Introduction:

As industrial operations grow more complex, managing safety hazards and mitigating their risks have become increasingly challenging. Plant Managers and Engineers need to recognize that safety and risk management are central to running safe and efficient operations. Failing to control safety risks can lead to significant financial losses, production disruptions, legal issues, and damage to assets and the environment.

This **Advanced Safety Technology and Risk Management Training Course** offers in-depth training on the latest safety technologies, risk management practices, and methods for creating secure environments in industrial settings. Participants will gain proficiency in utilizing advanced safety technologies and understanding key safety control and health and safety technology systems.

The course aims to provide a thorough understanding of safety systems, their integration into operations, and the ways to safeguard both people and assets in complex systems.

Targeted Groups:

- **Operations and Process Professionals**
- **Reliability and Safety Professionals**
- Professionals involved in **process improvement**

Course Objectives:

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

1. Apply principles of **hazard identification** and **risk assessment** to processes and machinery.
2. Understand the concept of **reliability** and apply **failure-tracing methods** to mitigate risks.
3. Demonstrate an understanding of **quantitative risk assessment techniques** and data recording.
4. Advise management on the most effective **control methods** based on risk evaluation.
5. Identify the general requirements for the development of a **safe system of work**.
6. Recognize **international safety standards** related to reliability and machinery safety.
7. Foster a **proactive attitude** toward hazard analysis within the organization.

Targeted Competencies:

Upon completion, participants will be proficient in:

- **Safety and Risk Management**: Understanding operational safety, risk analysis, and business continuity.
- **People Management**: Developing skills to manage teams focused on safety and reliability.
- **Plant Reliability Enhancement**: Mastering techniques to improve plant reliability and minimize failures.
- **Benchmarking and Auditing**: Conducting benchmarking and quality systems auditing.
- **Decision Analysis**: Applying decision analysis approaches to safety and risk management scenarios.

Course Content:

Unit 1: Hazard Identification

- Importance of **safety engineering** and its role in preventing accidents.
- Notable examples of **major industrial disasters** and lessons learned.
- The **safety system process**: Key components and procedures.
- Methods for **hazard identification** and assessing **tolerability of risk**.
- Hazard control techniques: Designing out hazards in processes and machinery.
- **Safety standards codes** and **national/international standards** governing safety.
- Applying safety analysis to **engineering**, **chemical processes**, and **manufacturing systems**.

Unit 2: Risk Assessment Techniques

- Overview of **safety management** and its integration into the life cycle of systems.
- **Risk assessment checklists** for workplace processes and work equipment.
- Conducting **task-based risk assessments**.
- Introduction to **HAZOP (Hazard and Operability Study)** and its application in risk assessments.

Unit 3: Machinery and Work Equipment Safety

- Identifying **machinery hazards** and methods for preventing machinery accidents.
- Using **HAZOP** in machinery safety analysis.
- Addressing **failure modes** and human factors in safety.
- Conducting a **Failure Mode and Effects Analysis (FMEA)**.
- Analyzing the impact of **human error** on safety and incorporating **human factors** into safety planning.

Unit 4: Reliability Technology

- **Types and causes of failures** in industrial systems.
- Techniques for preventing failure and enhancing system reliability.
- Maintenance and inspection regimes: **preventive, predictive, and corrective maintenance**.
- Evaluating the **reliability of components and systems**, including **control and protective systems**.
- Understanding **HIPS (High Integrity Protective Systems)** and selecting **Safety Integrity Levels (SIL)** for safety-critical systems.

Unit 5: Consequences Analysis

- **Mechanics of fire, explosion, and toxic releases** in industrial environments.
- Using **dispersion modeling software** for fire and toxic gas releases.
- Understanding different types of **fires** (flash, jet, cascading, BLEVE) and **explosions**.
- **Quantification of risk**: Methods and tools to assess potential consequences of hazards.
- Performing **Event Tree Analysis (ETA)** to predict accident sequences and outcomes.