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COURSE BROCHURE

# Advanced Task and Process Risk Analysis Training Course

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Registered in the United Kingdom and Saudi Arabia

# Advanced Task and Process Risk Analysis Training Course

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Task and Process Risk Analysis is the subject of this 2-week advanced training course for process safety engineers, HSE engineers and plant risk analysts, who leave with a plant risk study pack that links job safety analyses to process scenarios, safeguards and risk reduction decisions. Plants still lose people to routine tasks and to process upsets studied by separate teams with separate matrices. Jupiter Prime Training offers this course to join both views.

## Why Task and Process Risk Analysis Matters Now

Three forces shape task and process risk analysis today: ageing plants where maintenance tasks open process equipment, insurers and corporate risk committees that want one ranked list of scenarios, and smaller engineering teams expected to run studies faster. A plant that connects task-level hazards with process deviations spots where a valve isolation, a sampling task or a start-up step can trigger a major event. Keeping them apart leaves gaps between permit desk and study room. The course draws on IEC 61882 Hazard and Operability Studies Application Guide and links findings to ISO 45001 Occupational Health and Safety Management Systems.

## Who Gains Most from Task and Process Risk Analysis

- Engineers who facilitate or scribe process hazard studies across units
- Specialists who run job safety analyses for maintenance, sampling and start-up tasks
- Analysts who calibrate risk matrices and rank scenarios for the risk register
- Engineers who specify and verify safeguards, alarms and protection layers
- Leads who present risk reduction options and residual risk to plant management

The greatest gain comes when a process safety engineer, an HSE engineer and an operations representative from the same plant attend together and agree one shared risk language.

## Task and Process Risk Analysis Capabilities

Participants learn to move from a single task step to a process scenario and back, using one risk matrix and one set of safeguard rules.

- Design a job safety analysis for non-routine plant tasks that interact with process equipment — maintenance planners and permit issuers
- Apply what-if and checklist analysis to small modifications and batch operations — change approvers
- Build bow-tie diagrams that show threats, consequences and degradation factors — operations leaders and auditors
- Calculate scenario frequency with layer of protection analysis and independent protection layers — process safety leads
- Calibrate a risk matrix so task and process scenarios rank on one scale — risk committees
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Weigh risk reduction options against tolerable risk and practicability — plant management and project owners

## Key Task and Process Risk Analysis Terms

- Job safety analysis — a step-by-step review of a task that identifies hazards at each step and the controls needed to perform it safely.
- What-if analysis — a structured brainstorming method that asks what could go wrong at each step or node and records consequences and safeguards.
- Bow-tie diagram — a picture of one top event showing threats and preventive barriers on the left, consequences and mitigating barriers on the right.
- Layer of protection analysis LOPA — a semi-quantitative method that estimates scenario frequency and checks whether independent protection layers reduce it enough.
- Independent protection layer — a safeguard that can stop a scenario on its own, independent of the initiating cause and of other layers.
- Risk matrix — a grid combining likelihood and severity categories to rank scenarios and set the urgency of risk reduction.

## Task and Process Risk Analysis Day by Day

### Day 1: Two Lenses on Plant Risk

- Occupational Versus Process Hazards — Where Plant Fatalities Originate
- Task-Process Interfaces — Maintenance, Sampling and Start-Up Steps
- Risk Study Selection Matrix — Matching Method to Question
- ISO 45001 Hazard Identification Clauses — Linking Task Findings
- Plant Risk Study Pack Scope — Units, Tasks and Scenarios

### Day 2: Job Safety Analysis for Plant Tasks

- Task Breakdown Techniques — Steps Detailed Enough to Analyse
- Energy Source Identification — Pressure, Heat, Chemicals and Motion
- Non-Routine Task Screening — Line Breaking and Vessel Entry
- Control Selection by Step — Hierarchy Applied at Task Level
- JSA Quality Review — Rejecting Generic Task Sheets

### Day 3: What-If and Checklist Methods

- What-If Question Design — Prompts for Batch and Utility Systems
- Checklist Analysis — Using Lessons From Past Incidents
- Combined What-If Checklist — Small Modifications and Temporary Changes
- Session Recording Formats — Consequences, Safeguards and Actions
- Method Limits — When to Escalate to a Full Study

