BAKERRISK®

Identify | Evaluate | Solve

Learning Center | Course Catalog

Asset Integrity Training

Days: 2

PDH: 16

CEU: 1.6

Course Cost:

Early $1,875

Normal $2,150

This two day Asset Integrity course will focus on the value creation potential of Asset Integrity Management, as measured through a risk reduction lens. This course will cover the Asset Integrity and Reliability element of CCPS' Risk-Based Process Safety (RBPS) with reference to the elements of the U.S. OSHA PSM rule where relevant.

The course will include the following topics:

- **Asset integrity background**
  - CCPS guidelines
  - AIM incident data
- **Asset integrity management**
  - Business case
- **AIM risk based framework**
  - Elements of RBPS
- **Scope and definitions**
- **Management responsibilities**
  - AIM procedures, roles, responsibilities
- **AIM equipment selection**
  - Equipment selection and register
  - Critical equipment
- **AIM planning and scheduling**
  - ITPM plans
  - Scheduling of ITPM tasks
  - Overdue and deferred ITPM tasks
- **AIM task execution**
  - Safety
  - Calibration
  - Test results
  - Operational readiness
- **Deficiencies**
  - Management
  - Temporary repairs
  - Rerating, repairs, alterations
- **ITPM documentation and records**
  - Equipment records and files
  - Test records and files
- **Quality management**
  - Design and fabrication
  - Materials receipt
  - Installation
- **Course wrap-up and discussion**
- **Recap on concepts, definitions, elements, etc. to ensure understanding**
- **Quiz on AIM standard requirements**

Blast Resistance Design (Only for ERC Participants)

Days: 4
PDH: 32
CEU: 3.2

Course Cost:
Early $2,250
Normal $2,500

This four day course will focus on the practical calculations of designing structures to withstand postulated blast load. This course will utilize the tools and analysis techniques developed by the Explosion Research Cooperative.

The course will include the following topics:

- Introduction to designing for VCE blast loads
- Introduction to BEAST and screening approaches
- Building damage levels - When to use and when not to use
- How developed
- Intro to SDOF method and criteria
- ISADS
- Steel design
- Dynamic design of trusses
- Concrete design
- Masonry design
- Lateral resisting systems and foundations
- Windows and doors
- Blast intrusion into buildings
- Design of CMU upgrades
- Design of shield walls
- Tents and trailers
- Wrap up discussion – Case studies

Emergency Management Training

Days: 1
PDH: 8
CEU: 0.8

Course Cost:
Early $1,250
Normal $1,450

The focus of this one day course will be on explaining elements of a sample real-life Crisis Emergency Response Plan. Practical tools and industrial examples will be presented.

The course will include the following topics:

- Requirements / Roles / Responsibilities
- Classification / Level of incidents and other definitions
- Emergency management vs. Crisis management and the transition
- Non-traditional “emergencies” (e.g. operational, capital projects, company reputation, business continuity, potential incidents, etc.)
- Risk exposures
- Incident examples (emergency vs. crisis)
- Unified incident command system
- Emergency response teams
- Response levels
- Emergency / Crisis plans
- Coordination among governmental, corporate, plant, community, and client plans
- Prepare, prevent, respond, recover
- Plan elements
- Examples of plan elements for team members
- Plan activation stages
- Communication planning
- Control centers
- Testing, training, drills, and continuous improvement

Explosion Fundamentals & Blast Load Prediction

Days: 2

PDH: 16

CEU: 1.6

Course Cost:

Early $1,750

Normal $2,000

This two day course focuses on the fundamentals of explosions and blast load predictions. The course provides exposure to a range of explosion types, with a focus on vapor cloud explosion (VCE) phenomena. Blast load prediction techniques for VCEs are covered in detail, and a summary of bursting pressure vessel (BPV) blast load prediction methods is provided.

The course will include the following elements:

- **Overview of explosions**
- **VCE blast load prediction methods**
- **VCE blast load prediction example cases**
- **BPV blast load prediction methods**
- **Other VCE blast load topics (blast walls, door blast shields, clearing and infiltration)**

Fault Tree Training

Days: 1

PDH: 8

CEU: 0.8

Course Cost:

Early $1,250

Normal $1,450

This one day course focuses on the fundamentals of using fault trees to calculate frequencies and probabilities for different types of events. The topic includes areas of instrumentation failure, human failures, and creating logical models using binary (AND and OR) gates to form a fault tree of different components. Students will use real world examples to evaluate cutsets and understand the importance of different cutsets and the co-relations between them. Students will review standard databases to identify failure rates of different equipment and instruments.

