

Formwork Design and Safety Engineering Course

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Overview

The Formwork Design and Safety Engineering Course is a one-week course for structural engineers, temporary works coordinators, and site safety managers who leave with a formwork safety and shoring design portfolio to direct structural temporary works and multi-tier construction loads. Inadequate formwork lateral pressure calculations, unsafe shoring removal sequences, and poor temporary works coordination cause catastrophic structural failures and severe jobsite liabilities. This course resolves structural temporary works risks through the practical application of ACI 347R-14, BS 5975-2:2024, and ISO 45001 safety principles. Agile Leaders Training Center delivers the Formwork Design and Safety Engineering Course.

Who Should Attend

- Structural temporary works engineers designing modular formwork assemblies and falsework systems.
- Site construction managers supervising shoring erection, multi-story load cycles, and pour sequences.
- Quality and materials engineers validating concrete maturity telemetry and formwork stripping criteria.
- Health and safety managers enforcing temporary works risk registers and site safety protocols.
- Field superintendents managing formwork carpenter teams and mechanical strike operations.

The course assumes participants actively manage reinforced concrete construction or temporary structural engineering, and it leaves out entry-level trade carpentry drills and basic hand tool operation.

Departments and Industries

The course draws operational cases from heavy civil engineering and multi-story commercial infrastructure.

- Civil infrastructure and mass transit structural engineering divisions
- High-rise commercial construction and cast-in-place superstructure projects
- Industrial plant civil maintenance and marine concrete terminal operations
- Hydraulic engineering, water retaining structures, and heavy civil works
- Temporary works design consultancies and commercial equipment supply firms

Learning Objectives

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

- Apply ACI 347R-14 equations to calculate lateral fresh concrete pressures on wall and column formwork.
- Analyze multi-tier falsework structural stability and shoring capacity utilizing BS 5975-2:2024 standards.
- Evaluate real-time concrete maturity telemetry using ASTM C1074 to govern safe formwork stripping schedules.
- Build multi-story shore and reshore load distribution models across sequential suspended slab placements.
- Diagnose temporary works hazard vectors and structural failure modes utilizing ISO 45001 risk registers.
- Formulate a formwork safety and shoring design portfolio to control site temporary works lifecycles.

Course Agenda

Day 1: Formwork Engineering Principles and Pressure Calculations

- ACI 347R-14 lateral pressure formulations for fresh concrete in walls and columns
- Concrete unit weight allowances and Eurocode actions specified in BS EN 1991-1-6
- Permissible stress design vs limit state temporary works structural methods
- Form tie tensile ratings, waler spacing models, and plywood deflection checks
- Rate of pour limits, slump factors, and temperature adjustments for hydraulic heads

Day 2: Shoring, Falsework Design, and Stability Analysis

- BS 5975-2:2024 code of practice for falsework design and permissible stress limits
- Modular proprietary shoring towers, screw jacks, and baseplate load transfer mechanisms
- Lateral wind loads and secondary environmental actions governed by BS EN 1991-1-4
- Shoring tower bracing, sway stability checks, and foundational sill distribution pads
- BIM and Revit structural detailing integration for temporary shoring systems

Day 3: Multi-Story Load Sharing and Stripping Telemetry

- Structural load sharing analysis between active slabs, shores, and reshoring systems
- ASTM C1074 concrete maturity sensing methods for early-age in-place strength verification
- Pullout testing per ASTM C900 and cast-in-place cylinder verification per ASTM C873
- Deflection limits and crack control criteria during premature formwork release phases
- Multi-story reshoring removal sequencing matrices across sequential floor cycles

Day 4: Proprietary Systems, Mechanized Formwork, and Field Safety

- Modular panel systems, tunnel forms, and insulated concrete formwork integration
- Vertical slipform controls, climbing bracket anchorages, and hydraulic jacking safety
- OSHA 29 CFR 1926 Subpart Q shoring inspections and ANSI A10.9 temporary controls
- Inspection checklists, formal tag management systems, and work permit protocols
- High-risk occupational health tracking and baseline medical monitoring protocols

Day 5: Formwork Design Verification and Safety Engineering Practice

- Suggested activity: Calculate lateral concrete pressures and form tie spacings under ACI 347R-14
- Suggested activity: Model multi-story shore and reshore load distributions across four consecutive slab levels
- Suggested activity: Validate concrete maturity data against ASTM C1074 parameters for shoring release
- Suggested activity: Audit temporary works risk registers using ISO 45001 safety system benchmarks
- Capstone exercise: Assemble a complete formwork safety and shoring design portfolio for multi-story concrete pours

Practical Exercises

The course uses temporary works design calculations, digital telemetry logs, and structural site drawings.

- Suggested activity: Calculate fresh concrete lateral pressures and tie rod spacing limits using ACI 347R-14 formulas.
- Suggested activity: Evaluate early stripping eligibility using ASTM C1074 concrete maturity logs and temperature history records.
- Suggested activity: Formulate a formwork safety and shoring design portfolio to verify structural falsework stability.

FAQs

Who suits the Formwork Design and Safety Engineering Course?

The Formwork Design and Safety Engineering Course suits structural engineers, temporary works designers, and site safety managers. The course assumes participants manage concrete works, leaving out basic manual carpentry drills.

How does this course differ from general scaffolding courses?

General scaffolding courses focus on working platforms and access staging. The Formwork Design and Safety Engineering Course addresses fresh concrete fluid pressures, structural shoring load transfers, multi-story reshoring analysis, and early-age strike strength telemetry.

Which standards structure this formwork safety engineering course?

The Formwork Design and Safety Engineering Course integrates ACI 347R-14 guidelines, BS 5975-2:2024 temporary works codes, and ASTM C1074 maturity sensing protocols.

How are concrete stripping decisions evaluated in the course?

The Formwork Design and Safety Engineering Course evaluates stripping times using ASTM C1074 maturity telemetry, ASTM C900 pullout tests, and multi-tier structural load sharing analysis rather than fixed calendar rules.

Conclusion

Participants return to their organizations equipped with an operational formwork safety and shoring design portfolio to govern temporary works lifecycles. This work product eliminates premature shoring removal hazards, aligns load distribution calculations with engineering standards, and optimizes concrete strike cycles. Construction teams immediately improve site safety governance while maintaining structural integrity across complex casting phases.

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