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TRAINING COURSE

# **Advanced hazard assessment techniques for SIL determination**

Management of risk and the demonstration of appropriate risk reduction measures - IEC 61508 and IEC 61511

6<sup>th</sup> - 10<sup>th</sup> November 2017 - Edinburgh, Marriott Hotel

5<sup>th</sup> - 9<sup>th</sup> November 2018 - Edinburgh, Radisson Blu Hotel



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# Advanced hazard assessment techniques for SIL determination

Management of risk and the demonstration of appropriate risk reduction measures are becoming increasingly important in industry today. This can be relevant to compliance with aspects of legislation, such as COMAH, and in the application of standards such as IEC 61508 and IEC 61511.

This course is designed for those who need to understand the causes and sequence of failure that can lead to significant hazardous events occurring and be able to identify the key contributors to the level of risk - to people, business or the environment.

## Topics include:

- Calculation of hazardous event frequencies
- Assessment of risk reduction from protective systems and Safety Integrity Levels (SIL)
- Criteria for tolerable levels of risk
- Assessment of demand frequency on protective systems

## Duration: 5 days

## Price:

Member of IChemE - £2200 + VAT

Non-Member - £2320 + VAT

## The benefits

The effective use of the techniques allows questions to be answered in the areas of safety, health and environment; asset management and maintenance; loss prevention; new investment.

## Typical attendees would be:

- Process design engineers
- Electrical, control and instrument engineers
- Safety managers and advisors
- Works or technical managers with responsibility for managing risk
- Leaders of HAZOP studies

## Typical attendees would probably have:

- Some experience of design and plant operation
- An analytical and structured approach to problem solving

## The course

On completion of the course you should be able to demonstrate a working knowledge of SIL and hazard assessment including:

- Logical analysis, using fault tree techniques of scenarios leading to hazardous events
- Use of data and its application to predict the likelihood of a hazardous event
- Development of practical hazard criteria
- Handling of dependent or common mode failures
- Basic human error assessment
- Applying basic SIL and hazard assessment in a variety of situations to help in making more effective and cost effective decisions

This course is also suitable as a basic qualification for those wanting to become hazard and reliability analysts.

## Syndicate topics

- Working with logic gates
- Use of the basic techniques to assess the potential frequency of hazardous events
- Logic diagram development and effect of proof testing
- Logic diagram development and effect of elements common to control and protective systems
- Logic development and use of data
- Use of event trees
- Failure rate for multiple plant items - development of logic
- Use of truth tables in analysing different plant arrangements
- Cost effective decision taking in controlling hazards
- Logic diagram development and the relative merits of shared elements and independent control and protective systems

- Use of minimum cut-sets to analyse complex protective systems
- Risk calculation for various operator situations

## Course tutor

Gaynor Woodford-Phillips, Senior Consultant for ABB Consulting. Gaynor is a Fellow of the Institute of Chemical Engineers with over 25 years' experience in project design, operations support and line management in the petrochemical and chemical industries. Gaynor specialises in technical process safety which includes carrying out target SIL assessments, quantified risk assessments (QRA) and consequence modelling.

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## Agenda\*

### Agenda Day 1 - 08:30 to 17:00

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|---------------------------------------------|---------------------------------------|
| - Registration and coffee                   | - Risk assessment                     |
| - Introduction                              | - Consequence assessment              |
| - International standards - IEC 61508/61511 | - Layer of Protection Analysis (LOPA) |
| - Risk and criteria                         | - Syndicate exercises                 |

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### Agenda Day 2 - 08:30 to 17:00

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|------------------------------------------------------------------|-----------------------|
| - Event tree analysis                                            | - Syndicate exercises |
| - Reliability concepts of elements and states                    |                       |
| - Guided exercise - development of fault trees to assess hazards |                       |

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### Agenda Day 3 - 08:30 to 17:00

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|------------------------------------------|-----------------------|
| - Use and collection of reliability data | - Syndicate exercises |
| - Trip system overview                   |                       |

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### Agenda Day 4 - 08:30 to 17:00

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|------------------------------------------------------------|---------------------------------------------------------------|
| - Protective systems mathematics and assessment techniques | - Failure dependency - key issues regarding dependent failure |
| - Limiting factors in PFDawg - common cause failures etc.  | - Syndicate exercises                                         |
|                                                            | - Intro to hazard study 2 quantification exercise             |

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### Agenda Day 5 - 08:30 to 15:00

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| - Hazard study 2 syndicate exercise - applying the principles learned over the week |
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\*ABB reserve the right to amend the course agenda.

## How to book

Web: [www.abb.com/uk/consulting/training](http://www.abb.com/uk/consulting/training)

Email: [jackie.kendall@gb.abb.com](mailto:jackie.kendall@gb.abb.com)

Phone: Call Jackie Kendall on +44 (0)1642 372121

# Booking form

## No. of places

6<sup>th</sup> - 10<sup>th</sup> November 2017 - Edinburgh, Marriott Hotel

5<sup>th</sup> - 9<sup>th</sup> November 2018 - Edinburgh, Radisson Blu Hotel

## Delegate details

Dr/Mr/Mrs/Ms

First Name

Surname

Job title

Company name

Address

Telephone

Email

## Fee per delegate

Member of IChemE - £2200 + VAT

Non-Member - £2320 + VAT

Discounts are available for bookings of 3 or more delegates. The fee includes course documentation, refreshments and lunch but does not include accommodation.

## Payment

Please debit my credit card (Mastercard / Visa / American Express)

Card number

Cardholder details (if different)

Expiry date

Security code

Cancellations made up to 28 days prior to the event will be subject to an administration fee of £50. Cancellations made 27-14 days prior to the event will be subject to a cancellation fee of 50%. Cancellations made thereafter will be subject to the full event fee, however a substitute delegate can be named at any time. Prices apply to bookings made prior to 31st December 2017.

Payment is due at the end of the month following a booking confirmation - ABB reserves the right to cancel bookings if payment is not made by this date. Accommodation is not included in the fee. We have reserved a limited amount of hotel accommodation subject to confirmation. Please mention you will be attending an ABB Consulting event when booking. Hotel details will be forwarded on receipt of the registration form. It may be necessary for reasons beyond the control of the organisers to cancel the event, alter the content, change the timing of the programme, or the listed speaker(s). This event is aimed at operating company personnel only. Please note: If you request overnight accommodation at the hotel via ABB and then choose to cancel less than 2 weeks prior to the event then it is your responsibility to pay any cancellation fees. ABB reserves the right to use any photograph / video taken at any event.