The course will include the following elements:

- **Introduction to fault tree analysis**
- **Creating basic fault trees with example scenarios**
- **Generating and analyzing cutsets**
- **Understanding failure modes and failure rates**
- **Basic probability for fault trees**
- **Selecting failure rate data from databases**
- **Evaluating event frequency or probability**

The training will be conducted using Computer Aided Fault Tree Analysis (CAFTA) software from Electric Power Research Institute.

FSS & QRA Training

Days: 2

PDH: 16

CEU: 1.6

Course Cost:

Early $1,500

Normal $1,725

This two day course focuses on the fundamentals of facility siting studies (FSS), quantitative risk assessments (QRA) and mitigation techniques. The primary objectives are to provide a thorough foundation and knowledge of the inputs, methodologies and typical types of results for FSS and QRAs. It will also provide knowledge of how QRAs can be used to identify and prioritize risk mitigation strategies to make informed and effective risk mitigation decisions. This course is ideal for PSM managers, process safety engineers, facility siting coordinators / SMEs, and anyone involved in the facility siting decision making process.

The course will include the following topics:

- **FSS / QRA regulations and industry guidance**
- **Hazard identification and hazard definition**
- **Discharge and Dispersion Calculations**
- **Occupant vulnerability (OV) determination**
- **Building analysis**
- **Outdoor area analysis**
- **Congestion / Confinement theory and modelling**
- **Explosion calculations**
- **Risk analysis**
- **Frequency analysis**
- **Occupancy analysis**
- **Overview of risk measures and criteria**
- **Overview of consequence results**
- **Risk results**
  - Developing and evaluating risk refinements and mitigation options
  - Making risk-based decisions
  - Assessing risk for abnormal operations (turnaround, etc.)

Fundamentals of Combustible Dust

Days: 1
PDH: 8
CEU: 0.8

Course Cost:
Early $750
Normal $1,000

This one day course focuses on the fundamentals of combustible dust hazards and associated mitigation techniques. In addition, the course will cover the current regulatory climate with regards to performing dust hazard assessments, as well as the legal ramifications of incurring a combustible dust related incident.

The course will include the following elements:

- **Combustible dust fire and explosion characteristics – how do they manifest?**
  - Case studies
  - Combustible dust 101
  - Regulatory requirements for facilities handling combustible dusts
- **Dust hazards analysis**
  - Overview of NFPA 652
  - Introduction to DHA methodology
  - Example DHA Sessions
- **How do I know if my dust is explosive? – Dust testing**
- **Dust explosion fire and explosion protection solutions**
- **Equipment Evaluation for Provision of Explosion Protection – What you need to know**
- **Explosion Protection System Deficiencies – As Identified through Performing DHAs**

Hazards Awareness Course (Testing Demonstrations)

Days: 1
PDH: 8
CEU: 0.8

Course Cost:
Early $1,750
Normal $2,000

Visit the Wilfred E. Baker test facility to witness actual loss of containment events/consequences. Feel the heat of a jet fire on your face and the pressure from a vapor cloud explosion on your chest! In the Hazards Awareness Course, you'll learn about actual incidents that have shaped our industry and discuss the lessons learned. You will return to work with a new understanding of how hazards become incidents.

The following demonstrations will be performed:

- **Dispersions**
- **Flange release**
- **PSV release**
- **General dispersion from small diameter piping**
- **Liquid release (diesel or gasoline)**
- **Jet Fire**
- **Pool fire**
- **Flash Fire**
- **Vapor cloud explosion**

Incident Investigation Training

Days:	2.5	Course Cost:	
PDH:	20	Early	$1,750
		Normal	$2,000
CEU:	2		

Incidents: you hope that they never happen, but you need to be prepared in case they do. In this course, you learn how to perform a scientifically rigorous incident investigation based on BakerRisk's vast experience in this area across a broad range of industries. Through a range of active, hands-on sessions, you will practice techniques for hypothesis development, witness interviews, timeline creation, and root cause analysis, among others.

