



STAAD.Pro Essentials: Structural Analysis & Design Simplified

Target Audience:

This course is designed for structural engineers, civil engineers, architects, and construction professionals who want to enhance their skills in structural analysis and design using STAAD.Pro. It is ideal for professionals working in building, bridge, industrial, and infrastructure projects, as well as students aspiring to gain expertise in structural engineering software.

Course Objective:

The course aims to provide a comprehensive understanding of STAAD.Pro for performing structural analysis, design, and validation of various structures. Participants will learn to model, analyze, and optimize structures using industry-standard techniques while ensuring compliance with design codes and regulations.

Course Outcomes:

- Structural Modeling & Analysis Develop the ability to create structural models, apply loads, and perform detailed structural analysis using STAAD.Pro.
- Code-Based Design & Optimization Learn to design and optimize structures as per international design codes and industry standards.
- Report Generation & Interpretation Gain expertise in generating and interpreting analysis reports, ensuring accuracy in structural designs for real-world applications.

Course Outline:

The course comprises **40-hours** of theory and labs and is divided into **8** different chapters. Each chapter will be followed by **hands-on lab exercises** to reinforce learning and gauge understanding of the topics covered.





Chapter 1: Introduction to STAAD.Pro CONNECT Edition

Introduction to STAAD.Pro CONNECT Edition Basic Features of STAAD.Pro CONNECT Edition Starting Bentley STAAD.Pro CONNECT Edition Starting a New Project Working in User Interface

- Ribbon Tab
- Tool Search
- Quick Access Toolbar
- Workflow
- Data Area
- Status Bar
- View Window

Keyboard Shortcuts

Importing and Exporting a Model in STAAD.Pro

Chapter 2: Structural Modeling in STAAD.Pro

Introduction

Structural Modeling Using STAAD Editor

- Creating Nodes
- Creating Members
- Creating Plate Elements
- Creating Solid Elements

Structural Modeling Using STAAD GUI

- Creating Nodes and Members Using Snap Node/Beam Method
- Creating Plate Elements Using the Snap Node/Plate Method
- Creating Solid Elements Using the Snap Node/Solid Method Structural Modeling Using the Structure Wizard
 - Truss Models
 - Frame Models
 - Surface/Plate Models
 - Solid Models
 - Composite Models
 - Import CAD Models
 - VBA Macro Models





Chapter 3: Structural Modeling Using Tools

Introduction

Essential tools for Structural Modeling

- Adding Beams Using Tools
- Creating Collinear Beams
- Creating Beams Along Axes
- Creating Plates Using Tools
- Creating Plates Using Meshing
- Creating Infill Plates
- Creating Solid Elements Using the Add Solid Tool
- Creating a Structure Using the Translational Repeat Tool
- Creating a Structure Using the Circular Repeat Tool
- Shifting Structure Using the Move Tool
- Rotating Structure Using the Generate Rotate Tool
- Mirroring a Structure

Other Miscellaneous Tools

- Stretching Members Using the Stretch Tool
- Intersecting Members Using the Intersect Tool
- Merging Members and Nodes
- Renumbering Nodes, Members, and Elements
- Breaking Beams at Selected Nodes

Cutting Sections

Chapter 4: Defining Material Constants and Section Properties

Introduction

Material Constants

- Creating New Materials
- Editing Material Properties
- Assigning Materials to the Structure
- Defining Orthotropic Material

Section Properties

- Prismatic Section
- Tapered Sections
- Steel Sections
- Steel Joist and Joist Girders
- Plate/Surface Thickness





Chapter 5: Specifications and Supports

Introduction Node Specification Member Specification

- Release
- Offset
- Property Reduction Factors
- Cable
- Truss
- Compression
- Tension
- Inactive
- Fire Proofing
- Imperfection
- Plate Specification
 - Release
 - Ignore Inplane Rotation
 - Rigid Inplane Rotation
 - Plane Stress
 - Ignore Stiffness

Supports

- Fixed
- Pinned
- Fixed But
- Enforced
- Enforced But
- Multilinear Spring
- Foundation
- Inclined
- Tension/Compression Only Springs

Chapter 6: Loads

Introduction

Primary Loads

- Selfweight
- Nodal Load
- Member Load





- Area Load
- Floor Load
- Plate Loads
- Solid Loads
- Temperature Loads
- Seismic Loads
- Time History
- Wind Load
- Snow Load
- Response Spectra
- Repeat Load
- Frequency

Load generation

• Defining Vehicle Loading Defining Load Combinations Defining Load Combinations Automatically

Chapter 7: Performing Analysis, Viewing Results, and Preparing

Report

Introduction Pre Analysis Print

- Problem Statistics
- Joint Coordinates
- Member Information
- Material Properties
- Support Information
- Member Properties
- Element Information
- Solid Information
- All
- Cg

Performing Analysis

- Perform Analysis
- PDelta Analysis
- Perform Cable Analysis
- Perform Direct Analysis
- Perform Imperfection Analysis





- Perform Buckling Analysis
- Perform Pushover Analysis

Post Analysis Print

- Load List
- Joint Displacement
- Member Forces
- Support Reactions
- Story Drift
- Cg
- Mode Shapes
- Section Displacement
- Force
- Analysis Results
- Member Stresses
- Element Forces/Stresses

Viewing Results

- View Output File
- Go to Post Processing Mode

Preparing Reports

Chapter 8: Physical Modeling

Introduction Starting a New Project In Physical Modeling Modeling

- Using Construction Aids
- Drawing the Structure
- Assigning Model Properties
- Defining Boundary Conditions
- Applying Loads

STAAD.Pro Model Data

• Transferring Physical Model to Analytical Model in STAAD.Pro