CONCEPT

Building Envelope Inspection and Condition Assessment: Facades, Waterproofing and Rehabilitation

13 – 24 September 2027
Dubai - Five-star CBD venue



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Ref: 605_17897 **Date:** 13 – 24 September 2027 **Location:** Dubai - Five-star CBD venue **Fees:** 35100 SAR

Introduction:

Leaking roofs, failed facade sealants, damp basements and loose cladding are often found only after occupants complain or a panel falls, and repair budgets are then spent on the loudest problem rather than the most urgent one. This Core Concept course builds building envelope inspection and building condition assessment practice: how roofs, walls, glazing and below-grade waterproofing control heat, air and moisture, how to test and inspect them safely, how to rate and diagnose defects, and how to cost and rank rehabilitation. Participants produce a Building Condition Assessment Report with a Five-Year Rehabilitation Plan.

Course Objectives:

- Explain how an envelope controls rain, air, heat and vapour and trace a leak, draught or damp patch back to the failed control layer
- Inspect roofs, below-grade waterproofing, cladding, curtain wall, glazing and sealant joints against defined acceptance criteria
- Plan and interpret field water tests, infrared thermography surveys and fan pressurisation air leakage tests on existing buildings
- Run a condition survey with element breakdown, rating scales and photographic defect records, and diagnose the cause of each defect
- Specify finishes and envelope rehabilitation works and brief structural engineers on renovation options that need design input
- Rank rehabilitation needs using life-cycle cost and risk and build a Building Condition Assessment Report with a Five-Year Rehabilitation Plan

Target Audience:

- Facility engineers responsible for the upkeep and repair budget of offices, schools, hospitals, hotels and residential blocks
- Maintenance engineers who plan roof, facade and waterproofing repairs and supervise contractors on occupied buildings
- Consultant engineers who carry out condition surveys, due diligence inspections and envelope investigations for clients
- Municipal and public-works engineers responsible for inspecting public buildings and reviewing facade safety
- Project and asset engineers who accept envelope works at handover and track defects through the liability period

Course Outline:

Day 1: Envelope Functions and Building Physics of Heat, Air and Moisture

- Envelope Control Layer Hierarchy: Rain, Air, Heat and Vapour Control
- Heat Transfer Paths: Conduction, Convection, Radiation and U-Value Basics
- Air Pressure Drivers: Wind, Stack Effect and Mechanical Pressurisation
- Moisture Sources and Movement: Rain Penetration, Capillary Rise, Diffusion and Air Leakage
- Envelope Element Register: Roofs, Walls, Openings, Basements and Interfaces

Day 2: Roofing Systems, Waterproofing Membranes and Below-Grade Protection

- Flat Roof Build-Ups: Warm Roof, Inverted Roof and Cold Roof Configurations
- Membrane Types: Bituminous, Single-Ply, Liquid-Applied and Cementitious Systems
- Roof Drainage, Falls, Upstands, Parapets and Penetration Detailing Checklist
- Below-Grade Waterproofing: Tanking, Structurally Integral and Drained Cavity Approaches
- Basement Leak Tracing Worksheet and Waterstop and Joint Inspection

Day 3: Cladding, Curtain Wall, Glazing, Sealants and Movement Joints

- Wall Water Management Types: Barrier, Drainage and Sealed-Surface Walls
- Curtain Wall Systems: Stick, Ladder and Unitized Framing and Rainscreen Pressure Equalisation
- Insulating Glass Units, Spandrel Panels and Glazing Gasket Condition Checks
- Sealant Joint Design, Adhesion Failure, Cohesion Failure and Replacement Sequence
- Rainscreen and Stone Cladding Fixings, Brackets and Cavity Barrier Inspection

Day 4: Envelope Testing: Water Tests, Thermography and Air Tightness

- Field Water Infiltration Testing with the ASTM E1105 Spray Rack Method
- Infrared Thermography Survey Planning: Weather Window, Emissivity and Reflected Temperature
- Thermal Bridge and Condensation Risk Mapping from Thermal Images
- Fan Pressurisation Air Leakage Testing to ASTM E779: Q50, ACH50 and Effective Leakage Area
- Envelope Test Record Sheet and Result Interpretation Rules

