Applied HAZOP Management

Improve HAZOP management & technique application in an integrated approach to process hazard analysis

Date: 13th MAY 2013 – 16th MAY 2013
Location: Kuala Lumpur, Malaysia

Petrosync Distinguished Instructor
Tom Drake
President & Founder
The Drake Group

- Over 35 years of industry experience in safety in the oil and gas industry. He has previously worked for Enron as Director for Safety and for AMOCO Corporation as Sr Safety Engineer
- His major clients include ConocoPhillips, BP & Duke Energy International
- Served on process Safety Committees for the Chemicals Manufacturing Association (SMA), National Petrochemical and refiners Association (NPRA), Propane Gas Association (GPA0, Interstate Natural Gas Association of America (INGAA)
- Has conducted countless HAZOP studies and workshops for various companies since 1982
- President & Founder of MESHsystems (est in 2000), which provides Process Safety enterprise systems

Masterclass Objectives
- ATTAIN self-sufficiency and efficiency in conducting HAZOP projects
- INTEGRATE PHA methods into the process safety system processes
- LEARN procedural HAZOP conduct from previously implemented programs through case study discussions
- UNDERSTAND preparation, conduct, and follow-up activities for HAZOP, and conduct set-up modification independently
- APPLY HAZOP techniques through practical exercises and industry case studies
- OVERCOME limitations to achieving an optimal HAZOP

Specially Designed for
The course is designed for those who are initiating to participate in a HAZOP study, and those who are responsible for supervision of process and safety:
- PSM Managers/Engineers
- Operations Managers/Engineers
- Process Managers/Engineers
- Maintenance Managers/Engineers
- HSE Managers/Engineers
- Control, Monitoring, Emergency Response
- Plant Manager/Engineers
- Line Supervisors and Team Leaders

Supported by
Masterclass Overview

Oil and Gas, Refining, Petrochemical, and related facilities handle the most dangerous chemicals with the most challenging process conditions. Process Safety initiatives are successful in controlling or eliminating these challenges when applied effectively. One of the successful process safety elements is Process Hazard Analysis. While there are various methodologies for analyzing processes to identify potential process failures and their consequences, the Hazard and Operability Study (HAZOP) is universally accepted as the method of choice for most operations.

This course starts with the history of process failures with an emphasis on how the PHA methods were developed to prevent accidents and how each has benefits that are used in various types of facilities. Practical techniques for using the HAZOP method to evaluate processes will be presented and practiced with exercises. Participants will learn the step-by-step process of HAZOP and learn the correct way of applying them. This course will also present a review on some software support for hazard analysis. Moreover, this course will tackle how to handle future set-up modifications for established HAZOP designs. Class discussions will be held to facilitate the exchange of information from the class. Documentation tools and resources will be shared in order to assist the class with implementation and enhancement in their facilities.

Instructor’s Testimonials

“Any company that uses Tom’s consultation services will benefit from his expert level of knowledge in these areas as well as his “common sense” approach to solving challenges and giving good and useful solutions. Tom also gives training to many companies. These trainings are comprehensive and meaningful but most importantly leaves participants with a resource they know will help them. Tom is a unique consultant who indeed brings value added to you with any training and I highly recommend his services” - Robert N, Vice President Occupational Health and Safety ABB

“Tom is extremely knowledgable in his area of expertise, and students in the classroom love him. Anyone dealing with Tom will find him professional, knowledgeable, yet down-to-earth and practicable.” - Susan S, Project Manager, TEEX Texas A&M University

Upcoming HSSE Training Courses (2013)

