QUEST
Professional Center

PROFESSIONAL TRAINING COURSE

Course No. 1541

Structural Analysis Using STAAD.Pro Training Course

CIVIL & STRUCTURAL ENGINEERING
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION
5 Days

DELIVERY
Classroom

Course Overview

The Structural Analysis Using STAAD.Pro Training Course is an advanced professional program designed to develop the technical capabilities required to model, analyze, and evaluate structural systems using computer-aided structural analysis methods. The course enables participants to translate engineering concepts, structural assumptions, and project data into reliable analytical models that support informed decisions throughout the structural design process.

The program focuses on the fundamental principles of structural modeling, including the definition of structural members, materials, sections, supports, restraints, loads, load cases, and load combinations. Participants will develop a clear understanding of the relationship between the physical structure and its analytical representation, while learning practical methods for checking model integrity before analysis.

The course covers the analysis of a range of structural systems, including reinforced concrete structures, steel structures, framed buildings, and industrial structures. Participants will examine the effects of gravity loads, lateral loads, wind loads, seismic actions, and operational loading conditions, while learning how to interpret key analytical results such as displacements, reactions, internal forces, and structural response.

A major component of the Structural Analysis Using STAAD.Pro Training Course is the practical interpretation and verification of analysis results. Participants will learn how to identify modeling inconsistencies, investigate unexpected structural behavior, review critical members, and assess whether analytical results are consistent with engineering expectations and project requirements.

Through practical exercises, case studies, and structured modeling activities, participants will develop an end-to-end approach that begins with project data and structural assumptions and progresses through model development, load definition, analysis, result interpretation, and technical review. These capabilities support higher-quality structural design, stronger technical coordination, and more effective communication among structural engineers, consultants, contractors, and project teams.

Objectives

- Analyze the fundamental principles of structural modeling using STAAD.Pro within the course and relate them to project-specific engineering requirements.
- Develop accurate structural models incorporating appropriate members, materials, sections, supports, restraints, and structural properties.
- Apply appropriate methods for defining structural loads, load cases, and load combinations within analytical models.
- Evaluate structural behavior under gravity, lateral, environmental, and operational loading conditions using computer-aided analysis.
- Assess model integrity before analysis by checking geometry, connectivity, restraints, structural properties, and key engineering assumptions.
- Analyze displacements, reactions, internal forces, and other structural results and interpret their engineering significance.
- Evaluate the influence of structural properties, member sections, supports, and loading assumptions on overall structural response.
- Identify common structural modeling errors and assess their potential impact on analytical results.
- Apply appropriate analysis approaches to steel, reinforced concrete, and framed structural systems.
- Evaluate analytical results against project requirements and engineering expectations to identify critical structural conditions.
- Improve the technical review process for structural models and analysis results before design decisions are finalized.
- Develop a structured technical report presenting the modeling methodology, assumptions, analytical results, findings, and engineering recommendations.

Who Should Attend

This course is designed for civil engineers, structural engineers, structural design engineers, engineering consultants, and professionals involved in the analysis and design of buildings and structural systems. It is particularly relevant to project engineers, design office engineers, technical office engineers, structural review engineers, and professionals responsible for developing or reviewing computer-based structural analysis models.

The program is also suitable for engineering and design managers, project managers, technical department heads, structural design supervisors, and professionals responsible for reviewing structural calculations and analytical models. It provides practical value for engineers working within consulting firms, construction companies, design offices, government organizations, infrastructure authorities, and organizations responsible for delivering or supervising structural projects.

The course is especially relevant to professionals involved in reinforced concrete structures, steel structures, industrial facilities, multi-story buildings, structural frames, and other engineering structures requiring systematic structural analysis. It is also appropriate for engineers seeking to strengthen their ability to interpret structural analysis results and connect analytical findings with engineering decisions related to safety, performance, efficiency, and constructability.

