Non-Destructive Testing (NDT) for Civil Structures Training Course

Professional Development Training Course Outline

Category	Construction Institute	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Non-Destructive Testing (NDT) for Civil Structures Training Course is designed to develop advanced skills in structural health monitoring, infrastructure assessment, digital inspection technologies, and predictive maintenance. The course focuses on modern NDT techniques for concrete, steel, bridges, tunnels, buildings, dams, and critical infrastructure, enabling engineers and technical professionals to evaluate structural integrity without causing damage. With growing global demand for safe, sustainable, and resilient infrastructure, NDT has become a key component of asset management, smart construction, lifecycle analysis, and risk-based decision-making.

This training provides practical knowledge of ultrasonic testing (UT), ground penetrating radar (GPR), rebound hammer testing, infrared thermography, acoustic emission testing, corrosion assessment, drone-based inspection, and AI-enabled structural diagnostics. Participants will explore international best practices, inspection standards, and real-world applications through case studies of bridges, high-rise buildings, industrial facilities, and transportation infrastructure failures and rehabilitation projects. The course supports professionals in implementing condition assessment strategies, digital transformation, and sustainable infrastructure management.

Programme Curriculum

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Course Duration

5 days

Course Objectives

By completing this NDT for Civil Structures Training Course, participants will be able to:

1. Understand the principles of advanced Non-Destructive Testing technologies for civil infrastructure.
2. Apply structural health monitoring (SHM) techniques for real-time condition evaluation.
3. Identify defects, deterioration mechanisms, and hidden structural risks using modern inspection methods.
4. Perform effective concrete quality assessment and durability evaluation.
5. Interpret NDT data using digital inspection tools and analytical techniques.
6. Apply AI-based predictive maintenance approaches for infrastructure management.
7. Conduct professional inspections of bridges, buildings, tunnels, and industrial structures.
8. Understand international NDT standards, codes, and compliance requirements.
9. Evaluate corrosion, cracking, delamination, and material degradation.
10. Integrate drone technology and remote sensing into structural inspections.
11. Develop risk-based maintenance strategies using inspection findings.
12. Improve decision-making through data-driven asset management.
13. Enhance safety, sustainability, and resilience of modern infrastructure systems.

Target Audience

1. Civil Engineers and Structural Engineers
2. Construction Managers and Project Engineers
3. Infrastructure Asset Management Professionals
4. Structural Inspection and Maintenance Engineers
5. Quality Assurance and Quality Control Professionals
6. Bridge, Tunnel, and Transportation Engineers
7. Building Surveyors and Facility Managers
8. Researchers, Consultants, and Technical Specialists

Training Modules

Module 1: Fundamentals of Non-Destructive Testing in Civil Engineering

- Introduction to **NDT principles, applications, and industry trends**
- Role of NDT in **smart infrastructure and sustainable construction**

- Comparison of destructive and non-destructive evaluation methods
- Overview of inspection planning and structural assessment workflows
- Introduction to international NDT standards and certification pathways
- **Case Study:** Assessment of aging concrete bridges using NDT methods to determine rehabilitation requirements.

Module 2: Concrete Testing and Material Characterization

- Concrete strength evaluation using **rebound hammer testing**
- Ultrasonic Pulse Velocity (UPV) testing for concrete quality assessment
- Detection of voids, cracks, and internal defects
- Concrete durability analysis and service-life prediction
- Integration of NDT results with structural evaluation models
- **Case Study:** NDT evaluation of a deteriorating reinforced concrete parking structure.

Module 3: Advanced Ultrasonic Testing and Acoustic Methods

- Principles of ultrasonic testing technology
- Detection of internal flaws in structural materials
- Acoustic emission monitoring techniques
- Wave propagation analysis for structural diagnostics
- Applications in critical infrastructure inspection
- **Case Study:** Acoustic monitoring of a large industrial structure to identify active cracking.

Module 4: Ground Penetrating Radar (GPR) and Imaging Technologies

- Fundamentals of GPR technology for civil structures
- Reinforcement mapping and concrete scanning
- Detection of voids, moisture, and hidden defects
- Data interpretation and digital imaging techniques
- Applications in roads, bridges, tunnels, and buildings
- **Case Study:** GPR survey of a highway bridge deck to locate corrosion zones.

Module 5: Infrared Thermography and Remote Inspection Technologies

- Thermal imaging principles and applications
- Detection of delamination and moisture problems
- Drone-based inspection systems and UAV technologies
- Remote sensing for large-scale infrastructure monitoring
- Digital documentation and reporting methods
- **Case Study:** Drone-assisted thermal inspection of a high-rise building façade.

Module 6: Structural Health Monitoring (SHM) and Digital Transformation

- Smart sensors and IoT-based monitoring systems
- Real-time structural performance tracking
- AI and machine learning applications in NDT
- Digital twins for infrastructure management
- Predictive maintenance and risk forecasting
- **Case Study:** Implementation of a smart monitoring system for a major bridge.

Module 7: Inspection of Bridges, Buildings, and Critical Infrastructure

- Inspection strategies for bridges and transportation assets
- Assessment of tunnels, dams, and industrial structures
- Failure mechanisms and deterioration analysis
- Condition rating and rehabilitation planning
- Safety management during inspection activities
- **Case Study:** Structural condition assessment of an aging highway bridge network.

Module 8: NDT Data Analysis, Reporting, and Future Trends

- Interpretation of NDT inspection results
- Advanced reporting and digital documentation
- Integration of BIM and inspection databases
- Emerging trends in autonomous inspection technologies
- Future of AI-powered infrastructure diagnostics
- **Case Study:** Digital asset management system combining BIM and NDT inspection data.

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

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