

PROCESS HAZARD ASSESSMENT USING THE

HAZOP TECHNIQUE

18 – 20 July 2011, Kuala Lumpur, Malaysia

Develop your competency in the basic mechanics of the Hazard and Operability (HAZOP) technique to positively contribute to a HAZOP study team.

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HAZOP TEAM LEADER TRAINING

21 – 22 July 2011, Kuala Lumpur, Malaysia

Examine, learn and develop the required competence of a HAZOP Team leader to successfully lead a HAZOP study team.

Your Expert Trainer: John F. Davies B.Sc., MEI



Over 27 years in Refinery Operations with Shell in U.K., the Netherlands and Singapore. Lead over 20 HAZOP Study teams for several IOC's, NOC's, as well as key players in the international petrochemical construction business.

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Course Description

An intensely participative 3 day training course that will both explain the key facets of the HAZOP technique as well as provide ample opportunities for delegates to practice and become familiar with the technique using generic and real life examples.

Course learning outcome:

- ❖ to enable delegates to understand the basic HAZOP technique
- ❖ to enable delegates to fulfil roles as competent HAZOP team members
- ❖ to competently use a risk ranking matrix
- ❖ to understand how hazard identification can predict accidents and incidents
- ❖ to understand how HAZOP complements other hazard identification tools.

Who Should Attend?

All key persons in the organisation, who by their discipline and/or position are likely to be called on to initiate, participate or review a HAZOP study.

All who have responsibility for the management and supervision of process & safety including but not limited to Senior Management, Plant Managers, Process and Maintenance engineers (all disciplines), Line Supervisors, Team Leaders, Safety Specialists, and Process Training Instructors.

Course Agenda in Summary

- ❖ The foreseeability of process accidents.
- ❖ Overview of hazard identification techniques
- ❖ Background to HAZOP
- ❖ HAZOP guidewords and parameters
- ❖ The basic HAZOP methodology
- ❖ Selection of the study node.
- ❖ Recording the study
- ❖ HAZOP recommendations follow up and sign off.
- ❖ Risk ranking methods
- ❖ The HAZOP team and its members, team selection
- ❖ Setting up a HAZOP study, planning, resources and duration.
- ❖ Additional features of batch processes
- ❖ Other forms of the HAZOP study, Procedural, Control System

Course Methodology

From an early stage in the course delegates will have the opportunity to work as a HAZOP team member undertaking a HAZOP assessment of part of a generic process plant. Successive exercises will expand the technique to more complex examples beyond individual delegates' experiences.

Delegates will also participate in the analysis of high profile process industry accidents using material in the public domain as well as case studies from the presenter's own experience. At the end of the course delegates will identify the opportunities missed to prevent a major offshore disaster using actual video footage as well as reconstruction sequences.

Previous participants include:

PTT Exploration & Production, Carigali-Hess, RNZ Group, Talisman, Hess Indonesia, Shell Refining Company and many others

Course Outline in Detail

Day One

09.00 Welcome and Introductory material

- * Process safety vs. Personal safety
- * Baker Report conclusions – BP Texas City
- * Industry metrics

09.30 “Spiral to Disaster” – Piper

Alpha disaster

- * Film 6 docu6drama of 1988 Piper Alpha disaster UK North Sea
- * Class discussion

10.15 HAZOP background and terminology

- * Origins of HAZOP
- * Explanation of terminology – parameter, deviation, guideword, study node, design intent, etc

11.00 Mechanics of the HAZOP process

- * application of a deviation to a study node
- * examination of all possible causes
- * evaluation of consequences of each cause
- * evaluation of safeguards against each consequence
- * conclusions and recommendations

11.45 Generic HAZOP example 1 - class exercise

12.45 Lunch

13.45 Causes, Consequences and Safeguards

- * brainstorming causes
- * logical development and extension of consequences
- * critical assessment of adequacy of existing hard, soft and procedural safeguards

14.30 Recording the Study

- * role of the recorder
- * recording format
- * full and exception recording
- * simultaneous recording and team consensus
- * P & I mark up and sign-off

15.30 Syndicate Exercise 1

- * Selection of Study node
- * Application of deviations
- * Recording syndicates’ findings
- * Debrief of syndicates’ HAZOP studies

16.30 Other HAZOP Deviations

- * Basic 10 deviations
- * Additional commonly used deviation

17.00 Close

Day Two

09.00 Case Study 1 – how might HAZOP have helped to prevent incidents? Selected from:

- * Flixborough Disaster
- * Bhopal
- * BP Grangemouth Refinery
- * BP Texas City Refinery
- * Others

10.00 The HAZOP Team

- * members and responsibilities
- * depth and breadth of experience
- * availability and continuity of the study

10.45 Syndicate Exercise 2

- * Selection of study nodes
- * Application of deviations
- * Recording syndicates’ findings
- * Debrief of syndicates’ HAZOP studies

12.45 Lunch

13.45 Preparing for a HAZOP Study.

- * When should a HAZOP be undertaken
- * P & I drawing status
- * Identifying the team
- * Supporting documents
- * Venue, timing, duration.

