

Strengthening Reinforced Concrete Structures

Duration: 5 Days

Language: en

Course Code: IND13-110

Objective

Upon completion of this course, participants will be able to:

- Explore the distinctions between structural strengthening and stabilisation.
- Compare and contrast flexural strengthening with shear strengthening techniques.
- Elaborate on the failure methods of walls, risk management identification methods and various approaches to fortification.
- Differentiate between joints and connections within structural elements.
- Understand the concept of cathodic protection in the context of concrete structures.
- Establish connections between laboratory studies and field observations in the realm of cathodic protection.
- Draw distinctions between service life modelling and the estimation of residual service life.
- Engage in a comprehensive discussion on cathodic protection and its correlation with service life estimation.
- Identify and analyse the various factors that influence the service life of concrete structures.

Audience

This course is designed for anyone responsible for the planning or reinforcing concrete structures. It would be most beneficial for:

- Construction Workers
- Engineers
- Architects
- Technicians
- Enovation Workers
- Estate Agents
- Maintenance Managers
- Civil Engineers
- Project Planners

Training Methodology

This course uses a variety of adult learning styles to aid full understanding and comprehension. Participants will review the benefits of reinforced concrete structures and understand the dangers of allowing them to linger without repair. They will work together on project management tools and assessment criteria to determine how to monitor a structure's safety elements.
They will also view trainer-led presentations to understand the varied types of repair materials, when to use them, and how to monitor the success rate of any repairs made to retain a safe and secure environment for workers and the general public.

Summary

Strengthening reinforced concrete structures is a critical engineering practice to enhance the integrity, durability, and load-bearing capacity of existing buildings and infrastructure. Over time, factors such as environmental exposure, ageing, increased usage, or changes in design codes can lead to deterioration or insufficient structural performance.

Strengthening measures involve adding additional materials, such as fibre-reinforced polymers (FRP), steel plates, or carbon fibre, to reinforce and fortify the existing concrete

elements. They ensure the safety of occupants and the public by preventing structural failures and collapses. They also extend the service life of structures, minimising the need for costly replacements or extensive repairs.

Additionally, strengthening reinforced concrete structures aligns with sustainable practices. It promotes resource conservation by maximising the utility of existing infrastructure. It also ensures the longevity of a structure, contributing to the sustainability of the local environment.
Understanding the concepts and importance of reinforced concrete structures is essential for those in the construction, engineering or planning industries to maintain the highest level of safety and security for employees and the public.

Course Content & Outline

Section 1: The Importance of Concrete Reinforcement

- Types of reinforcement materials and their properties.
- Principles of reinforced concrete for durability and stability
- considerations for different types of structures (buildings, bridges, etc.).
- Reinforcement detailing and design specifications.
- The impact of environmental factors on concrete durability.
- Quality control measures in concrete reinforcement.
- Construction practices for effective reinforcement implementation.

Section 2: Identifying & Mitigating Risk Elements

- Site assessment and geological considerations.
- Evaluating design and structural risks.
- Environmental factors impacting concrete structures.
- Quality control measures to mitigate construction risks.
- Identifying and addressing material-related risks.
- Assessing risks associated with construction processes.
- Monitoring and mitigating risks during the curing period.
- Impact of temperature and climate on concrete structures.
- Incorporating redundancy and resilience in design for risk mitigation.

Section 3: Flexural Vs. Shear Strengthening Techniques

- Fibre-reinforced polymers (FRP) for flexural enhancement.
- Externally bonded reinforcement in flexural strengthening.

- Use of steel plates and laminates in flexural strengthening.
- Principles of shear strengthening in structural elements.
- Externally bonded shear reinforcement techniques.
- Use of shear reinforcement with FRP materials.
- Steel-based shear strengthening strategies.
- Combining flexural and shear strengthening for comprehensive solutions.

Section 4: Cathodic Protection & Repair Materials

- Concrete repair materials and techniques.
- Composite materials for structural repair and strengthening.
- Corrosion-resistant materials for long-term durability.
- Addressing challenges in material compatibility and adhesion.
- Quality control measures in the application of repair materials.
- Sustainable and environmentally friendly repair material options.

Section 5: Health & Safety Factors & Governance

- Ergonomics and injury prevention in reinforcement activities.
- Environmental considerations and waste management.
- Respiratory hazards in concrete reinforcement.
- Fall protection measures in elevated reinforcement work.
- Workplace hygiene and sanitation in concrete construction.
- Equipment safety in concrete construction and reinforcement.
- Personal protective equipment (PPE) for reinforcement workers.

Section 6: Field Testing Essentials

- Field testing for durability and corrosion assessment.
- Measuring and monitoring concrete moisture content.
- The integrity of post-tensioned concrete structures.
- In-situ testing for assessing concrete structural performance.
- Non-destructive testing techniques for concrete quality assessment.
- Evaluating concrete strength through field testing methods.
- Detecting and assessing concrete defects and deterioration.

Certificate Description

Upon successful completion of this training course, delegates will be awarded a Holistique Training Certificate of Completion. For those who attend and complete the online training course, a Holistique Training e-Certificate will be provided.

Holistique Training Certificates are accredited by the British Assessment Council (BAC) and

The CPD Certification Service (CPD), and are certified under ISO 9001, ISO 21001, and ISO 29993 standards.

CPD credits for this course are granted by our Certificates and will be reflected on the Holistique Training Certificate of Completion. In accordance with the standards of The CPD Certification Service, one CPD credit is awarded per hour of course attendance. A maximum of 50 CPD credits can be claimed for any single course we currently offer.

Categories

Construction & Real Estate, Engineering, Project Management

Tags

Reinforced Concrete Structure, Reinforced Concrete

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