The 2.5 day training program will provide instruction on:

- **Classification of incidents**
- **Establishment of incident investigation teams**
- **Execution of a systematic and analytical investigative process**
- **Identifying, documenting, and managing pertinent physical conditions and issues (i.e. evidence identification, collection, and preservation)**
- **Use of scientific methodology to determine incident origin and causal factors (e.g. timeline development, hypothesis validation)**
  - Overview of steps to get to root cause
  - Introduction to investigations
  - Investigation process and environment
- **Investigation approach**
- **Investigation procedures: Initial response**
- **Systematic data collection**
- **Document collection**
- **Witness interviews and statements**
  - Hypothesis development and analysis
  - Root cause analysis
  - Corrective actions
  - Reports
- **Bringing the investigation to closure**

PHA / LOPA Training

Days:	3	Course Cost:	
PDH:	24	Early	$1,250
		Normal	$1,500
CEU:	2.4		

This three day course is intended to give participants an overview of the PHA / LOPA process by teaching techniques and tools to assist in guiding teams through the qualitative risk analysis process.

This course includes the following topics:

- **Introduction to HIRA techniques**
- **Hazard identification**
- **Team management**
- **HAZOP method review**
- **PHA-Tool© software introduction**
- **MOCK HAZOP session**
- **Miscellaneous guidewords and checklists**
- **What-if analysis and checklists**
- **Alternate analysis methods**

Pressure Test Safety Training

Days: 1
PDH: 8
CEU: 0.8

Course Cost:
Early $1,250
Normal $1,400

This one day course will provide a high level overview of potential hazards associated with high pressure systems. Topics covered include applicable codes (ASME, UK HSE, etc.), general guidelines, recommended practices, best practices, recent developments, and examples of past incidents.

This course includes the following topics:

- **Pressure testing hazard awareness**
- **Possible hazards**
- **Developments**
- **Incidents**
- **Examples**
  - Introduction to pressure testing hazards
- **Types / Sources of hazards**
  - Evaluation process
- **Applicable codes and standards**
  - Introduction to structural response
- **How blast design differs from conventional design**
- **Specifying response / Damage criteria**
- **Owner / Consultant roles and responsibilities**

Process Safety Competency

Days: 2
PDH: 16
CEU: 1.6

Course Cost:
Early $1,500
Normal $1,725

This course will focus not only on understanding hazards and risks but also the linkage to the key risk control systems necessary for sustainable safe operation.

The outcomes include:

- **Understanding the key factors of process safety management**
- **Understanding hazard identification, risk assessment and management of risk**
- **Understanding the process safety culture and commitment**
- **Understanding how to implement sustainable improvements in process safety management**

This course will include the following topics:

- **Process safety awareness**
- **What is process safety**
- **The essentials of managing process safety**
- **Process safety information**
- **Dust explosions**
- **Gas / Vapor explosions**
- **Chemical reaction hazards and thermal stability of materials**
- **Ignition sources including electrostatic hazards**
- **Practical process hazard analysis**
- **Protection against deflagration (vapors and powders)**
- **Classification and management of hazardous areas**
- **Creating a management of change program**
- **Pre-start up safety reviews (PSSRs)**
- **Process safety metrics / Leading and lagging indicators**
- **Lessons from accidents in the process industries**

Risk Based Process Safety (For Executives)

Days: 2

PDH: 16

CEU: 1.6

Course Cost:

Early $1,500

Normal $1,725

This two day course focuses on leading implementation of PSM gap analysis findings and corporate standards.

This courses will cover:

- **Process safety concepts**
- **20 elements of CCPS's risk based process safety (RBPS) with reference to:**
  (i) 14 elements of the OSHA PSM rule, and
  (ii) Corporate PSM standards, where relevant
- **Process safety leadership**

The course includes the following topics:

- **Business case for process safety**
- **Impact of major accidents on a business, people, and environment**
- **Recurring root cause failures**
- **Process safety concepts**
- **Accident theory**
- **Hazard and risk**
- **Loss prevention principles**
- **Inherently safer systems**
- **Loss of containment events**
- **Human factors**
- **Process safety management / Management systems and assurance processes**
- **Integrating process safety alongside business objectives**
- **Risk-based process safety (compare / contrast to OSHA PSM)**
- **Understanding the impact of human factors on process safety**
- **Developing and maintaining a positive process safety culture**
- **Operational discipline**
  - The importance of setting policies and their effective deployment
- **Lessons learned**
  - External / Internal major accidents, incidents, near-misses
  - Maintaining corporate knowledge
- **Measuring process safety - Metrics, audit, and review**
  - Importance of sustainability
- **Implementing site improvement plans**
- **Gap analysis findings / actions**
- **Sharing best practice**

