Our proficiency and mentoring, is available in all major international languages, tailored to specific local requirements delivered through our local centers of excellence across the globe.
Our Comprehensive Global Portfolio of Process Safety Courses

For each of the following program descriptions, the objectives of the program are shown, as they would be presented to the program participants.

1 - Best Practices in management of Process Safety

- **Process Safety Management Essentials**
  To develop and implement an effective and successful process safety management (PSM) program, not only in order to meet regulatory compliance requirements, but more significantly, to incorporate it into a company’s safety culture and daily operations. The program is designed to highlight the essential elements of any process safety management system and to emphasize more specifically any pitfalls that could stand in the way of making it work.

- **Process Safety Information**
  To understand and appreciate Process Safety Information (PSI) in the context of managing process safety:
  - What data/information is required?
  - What are good/best practices for obtaining and compiling PSI?
  - Why is PSI so important?
  - How to spot gaps in PSI completeness and quality.

- **Process Hazards Analysis & Risk Management Program**
  You will gain an understanding of the basics of Process Hazard Analysis (PHA), with emphasis on the Hazard and Operability (HAZOP) methodology, which uses guide words and process variables to identify potentially hazardous deviations. Risk evaluation methods for developing the most suitable safeguards will be discussed. The program is illustrated with real examples from industry (both batch and continuous processes). In this program, you will work on case studies, as part of a HAZOP working group. The technical and organizational aspects of the methodology will be covered, as well as the soft skills required to become an efficient HAZOP leader.

- **Asset and Mechanical Integrity Management**
  You will receive practical insights on how to develop and implement a sound Asset/Mechanical integrity management program in the process industry. You will be taught about the types of damage and degradation mechanisms, non-destructive testing, inspection regimes of different plant equipment items, and Risk-based Inspection/Risk-centred Maintenance. The program is illustrated with real-world examples and case studies on major incidents caused by mechanical integrity program failures. You will be given tips and success factors to effectively embed the Asset/Mechanical integrity program within the whole PSM framework.

- **Management of change**
  You will gain an understanding of the importance and the requirements of a management of change (MOC) program in the process industry. The program is illustrated with real-world examples and workshops on MOC program failures leading to undesirable process safety events. You will be given success factors, best practices, tips & tricks to effectively implant the MOC program to the whole safety management system framework.

- **Operating Procedures & Safe Work Practices**
  You will be given practical insights to ensure that safe work practices and operating procedures are well defined and used for routine and non-routine activities. You will be provided with tips and guidelines for developing and managing sound and consistent operating procedures. The program is illustrated with real-world examples from the process industry of good and bad practices in operating procedures, permits to work etc. Emphasis is placed on how to develop and write meaningful and unambiguous operating procedures so that they are used and followed.

- **Emergency Plans**
  This competence program covers methods to control spills and releases of other types of hazardous materials, alert and alarm methods, exit routes and distances, accounting for personnel, communication, control of incident-response activity, and drills to ensure the life-safety of employees. Emphasis is placed on practical aspects of building an effective site emergency plan, above and beyond the basic regulatory requirements.

- **Process Safety Audit**
  This competence program covers methods, techniques, tips and success factors for conducting efficient management system audits, and identifying and correcting gaps in the management system, in order to develop and maintain a successful process safety management system. Emphasis is placed on in-depth auditing of the critical elements relevant to undesirable process safety events, over and above the basic paper checklist audits.

- **Process Safety Metrics & Performance Indicators**
  This competence program covers relevant and efficient process safety indicators to aid leaders and management to effectively monitor Process Safety Performance Indicators (PSPIs), benchmarking of the existing status and implementation of metrics-monitoring tasks. Good practices and pitfalls are illustrated with real examples from this emerging practice.

- **Lessons from Accidents in the Process Industries**
  This competence program provides an understanding of the root causes and sequences of events in past incidents, in order to predict what might happen in the existing or new processes. The study of past incidents and lessons learned is an essential part of any robust Process Safety Management system. This program includes workshops on past process safety incidents.

- **Incident Investigation: Methods & Case Studies**
  This competence program covers methods of conducting investigations and finding the root causes of incidents or near-misses. Extensive case studies of industrial accidents are examined including:
  - Most of the process safety hazards in process industries: explosions (gas, dust, aerosols, BLEVE, pressure events), toxic dispersion, thermal runaway, self-ignition, anoxia, etc.
  - Techniques to investigate incidents & identify immediate and root causes.
  - Requirements for reporting incidents.

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LOCALIZATIONS (OPTIONAL MODULES – SECTOR/LEGISLATION/TOpic SPECIFIC)

Complementary sessions tailored to specific industry sectors, regions and regulatory environments such as ATEX, OSHA have been also developed by our local senior experts.

