

Safety and Loss Prevention in Petrochemical Plants

Techniques for Risk Assessment and Decision Making

Introduction

“One should always remember danger when you are secure, and remember chaos in time of order. Watch out for danger and chaos while they are still formless, and prevent them before they happen. This is best of all.

So the rule of military operations is not to count on opponents not coming, but to rely on having ways of dealing with them; not count on opponents not attacking, but to rely on having what cannot be attacked”

The Art of War, 6 Century B.C.

Risk is the probability of an undesirable event occurring and the significance of the consequence of what occurred. People tend to perform intuitive (not rigorous) risk management in their lives, using their own beliefs (politics, religion, etc) or experience - a future event will occur this way, because a similar event happened that way in the past. Once established, risk perceptions are hard to change.

Perception of risk needs to be fact-based utilizing logic, not emotion. Perform a systematic analysis of the risks. All projects and tasks have risks and most risks are small and manageable, but the analysis needs to be completed.

Course Objective

This course will guide the participants to develop key concepts and techniques to logically analyze risk assessment and decision-making. These key concepts can be utilized to make operating decisions that can improve your unit’s performance and safety.

Many aspects of operations can be improved including, product recoveries, purities and energy utilization, and safety. This cannot be achieved without first an understanding of basic fundamental principles of risk assessment and decision making. These principles need to be understood in advance of operating and trouble shooting a process unit operation for the operator or problem solving to be effective.

What You Can Expect To Gain;

- Introduction to problem solving and decision making
- Process Safety and Control
- Risk Assessment and Management
- Safety Hazard Analysis
- Introduction to Root Cause Analysis
- Introduction to HAZOP Analysis
- Industry Case Studies

Course Syllabus

This suggested course is five to ten days. The goal of the course would be to refresh the knowledge of those who have a basic understanding of risk management and to build a foundation to those who are new to process operations risk management.

Typical Course Outline

Day 1 – Introduction to problem solving and decision-making

- Introducing the course
- Introduction of creative problem solving
- Vertical and creative thinking contrasted
- The rational problem solving process
- The creative funnel approach

Day 2 – Safety, Environment and Plant Operation (1)

- Petrochemical equipments - overview
- Introduction to process safety and loss prevention
- Hazard identification methods

Day 3 – Safety, Environment and Plant Operation (2)

- Plant operation – refinery processes
- Inherent safety – refinery processes
- Environmental aspect of refinery processes

Day 4 – Process Safety and Control (1)

- Understanding process and instrumentation diagrams
- Hierarchy of safety approach in plant operation
- Basic process control systems
- Case study – refinery processes

Day 5 – Process Safety and Control (2)

- Safety automation
- Alarm and interlocks system
- Relief system
- Case study – refinery processes

Day 6 – Risk Assessment and Management (1)

- Occupational Safety and Health management systems

- HAZOP Fundamental
- Managing HAZOP
- HAZOP case study – furnaces and boilers

Day 7 – Risk Assessment and Management (2)

- Hazard Incident Scenario – case study
- Fault Tree Analysis
- Quantitative Risk Assessment
- Risk Acceptability and Tolerability
- Case study – refinery processes

Day 8 – Problem solving and decision making process

- Situational analysis
- Problem analysis
- Finding root causes
- Case study – refinery processes

Day 9 – Generating alternatives

- Mind mapping
- Fishbone diagrams
- Brainstorming
- Case study – refinery processes

Day 10 – Evaluating and choosing solutions

- Personal judgment
- Systematic decision making
- Potential problem analysis
- Case study – refinery processes