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Quantitative Risk Analysis for Oil and Gas EPC Projects Training Course

12 – 23 April 2027
Dar es Salaam

Quantitative Risk Analysis for Oil and Gas EPC Projects Training Course

Ref: 857_32478 **Date:** 12 – 23 April 2027 **Location:** Dar es Salaam **Fees:** 14000 GBP

Quantitative Risk Analysis for Oil and Gas EPC Projects is a 2-week training course for project managers, risk engineers and project controls specialists who build the probabilistic cost and schedule evidence behind sanction decisions, ending with a QRA contingency report for a live capital project. Engineering, procurement and construction contracts now carry larger, more interdependent exposures, so single-point estimates no longer convince investors or boards. Jupiter Prime Training delivers this course for practitioners who must defend contingency with numbers.

Why Quantitative Risk Analysis for Oil and Gas EPC Projects Matters Now

Three forces shape the subject today. Owners and lenders ask for P50 and P80 confidence levels before releasing capital; EPC contractors price lump-sum bids against supply chain volatility and long-lead equipment slippage; and partners in joint operating agreements expect transparent contingency drawdown. An organisation that quantifies uncertainty well sets realistic budgets, allocates risk to the party best able to carry it and avoids late overruns. One that relies on deterministic estimates discovers its exposure during commissioning, when options are fewest. The course draws on project economics practice and probabilistic thinking familiar from the SPE Petroleum Resources Management System PRMS reserves classification.

Who Gains Most from Quantitative Risk Analysis for Oil and Gas EPC Projects

- Professionals accountable for capital project budgets and sanction submissions
- Specialists who run Monte Carlo cost and schedule simulations
- Planners who maintain integrated project schedules and critical path logic
- Cost engineers who set and track contingency and escalation allowances
- Contract and commercial leads who negotiate risk allocation clauses

Owner project teams and contractor bid teams gain most when their planner, cost engineer and risk lead attend together and share one simulation model.

Quantitative Risk Analysis for Oil and Gas EPC Projects Capabilities

Participants move from listing threats to modelling their combined effect on cost, float and completion dates across EPC phases.

- Build a risk-loaded schedule with probabilistic branches — sanction gate readiness
- Calculate P50 and P80 cost outcomes from correlated estimate ranges — budget approval
- Specify contingency and management reserve by confidence level — owner and lender negotiations
- Weigh lump-sum, reimbursable and hybrid allocation of risk — contract strategy
- Design bow-tie barriers for high-consequence threats — operations and HSE leaders

- Communicate tornado and S-curve results — steering committees and joint venture partners

Key Quantitative Risk Analysis for Oil and Gas EPC Projects Terms

- Monte Carlo simulation — repeated random sampling of uncertain inputs to produce a probability distribution of project cost or finish date.
- P80 confidence level — the value that the simulated outcome stays below in eighty percent of iterations.
- Contingency — an allowance inside the base estimate for known risks whose cost or timing is uncertain.
- Risk-loaded schedule — a project network in which activities carry duration ranges and risk events linked to them.
- Tornado chart — a ranked bar chart showing which inputs drive most of the variation in the result.
- Bow-tie diagram — a picture linking threats, a top event and consequences through preventive and recovery barriers.

Quantitative Risk Analysis for Oil and Gas EPC Projects Day by Day

Day 1: Capital Project Uncertainty in Context

- Stage-Gate Front-End Loading — Timing of Risk Quantification Effort
- Owner Versus Contractor Risk Perspectives — Aligning Analysis Objectives
- Estimate Classes and Accuracy Ranges — Setting Realistic Input Spreads
- Lessons From Overrun Megaprojects — Recognising Systemic Bias Patterns
- Risk Appetite Statements — Choosing Target Confidence Levels

Day 2: Structured Threat and Opportunity Identification

- Risk Breakdown Structure for EPC Scope — Coverage of Engineering and Construction
- Expert Elicitation Sessions — Reducing Anchoring and Optimism in Ranges
- Cause-Event-Effect Statements — Writing Risks That Can Be Modelled
- Opportunity Capture Registers — Balancing Upside Against Downside
- Qualitative Probability-Impact Screening — Selecting Risks for Simulation

Day 3: Probability Distributions and Correlation

- Triangular, PERT and Lognormal Choices — Matching Shape to Evidence
- Three-Point Estimates From Historical Data — Calibrating Ranges Objectively
- Correlation Matrices Between Cost Lines — Avoiding Understated Spread
- Discrete Risk Events With Probability — Modelling Step Changes in Cost
- Escalation and Exchange Exposure Inputs — Treating Market Uncertainty

Day 4: Quantitative Schedule Risk Analysis

- Schedule Health Checks Before Simulation — Logic Quality and Open Ends
- Duration Uncertainty on Critical Activities — Finish Date Distributions
- Probabilistic Branching for Rework — Modelling Failed Tests and Repairs
- Criticality and Sensitivity Indices — Locating True Schedule Drivers
- Merge Bias at Path Convergence — Explaining Hidden Date Slippage