14.30 Case Study 2 – how might HAZOP have helped to prevent incidents? To be selected from:

- * Flixborough Disaster
- * Bhopal
- * BP Grangemouth Refinery
- * BP Texas City Refinery
- * Others

15.45 Writing HAZOP recommendations

- * Type of recommendation
- * Quality of recommendation what, why, where
- * Traceability, follow up, sign off

16.15 Risk Ranking

- * Frequency and consequence matrices
- * Ranking Recommendations – why, when & who

17.00 Close.

Day Three

09.00 Case Study 3 – how might HAZOP have helped to prevent

incidents? To be selected from:

- * Flixborough Disaster
- * Bhopal
- * BP Grangemouth Refinery
- * BP Texas City Refinery
- * Others

10.00 Other types of HAZOP study

- * Batch processes
- * Procedural HAZOP study
- * Control system study.

10.45 Other methods of Hazard Identification

- * Checklists
- * SWIFT
- * Failure Mode and Effects analysis
- * Task / Job analysis
- * Generic failures – Quantitative Risk Assessment.

11.30 Syndicate Exercise 3

- * Selection of study nodes
- * Application of deviations
- * Recording syndicates' findings
- * Debrief of syndicates' HAZOP studies

12.30 Lunch

13.30 Syndicate Exercise 3 (continued)

15.00 HAZOP in the life of a process plant.

- * Design phase
- * Operating and standing Instructions
- * Refresher HAZOP
- * Pre modification HAZOP.

15.45 "Spiral to Disaster" – Piper Alpha disaster

- * Class exercise 6 identification of Hazard ID opportunities to have prevented the disaster

16.45 Course review, Q & A

17.00 Close



About your Expert Trainer : John F. Davies

An internationally experienced senior executive of Shell, John Davies has spent 27 years mainly in Refinery Operations line management in U.K., the Netherlands and Singapore. Assignments whilst posted to the Stanlow Manufacturing Complex, UK included Start-up Manager for Shell's first Long

Residue Fluid Catalytic Cracker, Oils Manufacturing Manager and Divisional Manager responsible for Health, Safety and the Environment.

An independent consultant since 1994, John has undertaken a wide variety of Hazard and Operability study (HAZOP) assignments for clients such as BP Chemicals, Esso Petroleum Ltd., Mobil Oil North Sea, Statoil, Conoco, Kuwait National Petroleum Company, Arco Netherlands B.V., amongst others. He was also engaged by DNV Ltd. to deliver a series of HAZOP Leader Training courses for Saudi Aramco, Petronas, Malaysia and for Landsverkjun, the National Power Company of Iceland.

John has lead over 20 HAZOP Study teams for several oil majors, a number of National oil companies, as well as key players in the international petrochemical construction business. These studies have included new projects such as a \$ 400 m. Middle East Acid Gas Recovery Project and an 800,000 t/a Methanol plant for Norway, existing facilities including storage and batch process plant, as well as pipelines, pilot plants and offshore structures.

Course Description

An intensely participative 2 day training course that will develop participants already familiar with the HAZOP technique, the skills, knowledge and attributes of a HAZOP Team Leader.

During the 2 days, opportunities will be given to lead a HAZOP team (consisting of other participants) and to be observed performing the role for constructive feedback. Generic examples of Continuous, Batch and Procedural HAZOP studies will provide a variety of study types.

Course Objectives:

- ❖ to enable delegates to understand the role of the HAZOP Team Leader.
- ❖ to enable delegates to practise the role in a classroom environment.
- ❖ to provide feedback to delegates on their performance as HAZOP Team Leaders.
- ❖ to understand the roles of other team members particularly the HAZOP Recorder.
- ❖ to be able to plan, organise, manage and successfully undertake a Hazard and Operability study.

Who Should Attend:

All key persons in the organisation, who by their discipline and/or position are likely to be called on to plan, organise or manage a HAZOP study.

All who have responsibility for the management of process plant safety assessments using the HAZOP technique including but not limited to Senior Management, Plant Managers, Process and Maintenance engineers (all disciplines), Safety Specialists, and Process Training Instructors.

