JUPITER PRIME

Consulting • Training • Advisory

جوبيتر برايم للاستشارات والتدريب

COURSE BROCHURE

Industrial Concrete Structures Design Training Course

jupiterprime.uk

info@jupiterprime.uk

Registered in the United Kingdom and Saudi Arabia

Industrial Concrete Structures Design Training Course

Industrial Concrete Structures Design is a 1-week training course for civil and structural engineers on plants and facilities, who leave with an Industrial Foundations Design Basis for a process or utility unit. Heavier rotating machinery, aggressive chemicals and tight construction windows now make plant foundations, pipe racks and bunds a frequent source of rework. Jupiter Prime Training offers this course on industrial concrete structures design.

Why Industrial Concrete Structures Design Matters Now

Two pressures shape industrial concrete today: equipment vendors supplying larger compressors, pumps and turbines with strict vibration and settlement limits, and owners operating in corrosive, hot and chemically aggressive environments. A design team that reads vendor data, soil reports and exposure conditions correctly produces foundations that run smoothly for decades; one that treats plant structures like ordinary buildings sees resonance, cracking and leaking bunds. The course rests on the American Concrete Institute Building Code Requirements for Structural Concrete ACI 318 for strength and detailing, together with established practice for dynamic machine foundations.

Who Gains Most from Industrial Concrete Structures Design

- Engineers who design foundations for pumps, compressors, tanks and vessels
- Designers who size pipe racks, sleepers and equipment support structures
- Engineers who check retaining walls, sumps, pits and containment bunds
- Reviewers who approve vendor loads, anchor bolt layouts and construction drawings

A plant engineering group that sends its civil lead, a structural designer and a reviewer together gains most, because load data, design checks and drawings then follow one basis.

Industrial Concrete Structures Design Capabilities

Participants turn vendor drawings, soil reports and process conditions into concrete structures that carry static, dynamic and thermal loads safely.

- Calculate static and dynamic loads from vendor data, wind, seismic and thermal effects — informing foundation sizing
- Design block foundations for rotating machinery with frequency and amplitude checks — protecting equipment reliability
- Design pipe rack frames and sleepers in reinforced concrete — serving piping and layout teams
- Specify slabs on grade, bunds and sumps for chemical exposure and watertightness — supporting operations
- Apply ACI 318 detailing to anchors, laps and crack control — guiding drafting and site teams

Key Industrial Concrete Structures Design Terms

- Block Foundation — a rigid mass of reinforced concrete supporting machinery, sized to keep vibration amplitudes and soil pressures within limits.
- Natural Frequency — the rate at which a foundation-soil system vibrates freely; it must stay clear of machine operating speed.
- Pipe Rack — a frame structure carrying pipes, cables and trays between plant units, often designed for thermal and friction loads.
- Containment Bund — a walled area around tanks that holds spills; it must be liquid-tight and chemically resistant.
- Slab on Grade — a ground-supported concrete slab whose thickness and joints depend on wheel, rack and equipment loads.
- Anchor Bolt — a cast-in or post-installed fastener transferring equipment base forces into the concrete foundation.

Industrial Concrete Structures Design Day by Day

Day 1: Plant Structures and Design Inputs

- Industrial Load Types — Separating Dead, Live, Operating and Test Loads
- Vendor Drawings and Load Data — Extracting Forces for Foundations
- Geotechnical Reports — Selecting Bearing Pressure and Settlement Limits
- Refinery and Power Station Examples — Comparing Typical Plant Structures
- ACI 318 Design Framework — Setting Strength and Serviceability Checks

Day 2: Equipment and Machine Foundations

- Static Equipment Foundations — Sizing Footings for Vessels and Tanks
- Rotating Machinery Foundations — Checking Frequency Ratios and Amplitudes
- Pile-Supported Foundations — Choosing Piles for Weak Soils
- Anchor Bolts and Grout — Detailing Base Plate Connections
- Foundation Design Calculation Sheet — Recording Assumptions and Results

Day 3: Pipe Racks and Support Structures

- Pipe Rack Layout — Defining Bays, Tiers and Bracing
- Thermal and Friction Pipe Loads — Distributing Forces to Frames
- Concrete Frame Design — Checking Beams and Columns
- Sleepers and Low Supports — Designing Ground-Level Pipe Supports
- Expansion Joints in Racks — Controlling Long-Structure Movement

Day 4: Ground Slabs, Bunds and Below-Grade Structures

- Slab on Grade Design — Setting Thickness, Joints and Reinforcement
- Containment Bunds — Achieving Liquid-Tightness and Chemical Resistance
- Retaining Walls and Pits — Checking Earth and Water Pressures
- Sumps and Trenches — Detailing Against Leakage and Uplift
- Durability and Cover Requirements — Matching Concrete to Exposure

Day 5: Practising the Industrial Foundations Design Basis

- Compressor Foundation Exercise — Applying Dynamic Checks to Vendor Data
- Pipe Rack Case — Distributing Thermal Loads in a Concrete Frame
- Bund Detailing Review — Testing Joints and Coatings for Leak Risk
- Peer Review of Drawings — Catching Anchor and Reinforcement Clashes
- Industrial Foundations Design Basis — Completing Loads, Criteria and Detailing Rules

Applying Industrial Concrete Structures Design After the Course

- Review one live machine foundation against vendor frequency limits and record the margin found.
- Audit the bund and sump details of one tank farm for joints, coatings and cover.

Industrial Concrete Structures Design Questions FAQ

What is industrial concrete structures design, and why does it matter now?

It is the reinforced concrete design of plant foundations, pipe racks, bunds, pits and slabs. It matters now because larger machinery and harsher exposure make vibration, cracking and leakage costly when plant structures are treated like ordinary buildings.

Which roles gain most from industrial concrete structures design training?

Civil and structural engineers on industrial projects gain most. They size machine foundations, pipe racks and bunds from vendor and soil data, so load derivation, dynamic checks and durability shape their daily decisions.

How does industrial concrete structures design differ from a general reinforced concrete design course?

It applies concrete design to plant conditions rather than buildings. A general course covers beams, slabs and columns, while this subject adds machine vibration, pipe rack thermal loads, containment and chemical exposure.

What do you bring back from industrial concrete structures design training?

You bring back an Industrial Foundations Design Basis for a unit you support. It sets load cases, dynamic criteria, soil parameters, durability rules and detailing standards for consistent plant design.

Industrial Concrete Structures Design: The Way Forward

The Industrial Foundations Design Basis first informs how equipment loads are taken from vendor data into foundation sizing. Civil leads, designers and reviewers use it to keep calculations and drawings consistent across a unit. After the first machine foundation is commissioned it is worth revisiting the dynamic criteria, since measured vibration shows whether the assumed soil stiffness was right.