# Advanced Engineering and Construction Project Auditing: Risk-Based Technical Audit Course

6 – 10 September 2027
Kigali (Rwanda)



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## Introduction:

Advanced engineering and construction project auditing is the risk-based technical examination of capital projects, testing design, schedule, cost, contract, quality and safety evidence rather than audit procedures alone. This one-week course is for experienced auditors, project controls, cost, QA/QC and contract specialists, and audit and project managers; each delegate leaves with a risk-based audit plan and audit work plan for a sample project. It assumes audit fundamentals are known and is taught at expert level through case study work, aligned with the IIA Global Internal Audit Standards, the professional standards for internal audit.

## Course Objectives:

- Apply a project risk universe and heat map to prioritise audit coverage across feasibility, design, procurement, construction, commissioning and close-out
- Distinguish a technical design audit from a constructability review and select the evidence each needs
- Interpret forensic schedule analysis and earned value data to compare reported progress with as-built performance
- Apply contract compliance tests to payment certificates, retention, bonds, change orders, variations and claims
- Select data analytics tests and fraud red flags that turn project data into continuous auditing coverage
- Justify findings and management actions to boards and steering committees and compare a risk-based methodology with cyclical audit coverage

## Target Audience:

- Internal and project auditors who lead capital project engagements and decide which lifecycle stages and risks receive audit hours
- Technical and engineering auditors who review design, quality and safety evidence and judge whether a deviation is a finding
- Project controls and cost engineering specialists who own schedule, earned value and cost data and decide which variances need escalation
- QA/QC and contract specialists who administer inspections, payments and claims and judge contractor entitlement against contract terms
- Audit and project managers who sponsor project assurance and decide how findings reach boards and steering committees



## Course Outline:

### Day 1: Risk-Based Audit Planning for Capital Projects Across the Lifecycle

- Risk-Based vs Cyclical Audit Planning: Choosing Coverage for High-Value Capital Projects
- Project Risk Universe: Mapping Scope, Cost, Schedule, Contract and Safety Exposures
- Risk Assessment Heat Map: Scoring Likelihood and Impact to Rank Audit Priorities
- Lifecycle Audit Coverage: Feasibility, Design, Procurement, Construction, Commissioning and Close-Out Stages
- Global Internal Audit Standards: Risk-Based Planning and Engagement Planning Requirements Applied

### Day 2: Technical Audit Frameworks for Design, Schedule and Earned Value

- Design Audit vs Constructability Review: Testing Engineering Deliverables Before Site Mobilisation
- Design Change Control: Tracing Revisions, Approvals and Cost Effects in Registers
- AACE 29R-03 Forensic Schedule Analysis: Selecting a Method for Delay Evidence
- As-Planned vs As-Built Schedule Analysis: Testing Critical Path and Float Use
- ANSI/EIA-748 Earned Value Audit: Validating Baselines, Performance Indices and Estimates

### Day 3: Auditing Cost, Contracts, Quantities, Quality and HSE Performance

- Change Order vs Variation vs Claim: Auditing Entitlement, Pricing and Approval Evidence
- FIDIC 2017 Contract Compliance: Payment Certificates, Retention, Performance Security and Claims
- Quantity and Progress Verification: Reconciling Measured Works With Valuations and Site Records
- ISO 19011 Audit Techniques: Applying Sampling and Evidence Rules to QA/QC Systems
- ISO 45001 HSE Technical Audit: Testing Permit, Incident and Contractor Safety Controls

### Day 4: Analytics, Fraud Risk and Continuous Auditing on Project Data

- Continuous Auditing vs Continuous Monitoring: Dividing Assurance Roles Over Project Data
- CAATs on Project Ledgers: Duplicate Payment, Benford and Rate Variance Tests
- ACFE Fraud Tree in Construction: Bid Rigging, Phantom Vendors and Inflated Quantities
- Construction Fraud Red Flags: Change Order Splitting, Back-Charges and Unbalanced Bids
- Troubled Project Indicators: Cost Overrun, Claims Escalation and Schedule Slippage Patterns

### Day 5: Case Study: Building a Risk-Based Project Audit Plan and Audit Work Plan

- Troubled Project Case Review: Applying the Risk Universe and Heat Map
- Audit Work Plan Design: Linking Ranked Risks to Tests, Data and Evidence
- Findings vs Management Actions: Drafting Root Causes for Steering Committee Decisions
- Board Reporting Pack: Presenting Schedule, Cost and Contract Exposures With Ratings
- Risk-Based Project Audit Plan: Completing Methodology, Lifecycle Coverage and Audit Work Plan



## Skills You Will Gain:

- Project Risk Universe Mapping
- Audit Heat Map Scoring
- Forensic Schedule Analysis
- Earned Value Validation
- Claims and Variation Auditing
- Construction Fraud Detection
- Project Data Analytics
- Steering Committee Reporting

## Why Attend This Course:

- From spreading audit hours evenly across projects to ranking coverage by a scored project risk universe and lifecycle stage
- From accepting reported progress and earned value at face value to testing them against as-built schedules and measured quantities
- From sampling invoices by hand to running data analytics tests that flag duplicate payments, unbalanced rates and fraud patterns
- From a generic audit checklist to a risk-based project audit plan and audit work plan ready to apply to a live capital project

## Conclusion:

At advanced level, auditing engineering and construction projects means directing scarce audit effort to the lifecycle stages, contracts and data where capital value is most at risk, then testing technical evidence rather than procedures alone. The course makes clear how risk-based planning differs from cyclical coverage, how a forensic schedule analysis differs from a progress report, and how continuous auditing differs from management monitoring. It suits experienced auditors and project controls, cost, quality and contract specialists who already know audit fundamentals and need a technical, risk-based method.

## Frequently Asked Questions FAQ:

### What should delegates know before an advanced engineering and construction project auditing course?

Delegates should already know audit fundamentals: planning an engagement, gathering evidence, documenting findings and following up actions. Working familiarity with construction contracts, schedules or cost reports helps, as the case study uses project documents and data from several sectors.



## How does advanced engineering and construction project auditing differ from an introductory construction audit course?

It starts where an introductory course ends. Instead of audit steps and site procedures, it covers risk-based planning, forensic schedule and earned value analysis, claims and contract testing, data analytics and fraud red flags, and reporting technical findings to boards and steering committees.

## Why does advanced engineering and construction project auditing use a risk-based approach?

Capital projects generate more documents and transactions than any audit team can test. A risk-based approach ranks exposures by likelihood and impact across the lifecycle, so audit hours go to the contracts, stages and data most likely to cause overruns, disputes or loss.

## What do delegates take back from advanced engineering and construction project auditing training?

Each delegate takes back a risk-based project audit plan and audit work plan for a sample capital project: a project risk universe, a scored heat map, lifecycle coverage, the tests and data for each ranked risk, and a reporting format for steering committees.

