

CONSEQUENCE & RISK · ADVANCED · 2 DAYS

Quantitative Risk Assessment (QRA) and Risk Criteria

Building, interpreting and defending a QRA for land-use planning, safety cases and design decisions

DURATION
2 days

LEVEL
Advanced

FORMAT
On-site classroom · virtual instructor-led

LANGUAGE
English

MAX. PARTICIPANTS
16

- 1
complete QRA on a live unit
- 2
criteria frameworks compared
- 1
event-tree and F-N workshop

Overview

A QRA is a chain of assumptions with a contour at the end, and the contour is only as defensible as the weakest link. The course covers the CPQRA method end to end — scenario and failure-case selection, failure-rate data, event trees, consequence and vulnerability modelling, individual and societal risk aggregation — and then the part that decides the outcome: risk criteria, ALARP demonstration and how to present results to an authority or a project board. Participants build a QRA for a live unit and defend it in a review.

Learning outcomes

- Scope a QRA to the decision it must support and choose the level of detail
- Select failure cases, hole sizes and frequencies from IOGP, HSE and other data sets
- Build event trees with ignition, weather and mitigation branches
- Calculate location-specific and individual risk, F-N curves and PLL
- Apply UK HSE R2P2, Dutch and site-specific criteria and demonstrate ALARP
- Review a consultant's QRA critically and document the assumptions for revalidation

Who should attend

Process safety and loss-prevention engineers, safety-case and Seveso report authors, project engineers reviewing QRA deliverables from consultants

Course outline

DAY 1

QRA purpose and regulatory drivers · CPQRA method and study scoping · failure-case selection and parts count · failure-rate data sources and their limits · ignition probability and event trees · consequence models and vulnerability criteria

DAY 2

Individual risk contours and occupancy · societal risk, F-N curves and PLL · risk criteria: R2P2, Seveso, IOGP · ALARP demonstration and cost-benefit · QRA on a live unit in CeraImpact · reporting, sensitivity analysis and QRA review checklist

Standards referenced

- CCPS Guidelines for Chemical Process Quantitative Risk Analysis
- UK HSE Reducing Risks, Protecting People (R2P2)
- TNO Purple Book (CPR 18E)
- IOGP Risk Assessment Data Directory (Report 434)
- ISO 17776
- Seveso III Directive

Tools & exercises

QRA built in CeraImpact with event trees and risk contours on the georeferenced site map

What's included

- ✓ Course manual and slide pack
- ✓ Software access for the course
- ✓ Post-course Q&A with the instructor
- ✓ Exercise and case-study pack
- ✓ Competency quiz and certificate
- ✓ Templates used in the exercises

PREREQUISITES

Consequence Modelling Fundamentals (TR-B01) or equivalent; basic probability

CERTIFICATION

Certificate of completion

INSTRUCTORS

Practising engineers — TÜV HAZOP Leader, CCPSC and IEC 61511 Functional Safety certified — with 200+ years of cumulative plant experience.

Book this course or build a custom curriculum

On-site at your plant or virtual · in-house groups · competency assessment included

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