CORE CONCEPT

Water Transmission Systems Course: Large-Diameter Mains, Pumping Stations and Storage Reservoirs

25 January – 5 February 2027
Amsterdam - Zuidas business district hotel

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Ref: 2130_30825 **Date:** 25 January – 5 February 2027 **Location:** Amsterdam - Zuidas business district hotel **Fees:** 42300 SAR

Introduction:

Water transmission systems covering large-diameter mains, pumping stations and storage reservoirs form this 2-week course for transmission utility, design and operations units, ending with a Transmission Operating and Contingency Plan for a case organisation. Bulk supply from desalination and treatment plants to city reservoirs falters when routes, pipe materials, pump duties and reserve volumes are chosen in isolation and shutdowns lack a rehearsed response. Nominees already design, operate or maintain bulk conveyance assets and practise through case studies on profiles, pump curves and SCADA data. CoreConcept Training Center delivers this water transmission systems course.

Course Objectives:

- Select transmission routes and large-diameter pipe materials from steel, ductile iron and GRP using profile, crossing, lining and pressure class criteria
- Specify pumping station layouts, duty and standby pump configurations and drive types from pump curves and bulk demand
- Configure SCADA signals, alarms and telemetry fail-safes for control of flow from source plants to city reservoirs
- Size strategic and operational storage reservoirs and set fill sequencing rules for multi-reservoir corridors
- Plan shutdowns, burst response and source trip contingencies with agreed roles for production and distribution operators
- Measure specific energy and transmission KPIs and set tariff-aware pump schedules that reduce energy cost

Target Audience:

- Transmission engineering units responsible for bulk mains, crossings and line valve installations
- Pumping station operations and maintenance units responsible for high-lift and booster stations
- Control room units responsible for SCADA supervision of bulk flows, pressures and reservoir levels
- Design and EPC engineering units responsible for route studies, pipe material and station specifications
- Asset and contingency planning units responsible for shutdown schedules and bulk supply continuity

Course Outline:

Day 1: Water Transmission System Roles, Layout and Design Basis

- Bulk Transmission Layer and Distribution Network Asset Boundaries
- Source-to-Reservoir Schematic From Desalination Outlet to City Storage
- Gravity Versus Pumped Conveyance Choice Using Hydraulic Grade Lines
- Design Flow Basis From Bulk Demand Forecast and Peaking
- Transmission Asset Register for Mains, Stations and Reservoirs

Day 2: Route Selection and Large-Diameter Pipe Material Standards

- Route Selection Matrix for Corridors, Crossings and Land Access
- Longitudinal Profile Review for High Points and Low Points
- Steel Pipe Wall Thickness, Cement Mortar Lining and Coating Choice
- AWWA C151 and EN 545 Ductile Iron Pressure Class Selection
- GRP Pipe Stiffness Class and Buried Deflection Check

Day 3: Pumping Station Design and Pump Selection

- High-Lift and Booster Station Layout With Suction and Discharge Headers
- Pump Curve Duty Point and Best Efficiency Point Selection
- Parallel Pump Operation and Number of Duty Units
- Variable Speed Drive Versus Fixed Speed Configuration Trade-Offs
- Standby Unit Philosophy and Station Power Supply Redundancy

Day 4: SCADA, Telemetry and Transmission Control Data

- SCADA Architecture With RTU, PLC, HMI and Historian Layers
- Telemetry Link Options and Loss-of-Communication Fail-Safe Settings
- Bulk Flow Meter, Pressure and Reservoir Level Instrument Placement
- HMI Mimic Design, Alarm Priority and Shift Handover Log
- Defence-in-Depth Cyber Security for Transmission Control Networks

Day 5: Week-One Guided Case Study on a Transmission Corridor

- Case Data Pack With Route, Profile and Demand Basis
- Case Pipe Material Comparison for Steel, Ductile Iron and GRP
- Case Pumping Station Duty Point and Unit Configuration Check
- Case SCADA Signal List and Alarm Schedule Draft
- Week-One Findings Log Feeding the Operating and Contingency Plan

Day 6: Strategic and Operational Storage Reservoir Planning

- Strategic Reserve Volume Sizing in Days of Bulk Demand
- Operational Balancing Volume From Supply and Demand Profiles
- Reservoir Compartments, Inlet Control Valves and Overflow Arrangements
- Reservoir Turnover, Residual Chlorine and Stratification Monitoring Plan
- Multi-Reservoir Fill Sequencing Rules for Desalination-Fed Corridors