Day 5: Facade Access, Inspection Safety and Guided Envelope Walkthrough

- Facade Access Methods: Rope Access, Mobile Elevating Work Platforms, Cradles and Drones
- Inspection Safety Plan: Exclusion Zones, Falling Object Control and Permit Arrangements
- Close-Range Hammer Tapping and Fixing Pull Checks on Cladding Panels
- Guided Walkthrough: Mixed-Use Tower Roof, Curtain Wall and Basement Case File
- Week-One Envelope Defect Log and Peer Review

Day 6: Condition Survey Methodology and Rating Scales

- Survey Scope Types: Walkover, Detailed Condition Survey and Dilapidation Record
- Element Breakdown Structure for Building Fabric and Finishes
- Condition Rating Scale Design: Grades, Descriptors and Photographic Benchmarks
- Remaining Service Life Estimation and Urgency Coding
- Mobile Survey Forms, Defect Photograph Referencing and Data Quality Checks

Day 7: Defect Diagnosis and Non-Destructive Testing Overview

- Crack Pattern Diagnosis: Settlement, Thermal Movement, Shrinkage and Overload Signs
- Dampness Diagnosis: Rising Damp, Penetrating Damp and Condensation Differentiation
- Embedded Metal Corrosion, Spalling and Delamination Recognition on Facades
- Finishes Failure: Render Debonding, Tile Detachment, Paint Blistering and Efflorescence
- Non-Destructive Testing Menu: Moisture Meters, Cover Scanning, Rebound Hammer and Drone Imaging at Overview

Day 8: Finishes Specifications, Rehabilitation Works and Structural Renovation Options

- Rehabilitation Strategy Options: Repair, Overclad, Recoat, Replace or Monitor
- Finishes Rehabilitation Specification Clauses: Substrate Preparation, Materials and Hold Points
- Roof and Facade Refurbishment Sequencing in Occupied Buildings
- Structural Renovation Options at Overview: Underpinning, Jacketing, Added Framing and Change of Use
- Structural Engineer Briefing Note and Occupant and Owner Communication Plan

Day 9: Life-Cycle Costing, Capital Planning and Prioritisation

- Whole-Life Cost Model: Capital, Maintenance, Replacement and Disposal Costs
- Net Present Value Comparison of Rehabilitation Options Using Discount Rates
- Risk-Based Prioritisation Matrix: Safety, Weather-Tightness, Compliance and Service Impact
- Capital Plan Build: Cost Estimates, Contingency and Phasing Across Budget Periods
- Condition Indicators and Backlog Tracking for a Building Portfolio

Day 10: Capstone: Building Condition Assessment Report and Five-Year Rehabilitation Plan

- Case Building Data Pack Review: Drawings, Survey Photographs and Test Results
- Condition Findings Schedule and Defect Cause Statements Drafting
- Prioritised Rehabilitation Programme and Five-Year Cost Profile Build
- Building Condition Assessment Report Assembly and Executive Summary
- Report Presentation and Peer Challenge Panel

Skills You Will Gain:

- Building Physics Reasoning
- Waterproofing System Appraisal
- Facade Defect Recognition
- Envelope Test Interpretation
- Condition Rating
- Defect Cause Diagnosis
- Rehabilitation Specification Writing
- Capital Works Prioritisation

Why Attend This Course:

- Return with a Building Condition Assessment Report and Five-Year Rehabilitation Plan built on a case building you can adapt to your own estate
- Stop repeat leak and cladding repairs by finding which control layer failed and why
- Commission water, thermography and air tightness tests that answer a clear question and read the results with confidence
- Compare inspection practice with facility, consultant and municipal peers who manage offices, schools, hospitals and housing

Conclusion:

A building ages through its envelope first, and rehabilitation money goes further when defects are found early, diagnosed correctly and ranked on cost and risk. Week one covers building physics, roofs, waterproofing, cladding, glazing, sealants, envelope testing and safe facade access. Week two adds condition survey methods, rating scales, defect diagnosis, rehabilitation specifications, structural renovation options and life-cycle costing. The final day turns the evidence into a Building Condition Assessment Report with a Five-Year Rehabilitation Plan ready for asset owner review.