

Designing of Blast Resistance Buildings

Training program

Why Choose this Training Course?

This Design Blast Resistance Buildings for Oil & Gas Field training course will focus about the phenomena of blast load, the dynamic material strength, in addition to the concrete and steel structure design to resist the ballast load. The dynamic analysis technique will be presented, as well as the new materials as CFRP to be used to protect the structure from the blast load. The course content relies heavily on the recently revised ASCE publication for the Design of Blast Resistant-Buildings in Petrochemical Facilities. The design management procedure for industrial projects will be clarified and the entire load that affects the structure building in oil and gas facilities will also be illustrated.

This training course will feature:

- The concrete and steel structure design principal in selecting the suitable structure system
- The materials response and characteristics
- The CFRP design principal to resist the building against the blast load
- The integrity management system procedure, taking into consideration the major factors in design, construction and repair to maintain the concrete structure economically in all its lifetime

Who is this Training Course for?

training course is designed for and will greatly benefit:

- Construction Civil Engineers
- Construction Structural engineers
- Junior and Senior Structural Engineers
- Project Engineers
- Engineering Managers

What are the Goals?

- Familiarity with any problem and its solution in the concrete structure in the petrochemical industry and its causes of failure
- Familiarize participants with the issues, standards, and procedures used to design structures that resist blast loads.
- Provide participants with in-depth knowledge of the principles of dynamic analysis.
- Develop basic competence in the use of available engineering methods for calculating blast loads and dynamic structural response.
- Provide an overview of the design approach used for typical construction materials (steel, concrete, masonry), Systems (shear walls and frames), non-structural components (doors and windows)

Course Outline:

Day One: Loads in Different Design Codes

Competency Description: As an engineer, you need to loads that affect the structure in general.

Key Behaviors

- Understand all the load affects the structure members.
- Understand the difference between the codes in design the members
- Understand the phenomena of blast load

Topics to be covered

- Design Management process
- Control the design of the industrial projects
- Define the load on the industrial structure
- BS and ACI code in the design of concrete

Day Two: Characteristics of Blast Load

Competency Description: As an engineer, you need to know first the characteristic of blast load and how to calculate it.

Key Behaviors

- Understand all the blast load affects the structure members.
- Understand the behavior of structure under blast
- Understand the progressive collapse

Topics to be covered

- Reason for blast load
- Blast load effect and calculation
- Pressure Vs time Characteristic
- Load combination with blast load
- Joints ductility/response to blast loads
- Special detailing of Blast Resistant structures
- Fragment impact, positive/negative phase duration.
- The behavior of structural members/damages forecast.
- Progressive collapse.

Day Three: Materials Behavior under Blast Load

Competency Description: As an engineer, you need to know the behavior of the materials that are affected by blast load.

Key Behaviors

- Understand the dynamic materials effect.
- Understand the deformation limits for the structure under blast load
- Understand the evaluation of existing building

Topics to be covered

- Dynamic material strength
- Materials and structure element type.
- Dynamic materials
- Deformation limits
- Dynamic increase factor
- Elastic, Elasto-Plastic & Plastic deformation due to blast loads
- Inspection and maintenance plan
- Evaluation of existing structure

Day Four: Case Study Workshop

Competency Description: As an engineer, you need to know first the dynamic analysis calculation for building under blast load.

Key Behaviors

- Understand the dynamic analysis of the building.
- Understand the design of building to resist blast load
- Understand the main element of steel structure design under blast load.

Topics to be covered

- Dynamic analysis method
- Design procedure
- Typical detail for the connection
- Upgrade existing building
- Workshop for case study concrete structure
- Workshop for steel structure
- Construction precaution to achieve design requirement

Day Five: Using CFRP for Blast Resistance

Competency Description: As an engineer, you need to know the up-to-date application to resist the building for blast load.

Key Behaviors

- Understand CFRP to withstand blast load.
- Understand the precaution in control room design
- Understand the ways of protecting the existing building.

Topics to be covered

- The inspection and monitoring procedure to control the construction
- CFRP principal and design
- Doors and walls resistance specs to resist blast load
- Advanced materials for protection
- Precaution in control room design