High-Rise Construction and Structural Systems Management Training Course

14 - 18 Dec 2026

Cape town

4600 € (Per Person)

Ref: #CON2473_271980

Course Introduction / Overview:

The design and construction of high-rise buildings represent the pinnacle of civil engineering and architectural ambition, demanding a sophisticated integration of structural theory, material science, and project management. This course provides a comprehensive exploration of the entire lifecycle of tall building projects, from initial geotechnical investigations to advanced construction techniques and long-term structural health monitoring. Participants will delve into the complex forces that govern skyscraper design, such as wind and seismic loads, and learn to analyze the performance of various structural systems. Drawing on the foundational principles established by pioneers like Dr. Fazlur Rahman Khan, whose innovations in tube structural systems revolutionized modern skyscraper design, this program bridges theory with practice. We will explore concepts discussed in seminal texts like "Tall Building Structures: Analysis and Design" by Bryan Stafford Smith and Alex Coull, ensuring a robust academic underpinning. At BIG BEN Training Center, this course is meticulously structured to equip professionals with the critical skills needed to manage the unique challenges of vertical construction, ensuring safety, efficiency, and sustainability in these monumental projects.

Target Audience / This training course is suitable for:

- Structural Engineers.
- Civil Engineers.
- Construction Project Managers.
- Architects and Architectural Engineers.
- Site Managers and Supervisors.
- Geotechnical Engineers.
- Facade Engineers.
- MEP (Mechanical, Electrical, and Plumbing) Engineers.
- Urban Planners and Developers.
- Building Inspectors and Code Enforcement Officers.
- Quantity Surveyors.

Target Sectors and Industries:

- Real Estate Development.
- Construction and Contracting.
- Engineering Consulting Firms.
- Architectural Design Firms.
- Governmental bodies such as Municipalities, Public Works, and Urban Planning Authorities.
- Materials Manufacturing and Supply.
- Geotechnical and Environmental Services.
- Project Management Consultancies.

Target Organizations Departments:

- Engineering and Design.
- Construction Management.
- Project Management Office (PMO).
- Planning and Development.
- Health, Safety, and Environment (HSE).
- Quality Assurance and Quality Control (QA/QC).
- Contracts and Procurement.
- Facilities Management.

Course Offerings:

By the end of this course, the participants will have able to:

- Analyze the impact of lateral loads, including wind and seismic forces, on tall structures.
- Evaluate the suitability of various structural systems for different high-rise building applications.
- Understand the principles of foundation design for skyscrapers, including deep piles and raft foundations.
- Assess advanced construction materials like high-strength concrete and composite steel.
- Implement effective project management and logistical strategies for complex urban construction sites.
- Integrate Building Information Modeling (BIM) into the design and construction workflow.
- Develop strategies for ensuring fire safety and vertical transportation efficiency in tall buildings.
- Apply principles of sustainable design and green building technologies to high-rise projects.
- Manage construction site safety protocols specific to vertical construction environments.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to be immersive, interactive, and directly applicable to professional practice. This course moves beyond traditional lectures to foster a dynamic learning environment where participants actively engage with complex material. Central to our approach are real-world case studies of iconic high-rise buildings, allowing for in-depth analysis of their design challenges, structural systems, and construction innovations. Interactive sessions, group discussions, and problem-solving workshops will encourage collaborative learning and the exchange of professional experiences. Participants will work in teams on simulated project scenarios, tackling everything from initial structural system selection to developing a construction logistics plan for a constrained urban site. Practical exercises will reinforce theoretical concepts, while expert-led feedback sessions provide personalized guidance. This hands-on approach ensures that attendees not only grasp the engineering principles but also develop the critical thinking and managerial skills necessary to lead high-rise construction projects successfully from conception to completion.

Course Agenda (Course Units):

Unit One Introduction to High-Rise Buildings and Structural Concepts

- Introduction to the history and evolution of tall buildings.
- Defining high-rise, skyscraper, and supertall structures.
- Key challenges in high-rise design and construction.
- Overview of gravity and lateral load-resisting systems.
- Introduction to building codes and standards (ASCE 7, CTBUH guidelines).
- The role of the structural engineer, architect, and project manager.
- Preliminary site assessment and feasibility studies.

Unit Two Structural Systems and Lateral Load Analysis

- In-depth analysis of braced frames and rigid frames.
- Understanding shear walls and core wall systems.
- Exploring advanced systems like outriggers, belt trusses, and tube structures.
- Principles of wind engineering and wind tunnel testing.
- Fundamentals of seismic design and performance-based engineering.
- Computer-aided structural analysis and modeling concepts.
- Load path and distribution in complex high-rise structures.

Unit Three Foundation, Materials, and Facade Engineering

- Geotechnical investigation and soil-structure interaction.
- Design of deep foundations, including piles and caissons.
- Mat and raft foundation systems for tall buildings.
- Properties and applications of high-strength and self-compacting concrete.
- Advanced structural steel and composite construction.
- Introduction to facade engineering and curtain wall systems.
- Cladding materials, performance requirements, and testing.

Unit Four Construction Management and Technology

- Project planning, scheduling, and logistics for high-rise construction.
- Advanced formwork systems (slip-form, jump-form).
- High-capacity cranes and vertical material handling.
- Building Information Modeling (BIM) for coordination and clash detection.
- Construction safety management and risk mitigation on tall structures.
- Quality control and assurance protocols for high-rise projects.
- Managing construction in dense urban environments.

Unit Five Advanced Topics, Sustainability, and Future Trends

- Integration of MEP systems and vertical transportation design.
- Fire safety engineering and evacuation strategies in tall buildings.
- Sustainable design, LEED certification, and green building technologies.
- Structural health monitoring and building maintenance units (BMU).
- The concept of the digital twin for lifecycle management.
- Innovations in materials science and construction automation.
- Future trends in skyscraper design and smart building technology.

FAQ:

Qualifications required for registering to this course?

There are no requirements.

How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

Something to think about:

As urban density increases and material science evolves, how might the fundamental structural typologies of high-rise buildings change in the next 50 years?

What unique qualities does this course offer compared to other courses?

This course distinguishes itself through its holistic and integrated approach, bridging the critical gap between structural engineering theory and the practical realities of construction management. While many programs focus narrowly on design analysis, this training provides a comprehensive 360-degree view of the entire high-rise project lifecycle. We delve into the intricate interplay between architectural vision, structural integrity, geotechnical constraints, and construction logistics, which is essential for successful project delivery. The curriculum is built upon a foundation of real-world case studies, moving beyond abstract concepts to dissect the successes and challenges of iconic global projects. Participants will not just learn about outrigger systems; they will analyze how they were implemented in specific skyscrapers to solve complex wind load problems. This emphasis on practical application, combined with forward-looking modules on sustainability, BIM integration, and smart building technologies, ensures that graduates are equipped not only with current best practices but also with the foresight to navigate the future of vertical urban development.