<table>
<thead>
<tr>
<th>DATE</th>
<th>COURSE</th>
<th>INSTRUCTOR</th>
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<tbody>
<tr>
<td>04-07</td>
<td>Contractor Safety Management</td>
<td>D. Grubbe</td>
</tr>
<tr>
<td>01-05</td>
<td>Advanced Accident Investigation &amp; Management</td>
<td>R. Bedson</td>
</tr>
<tr>
<td>13-16</td>
<td>Applied HAZOP Management</td>
<td>T. Drake</td>
</tr>
<tr>
<td>10-14</td>
<td>Enhanced Process Safety Management</td>
<td>D. Grubbe</td>
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<tr>
<td>01-05</td>
<td>Risk-Based Decision Making</td>
<td>R. Bedson</td>
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<tr>
<td>19-20</td>
<td>Behavior-Based Safety for Managers</td>
<td>D. Richards</td>
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<tr>
<td>09-11</td>
<td>Safety Metrics &amp; Measures</td>
<td>D. Grubbe</td>
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<tr>
<td>30SEPT - 4 OCT</td>
<td>NEBOSH International Certificate</td>
<td>R. Bedson</td>
</tr>
<tr>
<td>11-14</td>
<td>Occupational Health &amp; Safety Mgt &amp; Systems</td>
<td>D. Richards</td>
</tr>
</tbody>
</table>

For registration, alternative dates, and inquiries on the upcoming HSSE courses, please email gopi.k@petrosync.com or call us at +65-6415-4500 ext 110. Visit WWW.PETROSYNC.COM for the course catalogue. These courses are also available for your In-House training. Contact us today.
Instructor Overview of the Course
Expectations: What each participant wants from the course
Highlighting of Delegate & Course Objectives
Instructor-led Discussion: What is your exposure and knowledge about PSM & PHA?

Review of Terms used in PHA
- Intrinsic/Extrinsic
- Quantity
- Process Design
- Operating Conditions
- Location of People & Assets
- Activities

Review of Process Safety Incidents
- AMOCO (Whiting, Indiana USA)
- NYPRO UK (Flixborough, UK)
- UCIL (Bhopal, India)
- AMOCO (Newcastle, Delaware USA)
- OCCIDENTAL (Piper Alpha)
- PHILIPS (Pasadena, Texas USA)
- BP (Texas City, Texas USA)

Review of PHA History, Regulations, & Initiatives
Overview of Components of Process Safety Program & the Integration of PHA
Inherently Safer Design & PHA
Hazard Identification (HAZID)

Review of Common PHA Methodologies, Advantages, & Disadvantages
- What If, What If Checklist, & Exercise
- Failure Mode and Effect Analysis (FMEA)
- Fault Tree Analysis
- Bow Tie
- Levels of Protection Analysis
- HAZOP

Overview of HAZOP Method
- Initiation of HAZOP
- Deliverables
- HAZOP Process
Types of Processes that Benefit from HAZOP

HAZOP Preparation
- Steps in Preparation for Conducting a HAZOP
- Charge Letter, Computer System, Alignment Meeting, Materials, Nodes

HAZOP Management
- Theories and Group Discussion

Starting the HAZOP
- Types of Processes that Benefit from HAZOP
- Timing & Schedule
- Selection of Team Member and Roles
- Common Team Issues
- Introduction to Guidewords & Parameters
  - Guide Word Exercise

HAZOP Preparation Exercise
Process Safety Information (PSI)
P&ID Preparation
Documentation and Reporting
- Communicating with Management

Software Review (PHS Work-Primatech, Leader ABS, PHA Pro-HIS, PHAX-Exida, Isograph-ERSG, LOPA Works-Piramatech, MESHpha-MESHSystems, HAZOP Manager-Lihoutech)

Follow-Up
- Action Tracking, Reports, Revalidation Quality

Evaluation of PHA, Report Preparation Discussion
Process Visit Guidelines
Effective Meeting Room
Typical HAZOP Day

Petrosync Quality

Limited Attendees
The course has limited seats to ensure maximum learning and experience for all delegates.

Certificate of Attendance
You will receive a Certificate of Attendance bearing the signatures of the Trainer upon successful completion of the course. This certificate is proof of your continuing professional development.