## Day 4: HAZOP Within the Wider Toolkit

- IEC 61882 Study Principles — Nodes, Parameters and Guidewords
- Linking HAZOP Deviations to Task Steps — Shared Causes
- Procedural HAZOP — Start-Up, Shutdown and Changeover Sequences
- Consequence Severity Calibration — Aligning With the Plant Matrix
- Scenario Hand-Over to LOPA — Selecting Candidates

## Day 5: Bow-Tie Barrier Analysis

- Top Event and Hazard Definition — Framing the Bow-Tie
- Threat and Consequence Lines — Building Both Sides
- Preventive and Mitigating Barriers — Testing Barrier Quality
- Escalation Factors and Their Controls — Degradation Paths
- Barrier Ownership and Critical Tasks — Linking Back to Job Safety Analysis

## Day 6: Layer of Protection Analysis

- Initiating Event Frequencies — Selecting Defensible Values
- Independent Protection Layer Criteria — Independence, Effectiveness, Auditability
- Conditional Modifiers — Occupancy, Ignition and Exposure Probability
- Scenario Frequency Calculation — Comparing With Tolerable Targets
- Human Action as a Protection Layer — Credit and Limits

## Day 7: Risk Matrices and Tolerability

- Likelihood and Severity Category Design — Calibration Across Methods
- Tolerable Risk Criteria — Individual and Societal Perspectives
- As Low as Reasonably Practicable Reasoning — Cost and Practicability
- Risk Ranking Consistency — Team Sessions Versus Desktop Reviews
- Matrix Pitfalls — Ceiling Effects and Compressed Categories

## Day 8: Safeguards and Risk Reduction Decisions

- Safeguard Hierarchy for Plants — Inherent, Engineered, Administrative
- Alarm and Operator Response Credit — Time and Clarity Tests
- Option Comparison Sheets — Risk, Cost and Schedule
- Residual Risk Acceptance — Who Signs and on What Basis
- Action Tracking From Studies — Closure Evidence and Verification

## Day 9: Integrating Studies Across the Plant

- Plant Risk Register Structure — One Record per Scenario
- Cross-Referencing JSA, What-If, Bow-Tie and LOPA Records — Traceability
- Management of Change Triggers — When Studies Must Be Revalidated
- Communicating Findings to Operations — Critical Task Briefings
- Study Revalidation Cycles — Ageing Units and Modifications

## Day 10: Practising the Plant Risk Study Pack

- Maintenance Task JSA Linked to a Process Node — Applying Days 2 and 4
- Bow-Tie for a Loss of Containment Event — Applying Day 5
- LOPA Worksheet for the Top-Ranked Scenario — Applying Days 6 and 7
- Risk Reduction Recommendation Peer Challenge — Plant Management View
- Plant Risk Study Pack — Register, Diagrams and Action List

## Applying Task and Process Risk Analysis After the Course

- Select one non-routine maintenance task that opens process equipment, rewrite its job safety analysis and link each step to the matching process node and safeguards.
- Run a layer of protection analysis on the highest-ranked scenario in the unit's risk register and present any protection gap with options to plant management.

## Task and Process Risk Analysis Questions FAQ

### What is task and process risk analysis and why does it matter now?

Task and process risk analysis connects step-by-step job safety analysis with plant methods such as HAZOP, what-if, bow-tie and LOPA. It matters now because many serious plant events start during maintenance or start-up tasks that process studies treat separately.

### Which roles gain most from task and process risk analysis training?

Process safety engineers, HSE engineers and plant risk analysts gain most. You benefit if you facilitate studies, write job safety analyses, rank scenarios or specify safeguards in refineries, petrochemical plants, gas processing or chemical manufacturing.

### How does task and process risk analysis differ from a HAZOP study leadership course?

A HAZOP leadership course focuses on running and recording HAZOP sessions. Task and process risk analysis treats HAZOP as one tool among several, adding job safety analysis, what-if, bow-tie, LOPA and risk matrix calibration to connect task hazards with process scenarios.

### What do you bring back from task and process risk analysis training?

You bring back a plant risk study pack with a linked job safety analysis, a bow-tie diagram, a LOPA worksheet, a calibrated risk matrix and a ranked list of risk reduction actions for your unit.

## Task and Process Risk Analysis: The Way Forward

The plant risk study pack informs the first decision on which scenario needs an added protection layer or a redesigned task before the next turnaround. Process safety engineers, HSE engineers and unit managers use it in risk reviews and change approvals. After its first use, the calibration of the risk matrix and the credit given to operator response deserve a fresh look.