
Blast Resistant Shelters and Control Rooms: Siting Studies, Loads and Retrofit Training Course

2 – 6 May 2027
Kuala Lumpur





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Programme Summary

Blast resistant shelters and control rooms are the subject of this one-week training course on blast resistant buildings for project managers, process safety leads and facility managers, ending in a building protection plan for one site. Occupied buildings in hazardous plants must be sited and protected on evidence about explosion scenarios, not habit. The programme links siting studies, blast load definition, protection choices and building retrofit, then applies each tool to one site. Mars Training Centre UK delivers this programme on blast resistant buildings to mixed-organisation cohorts.

The Business Case

Control rooms, offices and shelters near process units hold people who depend on the building holding under an explosion. Leaders who can read a siting study, question the assumed loads and compare relocation with hardening make better decisions on spending and occupancy, and give boards a clear account of residual risk.

- Occupant Exposure: Falls as buildings are screened for occupancy and explosion scenarios and moved or protected.
- Protection Spend: Is directed to the buildings with the highest risk as options are compared.
- Design Rework: Reduces as design briefs state load cases and performance criteria clearly.

Principles and Evidence Base

- API RP 752 on managing hazards from the location of permanent buildings in process plants: It guides the siting study outline in Session 1.
- API RP 753 on portable buildings: It guides the portable building checklist in Session 1.
- ASCE Design of Blast-Resistant Buildings in Petrochemical Facilities: It frames the performance criteria and building response work in Sessions 2 and 3.
- Risk-based screening of occupied buildings: It underpins the occupant risk matrix and the retrofit comparison in Sessions 1 and 4.

Intended Participants

- Project and design managers who prepare briefs for new or modified occupied buildings.
- Process safety and health, safety and environment leads who own siting studies and occupant risk.
- Facility and asset managers who decide on relocation, hardening or retrofit.
- Structural and civil engineering leads who review blast load assumptions and building response.
- Operations leaders who decide who works in which building.

Typical sectors include upstream oil and gas, refining, petrochemicals and chemical manufacturing.



Learning Outcomes

1. Participants will be able to screen occupied buildings for explosion exposure using occupancy and scenario data.
2. Participants will be able to construct a blast load definition worksheet with stated assumptions.
3. Participants will be able to evaluate building element response against performance criteria.
4. Participants will be able to compare relocation, hardening and retrofit options by risk and cost.
5. Participants will be able to justify a design brief for a blast resistant building.
6. Participants will be able to present a building protection plan for one site.

Programme Structure

Day 1: Explosion Hazards and Facility Siting Studies

How do explosion scenarios and occupancy decide where occupied buildings can stand?

- Facility Siting Study Outline under API RP 752
- Explosion Scenario Register
- Building Occupancy Count Sheet
- Occupant Risk Screening Matrix
- Portable Building Siting Checklist under API RP 753

Day 2: Blast Loads and Building Response

How are blast loads defined and what do they demand of a building?

- Blast Load Definition Worksheet
- Overpressure and Impulse Reading Guide
- Building Element Response Table
- Performance Criteria Matrix from ASCE Design of Blast-Resistant Buildings in Petrochemical Facilities
- Load Case Assumptions Log

Day 3: Protection Choices and Design Briefs

How are relocation, hardening and layout compared and written into a design brief?

- Relocation Versus Hardening Options Table
- Control Room Layout Principles Sheet
- Shelter and Egress Review Form
- Door, Window and Wall Specification Notes
- Design Brief Outline for Blast Resistant Buildings



Day 4: Retrofit of Existing Buildings and Design Assurance

How are existing buildings screened, strengthened and checked?

- Existing Building Screening Form
- Retrofit Option Cost and Risk Comparison
- Strengthening Measures Reference Table
- Change Control Review Sheet
- Design Review Checklist

Day 5: Applying the Tools to One Site

Do the siting, load, protection and retrofit tools hold together for one site?

- Applying the Session 1 Siting Outline to the Site
- Testing the Session 2 Load Worksheet on Sample Data
- Comparing the Session 3 Options for Two Buildings
- Screening Buildings with the Session 4 Form
- Completing the Building Protection Plan

Methodology

The programme uses a structured exercise method built on anonymised site layouts, occupancy tables, scenario summaries and short written cases from refineries, upstream facilities and chemical plants. Participants work in small groups on one site, defend their choices to peers from other functions and receive facilitator feedback on every screening result, load assumption and option comparison.

- Suggested activity: Screening six buildings on a site layout and ranking them by occupant risk.
- Suggested activity: Listing the assumptions behind a given blast load and challenging each one.
- Suggested activity: Comparing relocation and retrofit for one control room.

Capstone Output

Each participant completes a building protection plan for one site. It holds a siting screen, an occupant risk ranking, a load assumptions log, an option comparison and a design brief outline for the highest priority building. The plan is used at work to brief management, plan studies and commission design work.

Frequently Asked Questions

Is training in blast resistant buildings suitable for managers who are not structural engineers?

Yes. The programme assumes familiarity with plant operations and project work, and builds blast resistant buildings practice from siting studies, occupancy and explosion scenarios.



Which references do blast resistant buildings rest on in this programme?

They rest on API RP 752 for permanent building siting, API RP 753 for portable buildings and the ASCE publication on blast-resistant buildings in petrochemical facilities.

How is the blast resistant buildings protection plan used at work?

You use it to brief management, plan siting and engineering studies and commission design work for your own site.

How does learning blast resistant buildings differ from a programme on process safety management?

It centres on siting, blast loads and building protection, while process safety management centres on management systems for hazards across the whole plant.