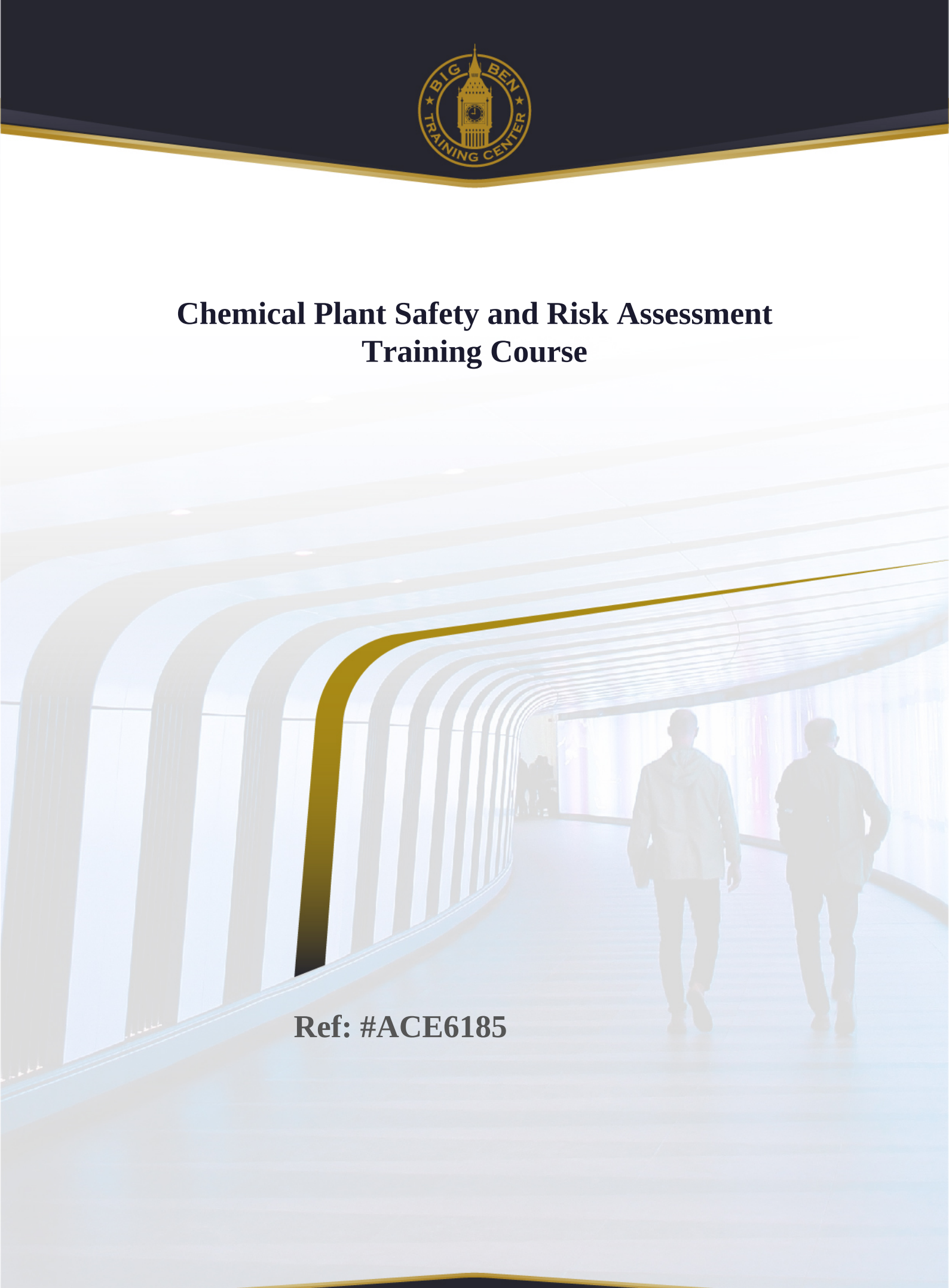
Chemical Plant Safety and Risk Assessment Training Course



Ref: #ACE6185

Course Introduction / Overview:

This training course gives a comprehensive look into the core principles of chemical plant safety and risk assessment. The chemical industry is an essential part of the modern economy, but it also carries inherent risks, from fire and explosions to toxic releases. A strong safety culture is not just a regulatory requirement; it's a moral and economic necessity. This course gives participants a solid foundation in modern safety management systems, hazard identification, and quantitative risk analysis. We explore how to use tools like HAZOP and LOPA to systematically evaluate and mitigate risks in chemical processes. The curriculum is informed by leading academic and industry resources, such as the book Guidelines for Hazard Evaluation Procedures, 3rd Edition by the Center for Chemical Process Safety, a foundational reference in the field. BIG BEN Training Center is committed to giving a forward-thinking curriculum that equips professionals with the skills needed to design, operate, and manage safer chemical plants.

