



3D Structural Analysis and Steel Building Design Training Course

25 – 29 July 2027
Johannesburg

3D Structural Analysis and Steel Building Design Training Course

Ref: 483_138673 **Date:** 25 – 29 July 2027 **Location:** Johannesburg **Fees:** 6000 Euro

Overview

3D Structural Analysis and Steel Building Design Training Course is a five-day advanced course for structural and civil engineers, consultants, reviewers, and project staff who leave with an Integrated Steel Building Model Review File. Participants connect structural idealization, model geometry, supports, sections, loads, combinations, stability, member checks, connection assumptions, validation, and result review. The course turns separate calculations into a coordinated building model. Agile Leaders Training Center presents structural steel analysis through traceable design decisions.

Who Should Attend

- Structural-engineering functions responsible for steel-building analysis and design
- Civil-engineering functions responsible for coordinating structural requirements
- Consultancy functions responsible for model development and checking
- Design-review functions responsible for verifying assumptions and results
- Project functions responsible for constructability coordination

The course assumes participants can perform basic structural analysis and member calculations and leaves out software commands, jurisdiction-specific code instruction, and fabrication detailing.

Departments and Industries

The course supports departments and industries that analyze, design, review, or coordinate structural steel buildings.

- Structural and civil engineering consultancies
- Construction, steel fabrication, and design-build organizations
- Industrial, logistics, commercial, and institutional development teams
- Engineering assurance and technical-audit functions
- Project engineering and constructability teams

Learning Objectives

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



- Build a three-dimensional structural idealization
- Apply gravity and lateral actions through load combinations
- Analyze first-order, second-order, stability, and deformation behavior
- Evaluate members, supports, releases, and connection assumptions
- Diagnose errors through validation and sensitivity checks
- Produce an integrated analysis and design review file

Course Agenda

Day 1: Structural Idealization and Geometry

- Building Load-Path and Structural-System Map
- Three-Dimensional Grid and Story Geometry Model
- Member Connectivity and Node Continuity Checklist
- Support, Release, and Restraint Assumption Register
- Material and Section Property Input Schedule

Day 2: Loads and Analysis Configuration

- Gravity Load Take-Off and Application Map
- Lateral Load Distribution Strategy
- Load Case and Combination Control Matrix
- Mass Source and Dynamic Participation Check
- First-Order Analysis Configuration Record

Day 3: Stability and Second-Order Response

- Frame Stability Sensitivity Assessment
- Geometric Imperfection Representation Method
- Second-Order Frame and Member Analysis
- Drift, Deflection, and Serviceability Review Grid
- Analysis Convergence and Instability Diagnostic Log

Day 4: Member Design and Model Review

- Beam, Column, and Brace Demand-Capacity Schedule
- Member Buckling and Unbraced-Length Review
- Connection Stiffness and Force Transfer Assumption Sheet
- Constructability and Design Coordination Checklist
- Model Validation and Result Interpretation Protocol



Day 5: Steel Building Analysis Practice

- Suggested Exercise: Diagnose Geometry and Connectivity Errors
- Suggested Exercise: Verify Loads and Combinations
- Suggested Exercise: Compare Analysis Results
- Suggested Exercise: Review Members and Connection Assumptions
- Capstone Exercise: Integrated Steel Building Model Review File

Practical Exercises

The course uses suggested activities to connect structural assumptions with reviewable analysis and design results.

- Suggested activity: create a steel-frame idealization with documented load paths, supports, releases, materials, and sections.
- Suggested activity: define load cases and combinations, then compare first- and second-order behavior.
- Suggested activity: assess stability, deformation, member demand, buckling, and connection assumptions.
- Suggested activity: assemble a validated model, result summary, design schedule, and review record.

FAQs

What is 3D structural analysis and steel building design?

3D structural analysis and steel building design represent a building as connected members, supports, loads, and properties to calculate response, check stability, design members, and coordinate decisions.

Who suits 3D structural analysis and steel building design training, and what does it assume?

Structural and civil engineers, consultants, reviewers, and project staff suit the training. It assumes basic structural analysis and member-calculation capability.

How does advanced steel building analysis differ from introductory structural design training?

Advanced analysis emphasizes whole-building idealization, second-order effects, stability, validation, sensitivity, and coordinated review. Introductory training focuses on fundamental behavior and isolated members.

Why are second-order effects important in steel building analysis?

Second-order effects capture added forces created when vertical loads act through displaced frames or members. Their significance depends on stiffness, loading, geometry, imperfections, and restraints.



How is a 3D steel building model validated?

A model is validated by checking geometry, connectivity, supports, releases, properties, load paths, combinations, reactions, equilibrium, deformations, stability indicators, sensitivities, and member demands.

Conclusion

Participants take back an Integrated Steel Building Model Review File linking assumptions, loads, combinations, stability, response, members, connections, validation, and review. It changes separate calculations into a coordinated engineering record. The file gives design teams a shared basis for model correction, member decisions, constructability coordination, and technical approval.