Course Agenda in Summary

- ❖ key features of the HAZOP technique and its correct application
- ❖ selection of the HAZOP team
 - role of the HAZOP team leader – preparation, ground rules, planning
- ❖ managing the HAZOP team - team members, time estimates, data base
- ❖ issues arising in the HAZOP team and Team Leader's role in their resolution
- ❖ Team Leader practice applying the technique to Continuous processes
- ❖ Team Leader practice applying the technique to Batch processes and Procedures
- ❖ Individual and class feedback on practice sessions
- ❖ HAZOP Team Leader's role in the HAZOP report
- ❖ HAZOP Team Leader's role in follow up and sign off

Course Methodology

Apart from a limited number of essential classroom lecture sessions, the majority of participants' time will be spent as members of a HAZOP team. Each delegate will be afforded the opportunity to lead the team as it undertakes assessments of generic process plant. There will be opportunities to apply the technique Batch processes as well as to Procedures with critical assessment of team and HAZOP Leader performance.

Course Agenda in Detail

Day One

09.00 Welcome and introduction

- * delegates self introduction
- * workshop arrangements

09.30 Correct application of the HAZOP technique

- * Identifying causes
- * Developing consequences
- * Consensus on adequacy of safeguards

10.00 Managing the HAZOP Team (1)

- * team members' vital roles
- * managing time, resources, data
- * HAZOP team issues
- * Consensus vs. coercion
- * Motivating the team

10.30 Break

10.45 Process HAZOP Exercise – description of process

11.00 Process HAZOP Exercise - Syndicate work in HAZOP Teams (Delegates will undertake HAZOP Team Leader role)

12.30 Lunch

13.30 Process HAZOP Exercise - Syndicate work in HAZOP Teams (cont.) (Delegates will undertake HAZOP Team Leader role).

15.00 HAZOP team leader's role in planning the study

- * selecting the team
- * 'ground rules'
- * working arrangements, duration, venue
- * managing the data

15.30 Break

15.45 Batch process HAZOP

- * additional deviations
- * estimating duration

16.00 Batch HAZOP Exercise - Syndicate work in HAZOP Teams (Delegates will undertake HAZOP Team Leader role)

Day Two

09.00 Feedback on Team performance in Exercises

09.15 Managing the HAZOP Team (2)

- * absences
- * conflict
- * personalities

09.45 Batch HAZOP Exercise (cont.) – Syndicate work in HAZOP Teams (Delegates to undertake Team Leader role)

10.30 Break

10.45 Procedural HAZOP

- * Specific features
- * Estimating duration

11.00 Procedural HAZOP Exercise - Syndicate work in HAZOP Teams (Delegates to undertake Team Leader role)

12.30 Lunch

14.30 Procedural HAZOP Exercise (cont.) - Syndicate work (continued) (Delegates to undertake Team Leader role)

15.15 Break

15.30 Feedback on Team performance in Exercises

16.00 HAZOP Team leaders role after the study

- * risk ranking
- * action item assignment
- * the HAZOP report
- * sign off arrangements

16.30 Workshop review Question & Answer session

17.00 Close

REGISTRATION FORM

Kuala Lumpur, Malaysia	Early Bird Price	√	Normal Price	√	
3 day Process Hazard Assessment using the HAZOP technique	S\$ 2699		S\$ 2899		TEAM DISCOUNTS PetroEdge recognises the value of learning in teams. Group bookings at the same time from the same company receive the following: 3 or more at 5% off 5 or more at 7% off 8 or more at 10% All other promotions including early bird is exclusive of the group discount.
2 day HAZOP Leadership Training	S\$ 2299		S\$ 2499		
Attend ALL 5 days & SAVE S\$600	S\$ 4399		S\$ 4799		
PetroEdge In-house Training { } Yes, I would like to organise this on-site and save over 20% of total course fees! For further information about in-house training, please call +65 67419927 or email info@asiaedge.net					

DELEGATE DETAILS

Mr Mrs Ms Dr Other
 Delegate 1:

 Telephone: -----
 Job Title: -----
 Department: -----
 Email: -----
 Mr Mrs Ms Dr Other
 Delegate 2:

 Telephone: -----
 Email: -----
 Job Title: -----
 Department: -----
 Head of Department: -----
 Company: -----
 Address: -----

 Country: -----
 Postcode: -----
 Attention Invoice to: -----
 Telephone: -----
 Fax: -----

Please note:

- indicate if you have already registered by Phone Fax Email Web
- if you have not received an acknowledgement before the training course, please call us to confirm your booking.
- photocopy this form to register multiple delegates.

Payment Methods :

By Cheque/ Bank Draft: Make Payable to Asia Edge Pte. Ltd.
 By Direct Transfer: Please quote AE1 with the remittance advise
 Account Name: Asia Edge Pte. Ltd.
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 All bank charges to be borne by payer. Please ensure that Asia Edge Pte Ltd receive the full invoiced amount.

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