Target Audience / This training course is suitable for:

- Chemical and process engineers.
- Safety and environmental managers.
- Plant operations and maintenance staff.
- Project managers.
- Technical and engineering consultants.
- Government agencies and regulators.
- Academics and students in chemical engineering.

Target Sectors and Industries:

- Chemical manufacturing.
- Oil and gas.
- Petrochemicals.
- Pharmaceuticals.
- Power generation.
- Government agencies and environmental departments.
- Risk management and insurance.

Target Organizations Departments:

- Health, safety, and environment (HSE).
- Process safety.
- Operations and technical services.
- Engineering and design.
- Risk management.
- Quality control.
- Regulatory compliance.

Course Offerings:

By the end of this course, the participants will have able to:

- Describe the principles of process safety management.
- Identify and analyze process hazards.
- Use tools like HAZOP and What-If analysis.
- Perform a quantitative risk assessment (QRA).
- Understand the concept of layers of protection analysis (LOPA).
- Design and evaluate safety instrumented systems (SIS).
- Develop a plant emergency response plan.
- Understand the role of human factors in plant safety.

Course Methodology:

This training course uses a blend of theoretical instruction, guided exercises, and hands-on projects to give a dynamic learning experience. The curriculum combines theoretical lectures with real-world case studies to bridge the gap between academic concepts and practical application. Participants will use hands-on activities, including group workshops and scenario-based exercises, to reinforce their understanding of key topics. We use discussions and Q&A sessions to encourage a collaborative learning environment, where participants can share experiences and insights. The course also includes an in-depth analysis of successful and unsuccessful projects from various industries to highlight best practices and common pitfalls. This approach gives participants the confidence to apply their new knowledge directly to their professional roles. At BIG BEN Training Center, we believe that an engaging and interactive format is key to mastering new skills, so we focus on giving immediate feedback and continuous support throughout the training. The methods are designed to ensure every participant leaf with a clear, practical skill set.

Course Agenda (Course Units):

Unit One: Fundamentals of Process Safety.

- Introduction to process safety management (PSM).
- Key principles of risk assessment.
- Hazard identification methods.
- Chemical properties and hazard classification.
- Understanding domino effects and cascading events.

Unit Two: Hazard and Operability (HAZOP) Studies.

- The HAZOP methodology.
- HAZOP team and roles.
- Guide words and process deviations.
- Conducting a HAZOP session.
- Documenting findings and recommendations.

Unit Three: Quantitative Risk Assessment (QRA).

- Introduction to quantitative risk assessment.
- Event tree and fault tree analysis.
- Consequence modeling for fires and explosions.
- Modeling for toxic gas dispersion.
- Calculating individual and societal risk.

Unit Four: Layers of Protection Analysis (LOPA).

- Introduction to LOPA.
- Independent protection layers (IPLs).
- LOPA methodology and its use.
- Risk reduction and target frequencies.
- Integrating LOPA with HAZOP.

Unit Five: Safety Management and Human Factors.

- Emergency response planning.
- Human factors in process safety.
- Safety culture and leadership.
- Learning from incidents and near misses.
- The future of process safety.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

How can the use of artificial intelligence and machine learning in chemical plants fundamentally transform how we predict and prevent high-impact process safety incidents?

What unique qualities does this course offer compared to other courses?

This training course is unique because it combines a strong theoretical foundation in chemical plant safety with a practical, step-by-step approach to risk assessment. While many courses discuss safety concepts in general, our program gives you the tools and methods used by top-tier engineering firms to systematically identify and manage hazards. We don't just teach you about HAZOP; we help you find out how to lead a HAZOP session and use it to get clear, actionable results. The curriculum is heavily focused on real-world case studies from major industrial accidents, enabling participants to learn from past mistakes and prevent future ones. It’s an advanced program that gives professionals the skills needed to create a culture of safety and protect both people and assets.