# FUNDAMENTALS OF REFINERY CATALYTIC PROCESSES

date/**13 - 17 March 2006** venue/**UTM *City Campus* Kuala Lumpur**

## ▪ 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 reliability. When people, processes and technology work together as a team developing practical solutions, companies can maximize profitability and assets in a sustainable manner. Most unit operations are divided into two sectors; the reactor section and the separation section. The high value products are produced in the ractor section and purified in the separation section. The proper reactor design and catalyst selection can greatly improve company profit margins. The net effect is to produce increasing amounts of higher and catalyst developments are one of the largest Research and Development (R&D) Divisions in Chemical Engineering. To stay abreast of the current reactor designs and catalyst developments should be an operations personnel's target.

## ▪ Course Objective

This course will guide the participants to develop key concepts and techniques to operate, select and optimize refinery catalytic processes. These key concepts can be utilized to make design and operating decisions. Training and development is an investment in future success – give yourself and your employees the keys to success. This course covers a general overview of the Catalytic Processes in a Refinery and how each integrates with the high value products, with a special emphasis on Fluidized Catalytic Crackers, and Catalytic Reformers. A history of each Catalytic Process will be reviewed including; process description, process variables, reaction chemistry, catalyst development and evaluation.

## ▪ What you can expect to gain

- Overview of the Catalytic Processes in a Refinery, with a special emphasis on Fluidized Catalytic Crackers and Catalytic Reformers
- Catalyst Evaluation Techniques
- An understanding of Reactor and Catalyst interaction
- The Operation, control and troubleshooting of a reactors and associated equipment
- An overview of reactors, practical solutions as well as theory
- An understanding of essential reaction concepts
- Valuable practical insights for trouble free design and field proven techniques for commissioning, start up and shutdown of reactor operations
- To tailor your approach to specific design, analysis and troubleshooting problems

## ▪ Course Content

### Day 1

- **Introduction**
  Refinery Overview
  Chemistry Overview
  Alkylation
  - Introduction
  - History
  - Process Overview
  - Process Chemistry
  - Feedstock, Reaction, Catalyst
  - Process Variables
  - Common Problems
  - Advanced in Cat Development
  - Catalyst Evaluation Techniques
  - Summary
- **Hydrogenation**
  - Introduction
  - History
  - Process Overview
  - Process Chemistry
  - Feedstock, Reaction, Catalyst
  - Process Variables
  - Common Problems
  - Advance in Cat Development
  - Catalyst Evaluation-Techniques
  - Summary

### Day 2

- **Dehydrogenation**
  - Introduction
  - History
  - Process Overview
  - Process Chemistry
  - Feedstock, Reaction, Catalyst
  - Process Variables
  - Common Problems
  - Advance in Cat Development
  - Catalyst Evaluation Techniques
  - Summary
- **Isomerization**
  - Introduction
  - History
  - Process Overview
  - Process Chemistry
  - Feedstock, Reaction, Catalyst
  - Process Variables
  - Common Problems
  - Advance in Cat Development
  - Catalyst Evaluation Techniques
  - Summary
- **Hydrocracking and De-Alkylation**
  - Introduction
  - History
  - Process Overview
  - Process Chemistry
  - Feedstock, Reaction, Catalyst
  - Process Variables
  - Common Problems
  - Advance in Cat Development
  - Catalyst Evaluation Techniques
  - Summary

### Day 3

- **Fluidized Catalytic Cracking**
  - Introduction
  - History
  - Process Overview
  - Process Chemistry
  - Feedstock, Reaction, Catalyst
  - Process Variables
  - Common Problems
  - Advance in Cat Development
  - Catalyst Evaluation Techniques
  - Summary

### Day 4

- **Hydrodesulfurization**
  - Introduction
  - History
  - Process Overview
  - Process Chemistry
  - Feedstock, Reaction, Catalyst
  - Process Variables
  - Common Problems
  - Advance in Cat Development
  - Catalyst Evaluation Techniques
  - Summary

### Day 5

- **Catalytic Reforming**
  - Introduction
  - History
  - Process Overview
  - Process Chemistry
  - Feedstock, Reaction, Catalyst
  - Process Variables
  - Common Problems
  - Advance in Cat Development
  - Catalyst Evaluation Techniques
  - Summary
- **SUMMARY**

## Who should attend

❶ People who are making day to day decisions regarding operation, design, maintenance, and economics of process industry plants ❶ An engineer or chemist who must troubleshoot and solve catalyst problem in a plant, an engineering office or laboratory ❶ Technical Engineers, Operating Engineers, Process Support Personnel, Chemist, and Managers ❶ Engineering graduates/technologists who will be using catalyst in their daily work ❶ Technical Process engineers doing process design and optimization projects and studies that need who need advanced skills for more complex modeling tasks ❶ Plant Operation Support Engineers checking plant performance under different operating conditions, and who are involved in design of new facilities or revamps of existing facilities ❶ R&D engineers and researchers using catalyst for process synthesis, upgrade or modifications ❶ Ideal for veterans and those with only a few years of experience who want to review or broaden their understanding of process safety ❶ Other professionals who desire a better understanding of the subject matter

## Course Tutors I Mr. Karl Kolmetz

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. Streangths encompass design details that originate from a strong operations background, with the ability to incorporate positive ideas from differing sources.

Experience includes four years of Construction, two(2) of which were on the Alaskan Pipeline with Fluor Daniel. Seventeen years (17) of Refining experience, including eleven years in Catalytic Reforming, in The Charter/Phibro (now Valero) Refinery in Houston, Texas. One year of commissioning experience with a total of three years (3) experience with the Westlake / Titan Group : four years in Louisiana and three years in Malaysia. Two (2) years of specialty distillation experience as Asian Technical Manager for Sulzer Chemtech, a major distillation company. Publication include authoring and co-authoring over 35 technical papers on a variety of subjects for product recovery, distillation troubleshooting, training, project management,and process design with safety and environmental concerns. Papers have appeared in Oil and Gas Journal (5), Hydrocarbon Processing (1), and Chemical Engineering Progress (1). Conference papers have been presented at the AiChE Conference, the Indian Oil & Gas Conference, the Japan petroleum Institute Refining Conference, Oil and Fats International Congress, Best Practices in Process Plant Management, and the Asean Regional Olefins Conferences, as well as others.

He has a Bachelor of Science in Chemical Engineering from the University of Houston. He is a member of the American Institute of Chemical Engineers and The American Chemical Society. Karl presently lives in Malaysia.

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### Method of Payments

*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:
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  **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

### Cancelation & Substitutions

A full refund will be promptly made for all written cancellations 3 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 commencements date .

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

***We can offer courses in-house at your company***

| Course Fee | Single | 2 or more |
|---|---|---|
| Local Participant (RM) | 2950 | 2800 |
| International Participant (USD) | 2250 | |

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

## REPLY FORM

**FUNDAMENTALS OF REFINERY CATALYTIC PROCESSES**
**13 - 17 March 2006**
**CEPP, UTM *City Campus*, KUALA LUMPUR, MALAYSIA**

**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 _____

## ENQUIRIES


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