- **Process Safety Management (PSM) for Executives**
- **Application of PSM to the Prevention of Fires and Explosions**

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1 - INTRODUCTORY // 2 - INTERMEDIATE // 3 - ADVANCED
2 - Understanding Process Safety Hazards

- **Hazards of Pressure & Temperature**
  This competence program provides an understanding of the effects of excessive pressure or vacuum and of high and low extremes in temperature, and methods for preventing such deviations from desired conditions. You will learn from process incidents caused by pressure upsurge, vacuum and temperature rise. Emphasis is placed on compressed gases, boiling of materials in equipment, the effects of runaway reactions, and Boiling Liquid Expanding Vapour Explosions (BLEVE).

- **Combustion & Fire Fundamentals**
  This competence program starts with an explanation of the fire triangle and the importance of controlling fuel, oxidant, and/or ignition sources in minimizing the hazards of uncontrolled combustion, such as pool, jet, and running fires. The hazardous properties of typical gas, vapour, aerosol or mist, liquid, and solid flammable and combustible materials are discussed, along with their effects on the rate of heat release and on fire-protection requirements. We will then discuss the extension of the fire triangle to the explosion pentagon and look at the impact of confinement and mixing on the combustion process.

- **Dust Explosions**
  This competence program provides an understanding of dust explosion phenomena and dust explosibility characteristics. Understanding sensitivity to ignition and the severity of explosions of combustible dust is essential to executing dust explosion hazard & risk analysis, to ensure adequate protection of employees and property.

- **Gas/Vapour Explosions**
  This competence program provides an understanding of explosion phenomena and how to accurately assess the associated hazards of flammable gas and vapour explosions, to be able to provide a good risk analysis. You will also understand the importance of obtaining and compiling the explosibility properties of gases and vapours for preventing explosion and for mitigating the effects of possible explosions.

- **Chemical Reaction Hazards (CRH) and Thermal Stability**
  This competence program provides you with the necessary tools to be able to identify chemical reaction and thermal-instability hazards. This includes determining whether any inherently safer practices could be put in place and developing such processes, interpreting test data correctly, and developing a robust basis of safety for each process of interest.

- **Ignition Sources and Electrostatics Hazards**
  This competence program provides an understanding of how, when, and where different types of ignition sources can become active, providing you with the essential background knowledge for carrying out a full fire and explosion hazard or risk assessment.

- **Corrosion & Toxicity**
  This competence program provides an understanding and increase fundamental knowledge on industrial corrosion, including types of damage and degradation mechanisms, and what measures can be taken to identify, monitor, prevent and delay them. The program will cover fundamental aspects of toxicity hazards such as thresholds, with an emphasis on toxic cloud dispersion phenomenology and models. Visual examples and practical workshops are included.

**LOCALIZATIONS (OPTIONAL MODULES – SECTOR/ LEGISLATION/ TOPIC SPECIFIC)**

- ATEX Explosion Protection Document
- ATEX 95 & 137 – Compliance for Equipment Manufacturers and Operating Companies
- IECEx05-001 : Certification of Personnel in Explosive Atmospheres
- OSHA Combustible Dust Inspection Preparatory Training
- ATEX for Labs & Pilot Plants
- ATEX for Powerplants, BioGas & BioMass Industry
- Predicting Chemical Reaction Hazards (CRH)
- Managing Combustible Dust in the Wood or Metal or Plastics Industry
- Safety of Unit Operations
- Safety of Drying Operations
- Safety of Hydrogenation Reactions
- Understanding Process Engineering Drawings and Diagrams
- Inherent Safety and Safety of Intensified Processes

**Regulations:**
- ATEX
- DSEAR
- OSHA

*1 = INTRODUCTORY // 2 = INTERMEDIATE // 3 = ADVANCED*
3 - Hazard Identification and Risk Analysis

- **HAZOP for Team Leaders**
  This competence program demonstrates how HAZOP is a rigorous, structured approach to identifying operational problems and hazards, which can be adapted to a variety of processes and technologies. Since the effectiveness and efficiency of a HAZOP depends on the competence of the leader, this program will help leaders develop the skills necessary to make HAZOP a cost-effective aspect of process development, design, and management in their organization.

- **Process Hazard Analysis (PHA)/ HAZOP for Team Members**
  This competence program provides awareness of classic PHA techniques, such as HAZOP, HAZID, What-if, Fault Trees, Event Trees, Bow-Ties and other methods that are used in Process Hazards Analysis in the process industry. Examples of each method are provided to show the differences in approach, effort, and the resulting findings of each method.