Interactive Training
You will be attending training designed to share both the latest knowledge and practical experience through interactive sessions. This will provide you with a deeper and more long-term understanding of your current issues.

High Quality Course Materials
Printed course manual will provide you with working materials throughout the course and will be an invaluable source of reference for you and your colleagues afterward. You can follow course progress on your laptop with soft copies provided.
WHY YOU SHOULD ATTEND PETROSYNC’S EVENTS

- To ensure that all objectives of the course matches yours, all PetroSync programs are developed after intensive and extensive research within the industry.
- PetroSync programs focus on your immediate working issues to ensure that you are able to apply and deliver immediate results in real work situations.
- Application and implementation of industry knowledge and experience are the drivers for our course design, not theoretical academic lectures.
- PetroSync training focuses on practical interactive learning tools and techniques including case studies, group discussions, scenarios, simulations, practical exercises and knowledge assessments during the course. Invest a small amount of your time to prepare before attending the course to ensure maximum learning.
- PetroSync follows a rigorous selection process to ensure that all expert trainers have first-hand, up-to-date and practical knowledge and are leaders of their respective industrial discipline.

APPLIED HAZOP MANAGEMENT
13th - 16th MAY 2012

DAY 3: CONDUCTING THE HAZOP

- Introduction to Managing the HAZOP
  - Initial Meeting
  - Introduction of Team Members, Specialist, and Roles
  - Explaining the HAZOP Process to the Team
- Team Development Exercise
- Conducting the Process Overview
  - Process Overview Exercise
- P&ID Selection & Introduction
  - Description of Design Intent
  - Process Selection and the P&ID
  - P&ID Review
- Node Identification
  - Node Selection Exercise
- Selection and Application of Parameters and Guidewords
  - Parameter/Guideword Exercise
- Deviations from Design Intent
- Development of Cause, Consequence, and Protection
- Risk Ranking Exercise
- Safety Critical Equipment Analysis
- Scribe Summarization of Discussion
- Study Documentation (Manual & Computer)
  - Scribe Exercise
- Recommendation Development
  - Cost/Benefit Analysis
- Forced Ranking of Recommendations
- Recommendation Exercise
- Team Review of Documentation
- Planning for Specialist Review
  - Report Design and Formatting
  - Report Preparation, Distribution, Presentation and Closure
- Action Tracking
  - Report Exercise
- HAZOP Session Review

DAY 4: ACTUAL HAZOP PROGRAM APPLICATION

- Review of HAZOP Method
- HAZOP Exercise on Small Process
- HAZOP on Refinery Dewaxing Unit Resources

Exercise Overview
- Review PFD and P&ID
- Assign P&ID Nodes
- Presentation of Selected Nodes per Team
- Review PSI Needed
- Presentation of Design Intent per Team
- Scribe Fills in Information
- Use of HAZOP Form to Enter Node Information
- Use of Parameters, Guide Words
- Identification of Deviations, Causes, & Safeguards
- Conduct Risk Ranking
- Indentify Recommendations
- Assign Actions
- Organize Final Report

Benefits and Issues with HAZOP
- Set-Up Modifications
  - Post-Project Review
  - Follow-up Procedures
  - Management Actions

Application of HAZOP to Attendees’ Process Safety Program

*Please note that most of Day 4 will be spent going through an actual HAZOP program, which will use the tools from the first three days of training*