Learning Outcomes

- Create a complete structural model using STAAD.Pro based on project-specific engineering information.
- Define structural members, materials, sections, and engineering properties accurately within an analytical model.
- Establish supports, restraints, and structural connections that appropriately represent the intended structural behavior.
- Define different types of structural loads, load cases, and load combinations in a systematic manner.
- Analyze framed, reinforced concrete, and steel structures using appropriate structural analysis methods.
- Interpret analytical results related to displacements, internal forces, and support reactions from an engineering perspective.
- Identify modeling and input errors that may influence the reliability of structural analysis results.
- Evaluate the effect of changes in sections, materials, supports, and loading conditions on structural response.
- Review structural member behavior and identify critical areas requiring further engineering investigation.
- Use structural analysis results to support design reviews, technical evaluations, and engineering decisions.
- Prepare clear analytical outputs that facilitate communication between structural engineers, consultants, reviewers, and project teams.

- Apply a structured methodology for reviewing structural models and analysis results before final engineering approval.

Course Outline

DAY 01

Fundamentals of Structural Modeling and Analysis Using STAAD.Pro

- Introduction to computer-aided structural analysis and its role in engineering design
- Overview of STAAD.Pro and its primary structural analysis capabilities
- Principles of developing an analytical representation of a physical structure
- Definition of nodes, structural members, materials, and cross-sections
- Definition of supports, restraints, and structural connections
- Modeling structural frames and multi-story building systems
- Establishing structural geometry and member connectivity
- Identification and correction of common modeling errors
- Model verification before structural analysis

> PRACTICAL APPLICATION
>
> Developing an initial structural model and verifying its geometry, connectivity, and basic properties

DAY 02

Structural Loads, Load Cases, and Structural Response

- Fundamentals and classification of structural loads
- Dead loads, live loads, operational loads, and imposed actions
- Concentrated loads, distributed loads, and nodal loads
- Lateral and wind loading principles
- Fundamental concepts of seismic loading
- Definition of load cases and load combinations
- Load distribution and its influence on structural behavior

DAY 02 — CONTINUED

- Verification of load paths within the analytical model
- Review of structural equilibrium and support reactions

PRACTICAL APPLICATION

Defining multiple loading conditions and analyzing the response of a structural model

DAY 03

Structural Analysis and Interpretation of Engineering Results

- Principles of linear structural analysis
- Understanding structural displacements and deformations
- Analysis of internal forces within structural members
- Interpretation of shear forces, bending moments, and axial forces
- Analysis and interpretation of support reactions
- Evaluation of structural behavior under different loading conditions
- Identification of critical analytical results
- Comparison of computer-generated results with engineering expectations and simplified calculations
- Using analysis results to validate and review structural models
- Identification of unexpected or inconsistent structural results

PRACTICAL APPLICATION

Analyzing a structural model, interpreting results, and identifying critical members and response conditions

DAY 04

Advanced Analysis of Steel and Reinforced Concrete Structures

- Modeling and analysis of steel structural systems
- Definition of steel sections and structural properties
- Analysis of steel frames and structural systems under different loading conditions

DAY 04 — CONTINUED

- Modeling reinforced concrete structural systems
- Analysis of beams, columns, and reinforced concrete structural members
- Principles of structural member verification and design checks
- Influence of slenderness, stability, and buckling on structural members
- Review of structural design results and member adequacy
- Identification and correction of advanced modeling and input issues

PRACTICAL APPLICATION

Developing and analyzing an integrated steel or reinforced concrete structural model and reviewing its results

DAY 05

Structural Model Review and Analysis Quality Improvement

- Professional methodologies for reviewing structural analytical models
- Verification of engineering assumptions and model inputs
- Review of loads, load cases, and load combinations
- Evaluation of analytical results and identification of critical structural conditions
- Comparison of analysis results with structural design requirements
- Model refinement and resolution of recurring analysis issues
- Preparation of structural analysis outputs and technical reports
- Documentation of modeling methodology, assumptions, and analytical results
- Improving coordination between analysis, design, construction, and technical review teams
- Best practices for improving the quality and reliability of structural analysis

FINAL WORKSHOP

Develop and analyze an integrated structural model using STAAD.Pro, review the analytical results, identify technical observations, and prepare an action plan for improving structural analysis and design quality

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Register or Request More Information

Course page: https://quest-training.com/courses/structural-analysis-using-staadpro-training-course
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