equilibrium** : Select the correct vapor-liquid equilibrium equation for your system; Review vapor pressure and equilibrium diagrams; Interpret mole fraction equilibrium curves, commonly called y-x diagrams; Break multi-component designs into simpler systems with binary pairs; Azeotropes and the challenges they create for distillation; 2. **Stage and Transfer Units Efficiencies** : Calculate the number of equilibrium stages using short cut methods; Calculate minimum reflux and stages using graphical & analytical methods; Determine number of theoretical stages needed in a distillation column; Adapt binary design methods to multi-component systems; Design separation process for an azeotrope and multiple components; Setup and troubleshoot rigorous calculation using simulation programs; 3. **Stage Efficiency** : Four methods for determining efficiency; Calculate point and tray efficiencies, and their difference; Calculate the number and height of transfer units for packing; Effects on distillation column by changing amount of reflux and reflux temperature; How flooding and foaming effects efficiencies and capacities.

C. Troubleshooting 1. **Introduction** : Build a list of troubleshooting strategies; Evaluate operation of a packed column; Evaluate operation of liquid distributors; Evaluate operation of a tray column; Use tools to diagnosis problem; 2. **Installation** : Develop a checklist of common column installation mistakes; Build a list necessary tasks to insure a proper installation; 3. **Commissioning** : Build a list common start up problems which occurs and steps to minimize them; List common reasons for column problems and understand how to correct them;

D. Workshops (which are mixed in the lectures) 1. **Simulation of DePropanizer** : Comparison of VLE; Choosing distillation device; Selection of stage efficiency; Preliminary hydraulics; 2. **Simulation of Crude Tower** : Comparison of VLE; Choosing distillation device; Selection of stage efficiency; Preliminary hydraulics; 3. **Simulation of Gas Plant** : Comparison of VLE; Choosing distillation device; Selection of stage efficiency; Preliminary hydraulics; 4. **Simulation of one of your plants towers** : Comparison of VLE; Choosing distillation device; Selection of stage efficiency; Preliminary hydraulics

Who Should Attend

- Plant Managers, Engineers, Chemists and Process Support Personnel
- People who are making day to day decisions regarding operation, design, maintenance, and economics of process industry plants
- Process Engineer or Chemist who must troubleshoot and solve distillation problems in a plant, an engineering office or laboratory
- Ideas for veterans and those with only a few years of experience who want to review or broaden their understanding of process safety
- Other professionals who desire a better understanding of the subject matter

Course Tutor

MR. KARL KOLMETZ | He is an Assistant Manager Process Technology, Sulzer Chemtech Ltd., has over twenty-five years of progressive experience in the design, construction, commissioning, and operations management of process units from the US Gulf Coast to Alaska through Asia. He has a strong background in the manufacturing of a wide variety of chemical process technologies and product categories including; cryogenic liquids, ethylene, propylene, benzene/toluene extraction, styrene, catalytic reforming, crude atmospheric/vacuum fractionation, polyvinyl chloride, and steam /power plant operations. Mr. Kolmetz has substantial experience in the design and trouble shooting of distillation columns, which is one of the key unit operations in hydrocarbon production. His experiences includes four eyes of Construction, two of which were on the Alaskan Pipeline with Fluor Daniel. Seventeen years of Refining experience, including eleven years in Catalytic Reforming, in The Charter/Phibro Refinery (now Valero Refinery) in Houston, Texas. One year of commissioning experience with Raytheon Badger EB/Styrene plants in Asia. Seven years Ethylene experience: four years in Louisiana and three years in Malaysia. Presently is the Asian Assistant Technology Manager for Sulzer Chemtech a leading distillation tower internals manufacturer. Karl has a Degree in Chemical Engineering from the University of Houston and is a member of the American Institute of Chemical Engineers. Karl presently resides in Singapore.

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Course Fee

Single 2 or more

Local Participant (RM) 1750 1650

International Participant (USD) 1350

(Fee is inclusive of lunch, refreshments and course materials)

METHOD OF PAYMENT

Please kindly complete and return the reply form together with:

Local Participants

- By cheque / Bank draft which are made payable to **PHYTO BIZNET SDN. BHD.**

International Participants

- By Direct Transfer/Bank Draft:
CEPP Bank details: **Bumiputra Commerce Bank Berhad**
Universiti Teknologi Malaysia
81310 UTM Skudai, Johor, Malaysia
- Account No : **0118-0004178-05-7**
- Please instruct your bank to remit us the full amount, net of bank charges.

Cancellation & Substitutions

A full refund will be promptly made for all written cancellations 2 weeks before the meeting. 50% refund will be made for written cancellations received 7 days before the meeting. A substitute may be made at any time.

Note a) The organiser has the right to make any amendments that they deem to be in the best interest of the course and to cancel the course if insufficient registrations are received a week before course commencement date .

B) CERTIFICATE OF ATTENDANCE will be awarded at the end of the course.

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REPLY FORM

<http://www.cepp.utm.my>

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CEPP, UTM City Campus KUALA LUMPUR

YES ! I would like to register the following participants

Name 1 _____

Job Title _____

Name 2 _____

Job Title _____

COMPANY INFORMATION

Company _____

Address _____

Town _____

State _____

Tel _____ Fax _____

AUTHORISED Signatory (*This registration is invalid without signature form an authorised officer)

Name _____

Job Title _____

Tel _____ Fax _____

Available accommodation around UTM City Campus, Kuala Lumpur

Nikko Hotel (5*) Tel : +603-21611111 Fax : +603-21611122

Crown Princess Hotel (4*) Tel : +603-21625522 Fax : +603-21624492

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BATC, UTM (Uni. Lodging) Tel : +603-26914020 Fax : +603-26911294

ENQUIRIES

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