Day 5: Quantitative Cost Risk Analysis

- Line-Item Range Estimating — Simulating Base Estimate Uncertainty
- Risk Driver Method — Linking Cost Ranges to Named Causes
- Time-Dependent Costs From Schedule Outputs — Integrating Delay Into Budget
- Bulk Quantity Growth Factors — Piping, Steel and Cable Allowances
- Cumulative S-Curves — Reading Cost at Each Confidence Level

Day 6: Integrated Cost and Schedule Models

- Joint Confidence Level Analysis — Paired Cost and Date Targets
- Scatter Plots of Iteration Results — Explaining Trade-Offs to Sponsors
- Long-Lead Equipment Delivery Risk — Compressor and Vessel Fabrication Slots
- Weather Windows and Marine Spreads — Offshore Installation Exposure
- Model Validation and Peer Challenge — Defending Results Before Sanction

Day 7: Contingency Setting and Reserve Control

- Contingency Versus Management Reserve — Ownership and Release Authority
- Allocating Contingency to Work Packages — Controlling Drawdown by Phase
- Contingency Burn-Down Curves — Signalling Early Overrun Trends
- Re-Running Simulations at Milestones — Updating Remaining Exposure
- Benchmarking Contingency Ratios — Testing Reasonableness Against Analogues

Day 8: Contractual Risk Allocation in EPC

- Lump-Sum Turnkey Versus Reimbursable Models — Pricing Transferred Exposure
- Liquidated Damages and Caps — Quantifying Contractor Delay Liability
- Change Order and Variation Exposure — Forecasting Claim Values
- Joint Operating Agreement Cost Sharing — Partner Approval of Reserves
- Insurance and Bonds as Transfer Tools — Residual Exposure Decisions

Day 9: Bow-Tie Analysis and Response Planning

- Bow-Tie Construction for Major Hazards — Barrier Ownership Decisions
- Escalation Factors on Barriers — Weak Point Identification
- Response Strategies Avoid, Reduce, Transfer, Accept — Cost-Benefit Selection
- Expected Value of Mitigation Actions — Ranking Spend by Return
- Response Owners and Trigger Points — Embedding Actions in Controls

Day 10: Practising the QRA Contingency Report

- Building a Risk-Loaded Schedule for a Gas Plant — Applying Schedule Methods
- Simulating a Refinery Revamp Estimate — Applying Correlated Cost Ranges
- Drafting Contract Allocation Recommendations — Applying EPC Clause Analysis
- Presenting Tornado and S-Curve Findings — Steering Committee Rehearsal
- Completing the QRA Contingency Report — Sanction-Ready Confidence Recommendation

Applying Quantitative Risk Analysis for Oil and Gas EPC Projects After the Course

- Lead a schedule health check and first Monte Carlo run on a current EPC project, reporting P50 and P80 finish dates to the project director.
- Facilitate an expert elicitation session that converts the existing qualitative risk list into correlated cost ranges and discrete risk events.

Quantitative Risk Analysis for Oil and Gas EPC Projects Questions FAQ

What is Quantitative Risk Analysis for Oil and Gas EPC Projects and why does it matter now?

It is the use of simulation to express project cost and schedule as probability ranges rather than single figures. It matters now because owners, lenders and partners expect contingency to be justified by confidence levels before they commit capital to complex facilities.

Which roles gain most from Quantitative Risk Analysis for Oil and Gas EPC Projects?

Planners, cost engineers, risk specialists and project managers gain most. You benefit if you prepare sanction packages, defend contingency, negotiate EPC risk clauses or run Monte Carlo models for owner or contractor teams in upstream, midstream or refining.

How does Quantitative Risk Analysis for Oil and Gas EPC Projects differ from a general project risk management course?

It focuses on numbers rather than registers alone. A general course covers identification and qualitative scoring; here you build correlated distributions, risk-loaded schedules, joint confidence levels and contingency allocations, and tie them to contract strategy for engineering, procurement and construction delivery.

What do you bring back from Quantitative Risk Analysis for Oil and Gas EPC Projects?

You bring back a structured contingency recommendation built on simulation. It includes a risk-loaded schedule, a cost model with correlated ranges, tornado and S-curve outputs, bow-tie barriers for major threats and a reasoned position on how risk should be shared under the contract.

Quantitative Risk Analysis for Oil and Gas EPC Projects: The Way Forward

The QRA contingency report first informs the confidence level at which a capital project is sanctioned and funded. Project directors, cost engineers and joint venture partners use it to agree budget, float and reserve release rules. After its first use, the perspective worth revisiting is correlation: whether the ranges and links assumed early still reflect the exposure the construction phase reveals.