Risk Based Process Safety Fundamentals

Days:	2	Course Cost:	
PDH:	16	Early	$1,500
CEU:	1.6	Normal	$1,725

Major industrial accidents involving the release of hazardous materials present a risk to the facility and local communities. Mechanical breakdown, fire, explosion, and toxic dispersion are just a few of the consequences of potentially catastrophic failures in process operations, which, if unchecked, can escalate to multiple injuries and fatalities, property damage, business losses, and environmental impact. The avoidance of process incidents is crucial to success in our industry. It has been demonstrated that a holistic management system comprised of several critical process safety activities is required to prevent, minimize, and recover from loss of containment incidents. Managing risk is central to these activities. Excellence in process safety can also lead to higher availability, productivity, and profit.

This course builds on, and complements, a Market Based Management initiative, and introduces process safety systems and concepts that have been effective across industry. A key focus throughout the course is that hazards and risks should be understood, and then managed by 'doing what is right' rather than slavishly following regulatory compliance alone.

The course is intended to teach process safety, risk management, and asset integrity concepts to personnel involved in design, operations, maintenance, and field safety. It is ideally suited to all discipline engineers, operations supervisors, and EHS professionals, especially new employees. Note that it may be too basic for experienced process safety engineers. The course consists of a mix of presentation tools (PowerPoint, video), exercises, and discussion.

The course includes the following topics:

- Accident theory with relevant case studies
- Physical and process hazards
- Loss prevention principles in design and operations
- Inherently safer systems
- Loss of containment events
- Fire, explosion, and toxic release
- Facility siting, human factors, mechanical integrity, Metallurgy considerations instrumentation
- Failure and loss
- How to identify and gauge risk
- Risk tolerance and acceptance – Risk matrix
- The ALARP concept
- Risk management framework
- Risk assessment process
- Facilitation exercises
- How to establish risk controls and safeguards
- Risk communication

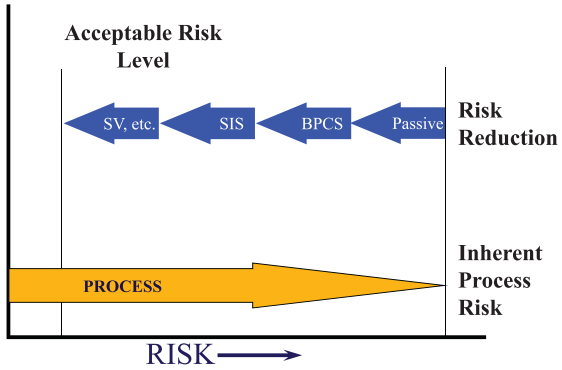
SIS/SIL Verification Training

Days:	2	Course Cost:	
PDH:	16	Early	$1,500
		Normal	$1,650
CEU:	1.6		

ISA84 and IEC61511 have developed Safety Instrumented Systems (SIS) standards for implementation of SIS worldwide. Many of the requirements have changed recently or are in the process of changing. Beginners, intermediate, or advanced practitioners of SIS can gain value and advance their knowledge in this area by attending this course. You will learn the basics of SIS, regulatory requirements around designing and implementing Safety Systems, how to perform calculations to meet the Safety Integrity Level (SIL) target and generate deliverables for systems integrator to program the system. The course goes through numerous examples of various designs, advantages and disadvantages of those approaches as experienced by SIS experts with extensive implementation experience. This course is beneficial for process safety coordinators, HSE managers, controls and process engineers to understand the value of having properly designed safety systems and generate best practices for their organizations as they develop new SIS programs or enhance existing ones.

The course includes the following topics:

- **Overview of SIS requirements**
- **Identifying SIFs and SIL requirements**
- **PM overview of SIL selection techniques (LOPA, risk graph)**
- **Preparing a safety requirement specification (SRS)**
- **Failure modes and failure rates**
- **SIL calculation basics using simplified equations (Probability of failure on demand – PFD)**
- **Calculating PFD of safety instrumented functions**
- **SIL calculation workshop**
- **Management of change (MOC) of SIS**
- **Test plan development**



Customized Courses

Days:	varies	Course Cost:	
PDH:	varies	Early	varies
		Normal	varies
CEU:	varies		

While BakerRisk offers a range of pre-packaged courses, we recognize that the most effective courses incorporate company and/or site specific guidelines and procedures. As such, BakerRisk also offers tailored courses from a high-level overview of a spectrum of service offerings to in-depth training on topics of interest. Please contact us to discuss your particular needs.

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