

# Industrial Building Designs and Renovation

## INTRODUCTION

- This Industrial Building Designs and Renovation training seminar is a must for civil engineers working in various industries like oil & gas, power plants, water treatment plants and industrial factories projects. Participants of this workshop will gain advanced knowledge of analysis and design of steel / concrete structures, foundations and basic principles of structures renovation.
- This training course will provide sample illustration of real structures that will assist the designer to understand design methodologies and apply it on different types of buildings. The examples to be used would vary from the typical two-dimensional beams and frames to the three-dimensional multistory frames to special systems such as space frames. This training seminar will present methods for inspection and evaluation of buildings, investigate the causes of structure deterioration and methods of renovation.

This training seminar will highlight:

- Selecting a suitable structural system and preparing the general layout
- Applying Loads & Load combinations as per IBC / UBC / ASCE
- Analysis and design of industrial buildings
- Methods of Structure Investigation
- Methods of Structure Renovation
- Materials to be used in Concrete / Steel Structures Repair

## OBJECTIVES

At the end of this training seminar, you will learn to:

- Determine the most convenient geometry, structural system and layout
- Use the American codes to calculate applied loads and load combinations
- Applying loads to structural models as per ASCE / IBC / UBC
- Analyze and Design steel/concrete industrial buildings as per AISC [ASD / LRFD]
- How to investigate & assess industrial building conditions
- Decide appropriate renovation methodologies

## TRAINING METHODOLOGY

- This Concrete Structure Designing for Industrial Projects training seminar will utilise a variety of proven adult learning techniques to ensure maximum understanding, comprehension and retention of the information presented. Daily workshops will be highly interactive and participative, videos and photos will be used for illustration.

## ORGANISATIONAL IMPACT

- Find out which structural systems are typically used in industrial buildings
- Explore the complexities of using various crane systems in industrial buildings
- Work through a number of design examples illustrating practical solutions for various facets of the design for new construction and renovation
- Explore common types of foundations for gable rigid frame structures made of structural steel, metal building systems, or concrete
- Find out how to design foundations for process equipment typically found in industrial buildings
- Anchorage to concrete and embedment
- Learn how to increase load-carrying capacities of beams and frames

## PERSONAL IMPACT

Participant will have an understanding on:

- The common practical challenges in the design of industrial buildings
- The design for new construction, including typical framing systems, design of crane runway beams and crane supports
- Foundations for building structures and equipment, anchors and embedment
- Renovation and strengthening of industrial buildings
- Vertical loads, wind, seismic retrofit, and foundation strengthening
- The issues of building expansion and rehabilitation of the building envelope

## WHO SHOULD ATTEND?

- This training seminar is designed for civil engineers and professionals working in industrial fields of oil & gas, power plants, water treatment plants and industrial factories projects who are involved in building analysis, design and/or renovation.

This training course is suitable to a wide range of professionals but will greatly benefit:

- Design Engineers
- Consultant Engineers
- Contractor Engineers
- Engineering Services Companies
- Construction Engineers

## Course Outline

### Introduction to American Codes, Creating Cost-effective Geometry Calculation of Loads and Load Combinations

- Introduction to American Codes and How to Use Them
- Creating Structural Layout
- Design Criteria
- Dead Load / Live Load and following loads in details
- Seismic Loads, Sources, Standards, Procedures Used to Derive Seismic Load, Load Resisting System, Design Approach and Detailing Requirements
- Wind Loads - Definition and its controlling factors, standards and procedures used to derive wind load, load resisting system, Basic knowledge of wind flow around buildings / structures and obtaining the design data and parameters in the calculation of wind loads
- Load combinations [ASD / LRFD]

### Design of Steel Industrial Buildings

- Design of Pipe Racks
- Steel Frames
- Purlins and Side Girt
- Crane Girders
- Bracing Systems
- Base Plates & Anchor Bolts



### Design of Concrete Industrial Buildings

- Concrete Slabs Design
- Design of Concrete Beams for Shear and Torsion
- Design of Concrete Columns
- Design of Concrete Stairs
- Foundations (Shallow & Deep)
- Design of Frames
- Design of Foundations for Vibrating Equipment
- Design of Tanks Foundation
- Liquid / Earth Retaining Structures

### Building Evaluation

- Methods of Inspection and Evaluation of industrial Buildings
- Visual Inspection Criteria
- Ultrasonic and Infrared
- Concrete Cracks Types
- Corrosion Phenomena
- Selecting the Materials Repair

## Methods of Industrial Buildings Renovation

- Reasons for Renovating Industrial Buildings
- Using CFRP for Structure Strengthening
- Building Expansion
- Strengthening of Primary Framing for Vertical Loads
- Structural Steel
- Metal Building Systems
- Concrete
- Wind and Seismic Retrofit
- Foundation Strengthening
- Renovation of Slabs on Grade
- Adding New Equipment into Existing Buildings
- Strengthening Anchors and Embedment

