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# Power Facility Concrete and Machine Foundations Training Course

27 June – 1 July 2027
Amman

# Power Facility Concrete and Machine Foundations Training Course

**Ref:** 2981_112983 **Date:** 27 June – 1 July 2027 **Location:** Amman **Fees:** 4200 GBP

Power Facility Concrete and Machine Foundations is a 1-week training course for civil and structural engineers on power stations and substations, built around a foundation design basis for one plant item. Turbine pedestals, transformer bunds and cable trenches carry loads that ordinary buildings never see, and a cracked block or a leaking bund can stop generation for weeks. Jupiter Prime Training delivers this course for engineers who design and check those structures.

## Why Power Facility Concrete and Machine Foundations Matters Now

Three pressures shape this work today. Generation fleets are changing fast, so engineers are asked to reuse ageing turbine halls, add battery and inverter plinths and strengthen substations for larger transformers. Equipment suppliers set tight frequency and settlement limits, and insurers check oil containment and fire separation. A foundation that resonates, settles unevenly or leaks oil creates outages and environmental claims. The course rests on reinforced concrete limit state design, soil and structure interaction and machine vibration principles, described in general engineering terms.

## Who Gains Most from Power Facility Concrete and Machine Foundations

- Engineers who size and reinforce turbine, generator, pump and fan foundations
- Engineers responsible for transformer plinths, oil bunds and fire walls in substations
- Engineers who lay out cable trenches, ducts, pits and drainage across switchyards
- Engineers who check contractor drawings and calculations for plant concrete
- Engineers who plan inspection and repair of concrete in operating stations

A civil design group gains most when several members attend together and agree one set of checks.

## Power Facility Concrete and Machine Foundations Capabilities

Participants turn supplier load data and soil reports into foundations that stay stiff, dry and serviceable.

- Assess static, dynamic, thermal and short-circuit loads on a plant foundation — design basis sign-off
- Calculate natural frequency and amplitude of a block foundation — supplier acceptance of the machine
- Design a transformer bund and fire wall for oil containment — environmental and fire approval
- Specify concrete mix, cover and crack width for aggressive plant conditions — durability over station life
- Weigh raft, pile and spread footing options for heavy equipment — cost and settlement trade-off

- Build an inspection and repair plan for operating plant concrete — outage planning with operations

## Key Power Facility Concrete and Machine Foundations Terms

- Block foundation — a heavy concrete block that controls a rotating machine's vibration through mass and stiffness.
- Frequency separation — the margin between a foundation's natural frequency and machine running speed.
- Transformer bund — a concrete enclosure that holds spilled transformer oil and firefighting water.
- Subgrade modulus — a measure of soil stiffness used to model ground response.
- Crack width limit — the largest crack allowed so reinforcement stays protected from water and chlorides.
- Grout pad — a thin high-strength grout layer that spreads machine base loads into the foundation.

## Power Facility Concrete and Machine Foundations Day by Day

### Day 1: Plant Loads and Ground Conditions

- Supplier Load Data Sheets — Separating Static, Dynamic and Fault Loads
- Short-Circuit and Thermal Loads on Pedestals — Combination Cases for Design
- Geotechnical Report Reading — Bearing Capacity and Settlement Limits
- Soil Spring and Subgrade Modulus Models — Foundation Stiffness Choices
- Groundwater and Soil Chemistry — Exposure Class and Protection Needs

### Day 2: Rotating Machine Foundations

- Block and Frame Foundation Types — Turbine, Generator and Pump Selection
- Natural Frequency Hand Methods — Resonance Margin Against Running Speed
- Unbalance Force and Amplitude Checks — Supplier Vibration Acceptance
- Anchor Bolts, Sleeves and Grout Pads — Alignment and Load Transfer
- Isolation Joints and Inertia Blocks — Protecting Adjacent Turbine Hall Floors

### Day 3: Substation and Transformer Structures

- Transformer Plinth and Rail Design — Handling Heavy Moves and Jacking
- Oil Bund Volume and Drainage Sizing — Containment and Separator Selection
- Fire Wall Height and Reinforcement — Separation Between Adjacent Units
- Gantry and Equipment Support Footings — Wind and Conductor Tension Loads
- Cable Trench, Duct Bank and Pit Layout — Access, Drainage and Cover Loads

### Day 4: Durability, Construction and Condition

- Concrete Mix and Cover Selection — Chloride, Sulphate and Heat Exposure
- Mass Pour Temperature Control — Early-Age Cracking in Thick Blocks
- Crack Width and Watertightness Checks — Bund and Trench Serviceability
- Non-Destructive Testing of Plant Concrete — Locating Corrosion and Voids
- Repair and Strengthening Options — Fitting Work into Planned Outages

## Day 5: Practising the Foundation Design Basis

- Load Combination Set for a Chosen Plant Item — Applying Day One Methods
- Dynamic Check of the Chosen Foundation — Applying Frequency Separation
- Bund and Trench Details for the Same Area — Applying Containment Sizing
- Peer Review of Drawings and Calculations — Finding Errors Before Issue
- Foundation Design Basis for One Plant Item — Completing the Work Product

## Applying Power Facility Concrete and Machine Foundations After the Course

- Run a frequency separation check on one existing turbine or pump foundation and share the result with the mechanical team.
- Audit one transformer bund for volume, drainage and crack condition and raise the repairs into the next outage plan.

## Power Facility Concrete and Machine Foundations Questions FAQ

### What is power facility concrete and machine foundations design, and why does it matter now?

It is the design of concrete that carries turbines, transformers and buried services in power plants. It matters now because fleets are being repowered and substations upgraded, and a poor foundation causes vibration, oil leaks and long outages.

### Which roles gain most from power facility concrete and machine foundations training?

Civil and structural engineers who design, check or maintain plant concrete gain most. That includes owner's engineers reviewing contractor work.

### How does power facility concrete and machine foundations training differ from a general industrial concrete course?

It focuses on power plant items only, going deeper into rotating machine dynamics, transformer oil containment, fire separation and switchyard trenches than a general industrial concrete course.

### What do you bring back from power facility concrete and machine foundations training?

You bring back a foundation design basis for one plant item, with loads, dynamic checks and containment details your team can reuse.

## Power Facility Concrete and Machine Foundations: The Way Forward

The foundation design basis first informs the decision on foundation type and size for the next plant item, and it is used by civil designers, mechanical engineers and checking engineers alike. After its first use, revisit the dynamic assumptions against measured vibration on site, because real soil stiffness often differs from the report.