PROGRAM SCHEDULE

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
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<tr>
<td>08:00</td>
<td>Registration (Day1)</td>
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<tr>
<td>09:00</td>
<td>Session I</td>
</tr>
<tr>
<td>11:00</td>
<td>Refreshment &amp; Networking I</td>
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<tr>
<td>11:15</td>
<td>Session II</td>
</tr>
<tr>
<td>13:00</td>
<td>Lunch</td>
</tr>
<tr>
<td>14:00</td>
<td>Session III</td>
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<tr>
<td>15:30</td>
<td>Refreshment &amp; Networking II</td>
</tr>
<tr>
<td>15:45</td>
<td>Session IV</td>
</tr>
<tr>
<td>17:00</td>
<td>End of Day</td>
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</table>
Tom Drake is one of the leading consultants in safety in the oil and gas industry. He has over 35 years of safety experience in chemicals, refining, E&P, pipeline, and manufacturing. He has held several positions as Safety Supervisor, Corporate Director for Safety and soon after, as CEO of his own consulting firm. Tom's experience includes field and corporate domestic and international responsibilities in different companies, including AMOCO Corporation, General Electric, and ENRON Corporation. He has spent more than 17 years as Director for Safety at ENRON Corporation and over 15 years in AMOCO Corporation.

After his years in the industry, he has founded The Drake Group LLC (1996), a consultancy firm which specializes in safety and process safety. Since then, he has worked on Process Safety and Process Hazard Analysis projects with several oil and gas companies including AMOCO (Texas City, Casper, Salt Lake, Whitning), Sunoco (Toledo), LyondellBasell (Pascena), Koch (Corpus Christi), Silver Eagle (Woods Cross and Evanston), CHS (Billings). Tom has also previously worked with chemical plants at General Electric, Amoco Chemicals, Chevron, Monsanto Sterlin, and Enron. He has lead and participated in several emergency investigations at Marathon Refinery, Valero/TCR Refinery, and AMOCO Refinery.

Tom has conducted countless HAZOP studies and has implemented programs in various industries. Tom has also created MESHsystems, a comprehensive Process Safety and Safety online management system which is presently being deployed. His major clients include companies such as Lafarge, Duke Energy International, QEP, Lyondell Refining, ConocoPhillips, BP, and Silver Eagle Refining.

Tom has managed HSE departments and has worked in international operations in Argentina, Jamaica, Malaysia, Mexico, UK, Thailand, and Venezuela. He has been deeply involved with process safety since the beginning of his career, and he has pushed for safety improvement through continuous projects globally with designing, building, and implementing global enterprise. Tom is also an Adjunct Professor for Texas A&M Engineering Extension Service and conducts seminars in Process Safety, Process Safety Audits and Combustible Dust. He has also developed courses in Process Safety Culture, Process Safety Critical Indicators and Process Safety Leadership. Tom’s affiliations include the following organization:

- American Society of Safety Engineers
- Society of Petroleum, Engineers (SPE) SEMS Sub-group on The Human Factor, Process Safety and Culture
- Chemical Manufacturers Association
- National Petrochemical and Refiners Association
- Propane Gas Association
- Interstate Natural Gas Association (INGAA)

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PetroSync understands that in current economic climate, getting an excellent return on your training investment is critical for all our clients. This excellent training can be conducted exclusively for your organization. The training can be tailored to meet your specific needs at your preferred location and time. We will meet you anywhere around the globe.

If you like to know more about this excellent program, please contact Jerry Tay (Conference Director) on +65 6415 4502 or email jerry.t@petrosync.com
Course Details

Title: Applied HAZOP Management
Date: 13th - 16th of MAY 2013
Location: Kuala Lumpur, Malaysia

INVESTMENT PACKAGES

<table>
<thead>
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<th>Investment Package</th>
<th>Deadline</th>
<th>Standard Price</th>
<th>Early Bird Offer</th>
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<tr>
<td></td>
<td></td>
<td>SGD $ 4,995</td>
<td>SGD $ 4,795</td>
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<tr>
<td>Group Discount (3 or more Delegates)</td>
<td>10th MAY 2013</td>
<td>10% discount for groups of 3 registering from the same organization at the same time</td>
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Please debit my credit card:

* Prices include lunches, refreshments and materials. Promotion & discount cannot be combined with other promotional offers.
* Important: Please note that registration without payment will incur a SGD 200 administration fee.
* Get a free gift when you register and pay for the full Standard Price 5 days masterclass before early bird deadline!

