TRAINING TITLE
STRUCTURAL ENGINEERING

Training Duration
5 day

Training Venue and Dates

Ref. No. OE202	**Structural Engineering**	**5**	**18-22 Aug. 2025**	**$5,500**	**DUBAI, UAE**

In any of the 4 or 5-star hotels. The exact venue will be informed later.

Training Fees

- **$5,500 per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Lunch**

Training Certificate
Define Management Consultants Certificate of course completion will be issued to all attendees.

TRAINING DESCRIPTION
An advance in structural engineering provides a major publication channel for research in the area of structural engineering and an international forum for the exchange of innovative ideas. It covers all aspects of the analysis, behavior, design and construction of civil engineering structures such as buildings, bridges, towers and masts, storage structures, and offshore platforms. The different between codes and standard will be discussed. The advanced reliability method and structure life time expectation will be discussed.

This course presents the basic concepts and principles of advanced techniques in structural engineering. Characteristics of reinforced concrete, advanced concrete additives, and modern materials used to increase the strength and bonds of reinforced concrete will be covered. Properties and use of fiber reinforced polymers, carbon-FRP and glass FRP polymers are presented. Repair schemes using FRP for reinforced concrete slabs and concrete columns are reviewed. Stress-Strain model of Rectangular Concrete Columns Confined by FRP and seismic structural analysis for different repair schemes using FRP are also covered are also covered.

The dynamic analysis and building resistance to explosion and blast will be discussed in detail.

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TRAINING OBJECTIVES

Toward the end of the session, participants will be able to understand:

- Recognize and understand the engineering properties of materials used in the construction
- Select the appropriate technique to achieve particular design goals
- Understand the advantages, disadvantages and limitations of such techniques
- Create informed design decisions to select materials for enhancing the structural performance, serviceability and durability of such structural designs
- The difference between codes such as ACI, BS, EC,..etc.
- Identify the basic properties of reinforced concrete, advanced additives, and modern reinforced concrete materials and the basic properties of the fiber-reinforced polymers FRP
- Enumerate the different types of concrete members using FRP
- Explain the behavior of rehabilitated reinforced concrete structures and the selective rehabilitation scheme of reinforced concrete structures
- Advanced structure inspection technique
- Blast resistance building

WHO SHOULD ATTEND?

This course is intended for construction engineers, maintenance engineers, design structural engineers, supervision engineers, and planners. It is also suitable for civil and structural engineers whose work is related to reinforced concrete design and repair. Hence, this course can be potentially useful to those responsible for Reinforced Concrete Structures Rehabilitation by FRP.

TRAINING METHODOLOGY

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions and motivating everybody to find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

Very useful Course Materials will be given.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work& Practical Exercises

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- 20% Videos& General Discussions

COURSE PROGRAM:

Concrete Materials

- Properties of concrete in fresh and hardened states
- Specifications
- Mix design
- Testing techniques
- Strength and deformation under generalized stress states
- Deterioration mechanisms

Reinforced Concrete 1

- Codes and standards
- Reliability methods
- Design for bending and combined bending and axial force
- Design and behavior of continuous beams
- Deflections
- Design of building structures

Pre-stressed Concrete

- Design for bending and combined bending and axial force
- Design and behavior of continuous beams
- Deflections
- Design of building structures

Principal Structural Dynamics

- Dynamic loads
- Single-degree-of-freedom models
- Free-vibration: natural frequency, initial conditions, maximum displacements and internal forces, effect of damping, motion caused by collision or impact
- Forced vibrations: dynamic magnification factor and response spectra; harmonic loading and resonance, short-duration pulse loads, maximum displacements and internal forces
- Multi-degree-of-freedom models
- Free vibrations: mass and stiffness matrices, natural frequencies and natural modes
- Principal of blast resistance building

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- Blast and explosion in oil and gas plant

Plastic Analysis of Framed Structures

- Ductility in reinforced concrete beam-columns
- Interaction between bending moment and axial force
- The plastic hinge concept and plastic hinge rotation capacity
- Plastic limit analysis of framed structures and the collapse load factor
- The mechanism method
- Rate of work and rate of plastic energy dissipation; load factor required to mobilize a given mechanism
- The mechanism method of calculating the collapse load factor as a linear program
- Static description of the structure prior to collapse

Steel Components

- Introduction to design philosophy, structural analysis and basis of codes of practice
- Design of steel components: local buckling, cross-section classification, design of tension members, compression members, beams and beam-columns
- Design of steel connections: general consideration of bolts and welds, analysis and design of connections
- Elastic stability of discrete systems: potential energy and equilibrium approaches, degree of freedom (DOF), non-linear responses, bifurcation and limit points, imperfection sensitivity

Nonlinear Structural Analysis and PUSHOVER analysis

- Sources of non-linearity is structural behavior
- Geometric non-linearity: buckling, large displacements
- Large displacement analysis of framed structures
- Non-linear solution procedures
- Material non-linearity
- Dynamic analysis: explicit and implicit time integration schemes
- Project related to a practical non-linear structural analysis problem
- Blast resistance building
- Theories are then introduced to predict the service life behavior of
- Application of the methods to design precise pre-stressed concrete composite bridges is made
- Inspection technique for concrete structure

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- Inspection technique for steel structure
- Modern Materials used to Increase the Strength and Bonds of Reinforced Concrete
- Advanced Concrete Additives
- FRP Types and properties
- Repair Schemes for Reinforced Concrete Slabs, beams and columns
- New inspection technique

NOTE:
Pre-& Post Tests will be conducted.
Case Studies, Group Exercises, Group Discussions, Last Day reviews, and assessments will be carried out.

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