Day 7: Construction Quality, Corrosion Protection and Asset Risk Governance

- Restrained Joint and Thrust Block Design at Bends
- AWWA C105 Polyethylene Sleeving and Cathodic Protection Decisions
- Hydrostatic Pressure Test Acceptance and Disinfection Before Commissioning
- Surge Protection Interface With Specialist Transient Study Findings
- Asset Criticality Scoring and Risk Register for Transmission Assets

Day 8: Outage Planning, Contingency and Stakeholder Coordination

- Planned Shutdown Request, Isolation Plan and Draining Procedure
- Emergency Burst Response Playbook for Large-Diameter Mains
- Source Plant Trip Scenarios and Reservoir Drawdown Timelines
- Interface Agreement With Production Plants and Distribution Operators
- Customer and Authority Communication Matrix During Supply Interruptions

Day 9: Energy Optimisation, Performance KPIs and Benchmarking

- Specific Energy Indicator in Kilowatt-Hours per Cubic Metre
- Pump Efficiency Field Testing and Refurbishment Payback Calculation
- Tariff-Aware Pump Scheduling Using Reservoir Storage Headroom
- Transmission KPI Dashboard for Availability, Losses and Energy
- Benchmarking Cycle and Continuous Improvement Action Register

Day 10: Case Study Capstone on the Transmission Operating and Contingency Plan

- Capstone Brief With Case Organisation Transmission Network Data
- Pipe Material and Station Upgrade Options From Week-One Findings
- Reservoir Reserve Targets and Pump Scheduling Rules for the Case
- Outage and Contingency Scenario Table With SCADA Response Actions
- Transmission Operating and Contingency Plan Completion and Panel Defence

Skills You Will Gain:

- Transmission Route Assessment
- Large-Diameter Pipe Material Selection
- Pump Duty Point Matching
- Reservoir Reserve Sizing
- SCADA Alarm Configuration
- Shutdown and Isolation Planning
- Specific Energy Analysis
- Transmission KPI Benchmarking

Why Attend This Course:

- Present a Transmission Operating and Contingency Plan for a case organisation to the head of transmission operations and the asset planning manager
- Decide pipe material, pump configuration and reserve volume options on documented evidence rather than precedent
- Avoid unplanned supply interruptions, excess pumping energy cost and unrehearsed shutdowns on critical mains
- Equip operations and design colleagues with the route matrix, signal list and outage playbook templates built during the course

Conclusion:

Back at work, the participant gives the head of transmission operations and the asset planning unit a Transmission Operating and Contingency Plan that sets pipe material and station upgrade options, reservoir reserve targets, pump scheduling rules, SCADA alarm settings and outage responses for the corridor. Operations use it to approve shutdown requests and energy schedules, and planners use it to rank capital works. After the first planned shutdown or source trip, the unit should compare actual reservoir drawdown, restoration time and energy use with the plan and revise its reserve targets and contingency steps.

Frequently Asked Questions FAQ:

What should participants know before a water transmission systems course on mains, pumping stations and storage reservoirs?

Participants should already work on bulk mains, pumping stations or reservoirs in design, operation or maintenance. Reading a pump curve and a longitudinal profile is enough background. Bringing anonymised route, station or SCADA data helps them apply the case study work to their own corridor.

How does a water transmission systems course differ from a distribution network design or surge analysis course?

It concentrates on the bulk layer between source plants and city reservoirs: route, pipe material, pumping stations, reserve storage, SCADA control and outage planning. Distribution network modelling, leakage control and detailed transient studies appear only where they meet the transmission system.

Why do water transmission systems need strategic storage reservoirs as well as pumping stations?

Strategic storage keeps cities supplied when a source plant trips, a main bursts or a planned shutdown runs longer than expected. Pumping stations move water, but only reserve volume buys the hours needed to isolate, repair and restore the transmission corridor safely.

What do participants take back from a water transmission systems course on mains, pumping stations and reservoirs?

Participants take back a Transmission Operating and Contingency Plan for a case organisation, plus a route selection matrix, pipe material comparison, pump configuration check, SCADA signal list and outage playbook that can be adapted to their own mains, stations and reservoirs.