JUPITER PRIME

Consulting • Training • Advisory

جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

Process Plant Concrete Inspection and Repair Design Training Course

jupiterprime.uk

info@jupiterprime.uk

Registered in the United Kingdom and Saudi Arabia

Process Plant Concrete Inspection and Repair Design Training Course

Process Plant Concrete Inspection and Repair Design is a 1-week training course for civil, structural and integrity engineers who look after foundations, pipe racks, bunds, sumps and cooling tower basins in petrochemical and process facilities, and who leave with a structure inspection and repair plan for one real asset. Ageing plant concrete exposed to chemicals, heat and chlorides now cracks and spalls faster than many inspection routines detect. Jupiter Prime Training offers this course in process plant concrete inspection and repair design.

Why Process Plant Concrete Inspection and Repair Design Matters Now

Life-extension decisions on older units, tighter turnaround windows and closer attention from integrity and safety functions all put plant concrete under scrutiny. A site that treats civil structures as maintenance-free discovers rebar corrosion only when a pipe-rack column loses cover or a containment bund leaks; a site that inspects by exposure zone and repairs to a designed specification keeps structures fit for service and avoids unplanned outages. The course connects concrete condition work to ISO 55001 for asset management systems, so structural findings feed the same risk ranking and renewal decisions as rotating and static equipment.

Who Gains Most from Process Plant Concrete Inspection and Repair Design

- Civil engineers responsible for the condition of foundations, plinths and pipe-rack frames
- Integrity engineers who include civil structures in the plant inspection register
- Structural engineers who check load capacity of damaged members and specify strengthening
- Maintenance engineers who schedule concrete repairs within turnaround and shutdown windows
- Inspection coordinators who manage contractors carrying out testing and repair

A site civil and integrity group that attends together gains most, because inspection grading, repair specification and turnaround scheduling then follow one shared condition scale.

Process Plant Concrete Inspection and Repair Design Capabilities

Participants read the signs of deterioration on plant concrete, confirm the cause by testing and specify a repair that matches the exposure.

- Assess carbonation, chloride ingress, sulphate and acid attack on plant structures — cause diagnosis for each defect
- Specify a testing sequence from rebound hammer to cores and half-cell surveys — inspection scope approval
- Grade defects with a condition rating scale by exposure zone — repair prioritisation
- Design patch, coating, cathodic and strengthening repairs — repair method selection
- Calculate residual capacity of corroded or fire-damaged members — continued-service decisions
- Build a repair schedule aligned with turnaround windows — maintenance planners and operations

Key Process Plant Concrete Inspection and Repair Design Terms

- Carbonation Depth — the distance carbon dioxide has neutralised concrete alkalinity, measured with phenolphthalein, beyond which embedded steel can corrode.
- Chloride Threshold — the chloride content at the rebar surface above which protective passivity breaks down and corrosion starts.
- Half-Cell Potential Survey — an electrical test mapping the likelihood of active reinforcement corrosion across a concrete surface.
- Spalling — detachment of cover concrete, usually caused by expanding corrosion products on reinforcement.
- Exposure Zone — a part of a structure grouped by the chemical, thermal and moisture conditions it faces in service.
- Residual Capacity — the load a damaged member can still carry safely once section loss and material degradation are allowed for.

Process Plant Concrete Inspection and Repair Design Day by Day

Day 1: How Plant Concrete Deteriorates

- Plant Structure Inventory — Foundations, Pipe Racks, Bunds, Sumps and Basins
- Carbonation and Chloride Mechanisms — Reinforcement Corrosion Onset
- Sulphate, Acid and Hydrocarbon Attack — Chemical Exposure in Process Areas
- Thermal Cycling and Fire Damage — Heat-Affected Concrete Near Furnaces
- Exposure Zone Mapping — Grouping Members by Service Conditions

Day 2: Inspection and Testing Methods

- Visual Condition Survey Protocol — Crack, Spall and Stain Recording
- Rebound Hammer and Ultrasonic Pulse Velocity — In-Situ Strength Indication
- Cover Meter and Half-Cell Potential Surveys — Corrosion Risk Mapping
- Core Sampling and Laboratory Tests — Chloride Profiles and Carbonation Depth
- Condition Rating Scale — Consistent Defect Grading Across Inspectors

Day 3: Structural Assessment of Damaged Members

- Section Loss Measurement — Rebar and Concrete Reduction Estimates
- Residual Capacity Check — Continued Service or Load Restriction
- Fire-Damaged Concrete Assessment — Colour Change and Strength Loss
- Foundation Settlement and Vibration Cracking — Rotating Equipment Plinths
- Risk Ranking With ISO 55001 Criteria — Priority in the Asset Register

Day 4: Repair Design and Protection

- Patch Repair Specification — Breakout Depth, Primers and Repair Mortars
- Protective Coatings and Sealers — Chemical Resistance Selection for Bunds
- Cathodic Protection for Reinforcement — Impressed Current or Galvanic Anodes
- Strengthening With Jacketing and Bonded Plates — Restoring Member Capacity
- Repair Quality Control — Hold Points, Pull-Off Tests and Records

Day 5: Practising the Structure Inspection and Repair Plan

- Inspection Scope for a Chosen Pipe Rack — Applying Zone Mapping and Tests
- Defect Grading and Cause Diagnosis — Applying the Condition Scale
- Repair Option Selection — Applying Patch, Coating and Protection Choices
- Turnaround Repair Scheduling — Sequencing Work Around Plant Outages
- Structure Inspection and Repair Plan — Completed Document for Integrity Review

Applying Process Plant Concrete Inspection and Repair Design After the Course

- Map exposure zones across one process unit and add its civil structures to the inspection register with a condition grade.
- Commission a half-cell and cover survey on the most exposed pipe-rack bay and compare results with the visual grading.

Process Plant Concrete Inspection and Repair Design Questions FAQ

What is process plant concrete inspection and repair design and why does it matter now?

Process plant concrete inspection and repair design is the practice of finding, diagnosing and specifying repairs for deteriorating plant structures. It matters now because many units are being run beyond their original life, and their concrete faces chemicals, heat and chlorides daily.

Which roles gain most from process plant concrete inspection and repair design training?

Civil, structural, integrity and maintenance engineers gain most, along with inspection coordinators. They decide what to test, how to grade defects and when repairs fit into turnaround windows.

How does process plant concrete inspection and repair design differ from a concrete materials course?

Process plant concrete inspection and repair design centres on in-service structures in chemical and thermal environments. A concrete materials or mix design course focuses on producing new concrete rather than assessing and repairing existing plant members.

What do you bring back from process plant concrete inspection and repair design training?

You bring back an inspection and repair plan for one structure at your site, covering test scope, defect grades, likely causes, chosen repair methods and a schedule tied to the next turnaround.

Process Plant Concrete Inspection and Repair Design: The Way Forward

The structure inspection and repair plan first informs which civil repairs enter the next turnaround scope. Integrity and civil engineers use it to brief planners and contractors on test methods and hold points. After the repairs are complete, revisit the exposure zone map, because coatings and drainage changes alter which members deteriorate fastest.