- **Consequence Modeling & Toxic Dispersion**
  This competence program covers how to quantify the effects of explosions, uncontrolled fires, and releases of toxic materials on site occupants and property, arising after an industrial accident. Quantification of these effects is required for European Seveso/COMAH files and for the US PSM standard, and it is at the core of more sophisticated studies such as HAZOP, quantitative risk analysis (QRA), Occupied Building Risk Assessment (OBRA)/facility siting or others.

- **Quantitative Risk Assessment (QRA)**
  This competence program provides an understanding of the fundamentals of the QRA technique (methods, source data, and tools) and reach a practical understanding on how to effectively use the technique and the results to manage risks, in particular for those who supervise or contract those studies.

- **Facilities Siting Risk Assessment**
  This competence program provides you with the knowledge and tools required for analyzing the impact that a new facility would have on the existing risk levels, and to ensure they remain tolerable. This may require selection of either of the two approaches (consequence or risk) possibly depending upon the local regulatory preferences.

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**LOCALIZATIONS (OPTIONAL MODULES – SECTOR/ LE GISLATION/ TOPIC SPECIFIC)**

- Bow-tie in Practice
- Pre-start up Safety Reviews (PSSR’s)
- Fault-tree and Event Tree Analysis; Importance Analysis
- Reliability, Availability and Maintainability (RAM) Studies (Sp)
- Occupied Buildings Risk Assessment (OBRA)
4 - Safeguards and Layers of Protection

Classification and Management of Hazardous Areas
This competence program demonstrates how Hazardous Area Classification (HAC) can be used as a systematic approach to identifying flammable atmospheres, their persistence and control of ignition sources. In this way, areas can be classified for various levels of risk. This program presents current best practice and procedures for carrying out a HAC for flammable gases/vapours and dusts. It also provides an understanding of how HAC fits into compliance for DSEAR/ATEX and OSHA requirements.

Protection Against Deflagrations/Venting
This competence program discusses the hazards that can result from the confined combustion of gases, vapours, and dusts, in terms of maximum pressures and burning rates. The combustion properties of fuels need to be understood in order to control overpressure hazards, and to provide protection against damage to equipment and structures. You will gain an understanding of how to prioritize testing to determine appropriate explosion protection, such as venting and suppression.

Emergency Relief Systems, Blow-down & Pressure Vessels
This competence program covers the major aspects of sizing safety relief systems for single- and multi-phase flow, arising from loss of control of an exothermic chemical process. The program concentrates on the quantification and sizing of emergency vent systems for runaway reactions using experimental data derived from small-scale but representative laboratory tests. Emphasis is placed on identifying failure scenarios and applying the appropriate calculation techniques that would be required to arrive at correct system dimensions.

Safety Instrumented Systems, SIL Assessments and Verification
This competence program demonstrates how the safety lifecycle is an engineering process that contains all the steps needed to achieve high levels of functional safety in the design, operation, and maintenance of instrumentation systems. This program is suitable for anyone who would benefit from a broad understanding of this important safety-related area, in terms of reliability and reduction of risk.

Safety Critical Elements
This competence program demonstrates the importance of compiling an appropriate listing of safety-critical instruments and systems, in order to assess their reliability, and the level of reliability that would be required to reduce risks to an acceptable level. In particular, the issues addressed will provide you with the necessary knowledge to monitor and manage Safety Instrumented Functions and physical safety barriers.

Fire Protection & Fireproofing
This competence program provides an overview of assessment and computation techniques for evaluating the impact of fires and determining practical mitigation measures. This is required to prevent fires that can result in serious injury, major asset loss, and business interruption. This program will focus on how to recognize potential fire hazards, how to understand their consequences, and how to manage their risks. You will gain awareness of the main parameters for designing and checking fire protection systems in the context of reliability of layers of protection.

LOCALIZATIONS (OPTIONAL MODULES – SECTOR/ LEGISLATION/ TOPIC SPECIFIC)

- Design, Installation and Maintenance of Electrical Equipment in Hazardous Areas
- Design, Installation and Maintenance of Electrical and Non-Electrical Equipment in Hazardous Areas
- Mechanical Equipment Ignition Risk Assessment for Equipment (pre ATEX)
- LOPA Leadership : Method & Case Studies
- Functional Safety Management & SIL Assessments

1 = INTRODUCTORY // 2 = INTERMEDIATE // 3 = ADVANCED
Our delegates say:

Lots to cover but well-placed throughout. All expected content covered. Very difficult topics but presented & delivered very well. Good knowledge with easy to understand scenarios.

Very good & clear, trainers knowledge & ability to create clear understandable examples was the making of the course.

The course leader set the tone for the day in the introduction. This created a good atmosphere for the course & a lot of dialogue.

Truly Global Delivery

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