DELEGATES DETAILS

1st Delegate Name ____________________________ Gender: Male [ ] Female [ ]
Direct Line Number: __________________________ Email: __________________________
Job Title: __________________________ Department: __________________________
Head of Department: __________________________

2nd Delegate Name ____________________________ Gender: Male [ ] Female [ ]
Direct Line Number: __________________________ Email: __________________________
Job Title: __________________________ Department: __________________________
Head of Department: __________________________

3rd Delegate Name ____________________________ Gender: Male [ ] Female [ ]
Direct Line Number: __________________________ Email: __________________________
Job Title: __________________________ Department: __________________________
Head of Department: __________________________

INVOICE DETAILS

Attention Invoice to: __________________________
Direct Line Number: __________________________
Fax: __________________________
Company: __________________________
Industry: __________________________
Address: __________________________
Postcode: __________________________
Country: __________________________
Email: __________________________

Get a free gift when you register and pay for the full Standard Price 5 days masterclass before early bird deadline!

PAYMENT METHODS

- By Credit Card:
  - Please debit my credit card:
    - Visa [ ]
    - MasterCard [ ]
    - AMEX [ ]
  - Security Code: __________________________
  - Card Number: __________________________
  - Expiry Date: __________________________

- By Direct Transfer:
  - Please quote invoice number(s) on remittance advice
  - PetroSync LLP Bank details:
    - Account Name: PetroSync LLP
    - Bank Number: 7144 • Branch Code: 013 • Account No: 13-1-005531-6
    - Name of Correspondent Bank: Standard Chartered Bank, 6 Battery Road, Singapore 049909
    - SWIFT Code of Correspondent Bank: SCBLSGSGXXX
  - All bank charges to be borne by payer. Please ensure that PetroSync LLP receives the full invoiced amount.

Confirmation

I agree to PetroSync’s terms & conditions, payment terms and cancellation policy.

Authorized Signature: __________________________

 PAYMENT TERMS: Payment is due in full at the time of registration. Full payment is mandatory for event attendance.

TERMS AND CONDITIONS

DISCLAIMER

Please note that trainers and topics were confirmed at the time of publishing; however, PetroSync may necessitate substitutions, alterations or cancellations of the trainers or topics. As such, PetroSync reserves the right to change or cancel any part of its published programme due to unforeseen circumstances. Any substitutions or alterations will be updated on our web page as soon as possible.

DATA PROTECTION

The information you provide will be safeguarded by PetroSync that may be used to keep you informed of relevant products and services. As an international group we may transfer your data on a global basis for the purpose indicated above. If you do not want to share your information with other reputable companies, please tick this box.

CANCELLATION POLICY

You may substitute delegates at any time as long as reasonable advance notice is given to PetroSync. For any cancellation received in writing not less than fourteen (14) working days prior to the training course, you will receive credit voucher less a SGD $200 administration fee and any related bank or credit card charges.

Delegates who cancel less than fourteen (14) working days of the training course, or who do not attend the course, are liable to pay the full course fee and no refunds will be granted.

In the event that PetroSync cancels or postpones an event for any reason and that the delegate is unable or unwilling to attend in on the rescheduled date, you will receive a credit voucher for 100% of the contract fee paid. You may use this credit voucher for another PetroSync to be mutually agreed with PetroSync, which must occur within a year from the date of postponement.

PetroSync is not responsible for any loss or damage as a result of the cancellation policy. PetroSync will assume no liability whatsoever in the event this event is cancelled, rescheduled or postponed due to any Act of God, fire, act of government or state, war, civil commotion, insurrection, embargo, industrial action, or any other reason beyond management control.

Please accept our apologies for mail or email that is incorrectly addressed. Please email us at registration@petrosync.com and inform us of any incorrect details. We will amend them accordingly.

- For Payment by Direct Telegraphic Transfer, client has to bear both local and offshore bank charges.
- For credit card payment, there is additional 4% credit card processing fee.

CHARGES & FEE(s)