



Designing of Blast Resistant Buildings  
for Oil, Gas & Petrochemical Plants



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## Introduction

This training will concentrate on dynamic material strength, the phenomenon of blast load, as well as the design of concrete and steel structures to withstand the ballast load. The novel materials, such as CFRP, that will be utilized to shield the structure from the blast load will also be discussed along with the dynamic analysis approach. The freshly updated ASCE publication on the Design of Blast Resistant-Buildings in Petrochemical Facilities is largely used in the material of this training course in civil and construction engineering. Clarification of the design management process for industrial projects will be provided, along with an illustration of the total load that impacts the structure building in oil and gas facilities. This training course will employ several tried-and-true learning approaches to achieve optimal absorption, comprehension, and memory of the knowledge delivered. This course will cover the following topics:

- The concrete and steel structure design principles are important in determining the best structure system.
- The reaction and properties of the material
- The CFRP design principle was used to protect the structure from blast damage.
- The integrity management system technique takes into account the primary aspects of design, building, and maintenance to economically maintain the concrete structure during its lifetime.

## Targeted Groups

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

## Targeted Competencies

- Bring down costs by learning the most cost-effective technique to construct blast protection structures.
- Improving organizational structure behavior with cutting-edge technology will be discussed, and its application in real-world projects will be shown.
- Reduce the cost of structure failure using new building design ideas.
- Protect the organization's investment by providing a building that can sustain a blast load.

## Course Objectives

- Familiarity with every problem and its remedy in the petrochemical industry's concrete structure, as well as its failure, causes
- Familiarize participants with the concerns, standards, and processes used to design blast-resistant buildings.
- Give participants a thorough understanding of the fundamentals of dynamic analysis.
- Develop fundamental skills in the use of existing engineering methodologies for estimating blast loads and dynamic structure reactions.

- Give an overview of the design technique utilized for common building materials steel, concrete, masonry, systems shear walls and frames, and non-structural components doors and windows

## **Course Content**

### **Unit 1: Loads with Various Design Codes**

- Controlling the Industrial Projects' Design through the Design Management Process
- Set the Industrial Structure's Load Conditions
- Concrete Design Using BS and ACI Code

### **Unit 2: Blast Load Characteristics**

- Blast Load cause
- Calculation and Effect of Blast Load
- Time vs. Pressure Combination of Characteristic Load and Joints Under Blast Load Ductility and Blast Load Response
- Blast-Resistant Structures: Special Detailing
- Impact of the Fragment, Positive/ Negative Phase Duration
- Damages and the behavior of structural members envisioned progressive collapse

### **Unit 3: Materials Behavior under Blast Load**

- Dynamic Material Strength Materials and Structure Type of Element Dynamic Materials
- Limits to Deformation
- Factors of Dynamic Increase
- Deformation of Elastic, Elasto-Plastic, and Plastic under Blast Loads
- Evaluation of the Existing Structure's Inspection and Maintenance Plan

### **Unit 4: Case Study Workshop**

- Dynamic Analysis Method Design Process
- Typical Connection information
- Workshop to Modernize Existing Buildings for a Case Study Workshop for Concrete Structures in Steel Structure Construction to Meet Design Requirements

### **Unit 5: Blast Resistance Using CFRP**

- The Inspection and Monitoring Procedure to Control the CFRP Construction Principal and Design Walls and Doors
- Advanced Materials for Protection
- Precaution in Control Room Design: Blast Resistance Specs