CONCEPT

Railway Operations Management: Timetabling, Signalling, Rail Asset Maintenance and Performance

27 September – 1 October 2027
Paris - Right Bank business hotel



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Ref: 287_12084 **Date:** 27 September – 1 October 2027 **Location:** Paris - Right Bank business hotel **Fees:** 23500 SAR

Introduction:

Railway operations management breaks down when timetables promise more paths than the signalling can deliver, the control centre improvises every recovery, and track and rolling stock are maintained by calendar instead of condition. This Core Concept course gives rail operators and infrastructure managers working methods to read line capacity from the train control system, build and recover timetables, run maintenance regimes for track and fleet, apply predictive analytics and screen OT cyber risk. Participants produce a Rail Operations and Asset Performance Plan for a line or network they run.

Course Objectives:

- Map how track, rolling stock, signalling, traction power and stations interact and where each constrains train service on a line
- Assess line capacity from fixed block, ETCS and CBTC signalling characteristics, headway and braking distance
- Build a working timetable with running times, dwell times, recovery allowances and linked rolling stock and crew plans
- Run control centre procedures to regulate trains and recover service after incidents for passenger and freight customers
- Set track and rolling stock maintenance regimes and use condition monitoring data to move towards predictive maintenance
- Measure rail performance with punctuality, availability and MDBF and turn the results into a costed improvement plan

Target Audience:

- Managers responsible for train service delivery on passenger, metro or freight operations
- Infrastructure managers accountable for track, signalling, power and station assets on a route
- Operations control centre managers who regulate traffic and lead incident recovery
- Rolling stock and depot maintenance managers responsible for fleet reliability
- Track and permanent way maintenance managers who plan inspection and renewal work
- Rail performance and planning managers who own timetables, delay data and service KPIs

Course Outline:

Day 1: Railway System Components, Service Types and Current-State Performance Review

- Railway System Interfaces: Track, Rolling Stock, Signalling, Traction Power and Stations
- Passenger, Metro and Freight Service Models Compared by Operating Pattern
- Infrastructure Manager and Train Operator Roles, Access Arrangements and Interface Registers
- Rail Performance Measures: Punctuality, Cancellations, Fleet Availability and MDBF
- Rail Operations Baseline Scorecard for an Own Line or Network

Day 2: Train Control, Signalling Architecture and Line Capacity

- Fixed Block Signalling, Interlocking Logic, Track Circuits and Axle Counters
- ETCS Levels 1 and 2 within ERTMS: Eurobalises, Movement Authority and GSM-R Radio
- CBTC under IEEE 1474: Moving Block Operation and Headway Reduction
- Grades of Automation GoA0 to GoA4 under IEC 62290-1 and the FRMCS Radio Migration
- Line Capacity Assessment: Headway, Braking Distance and Timetable Occupation

Day 3: Timetable Planning, Operations Control and Disruption Recovery

- Timetable Construction: Running Times, Dwell Times, Recovery Allowances and Path Conflicts
- Rolling Stock Diagrams and Train Crew Rostering Linked to the Working Timetable
- Operations Control Centre Roles: Train Regulation, Signaller Coordination and Communication Protocols
- Incident Recovery Playbook: Degraded Working, Contingency Timetables and Failed Train Rescue
- Passenger Information and Freight Customer Notification During Service Disruption

Day 4: Rail Asset Maintenance, Predictive Analytics, Safety and OT Cyber Risk

- Track Maintenance Regime: Geometry Recording, Rail Grinding, Tamping and Points Inspection
- Rolling Stock Maintenance: Mileage-Based Examinations, Wheelset Reprofiling and Pantograph Checks
- Predictive Maintenance from Condition Monitoring Data: Axle Bearings, Point Machines and Overhead Line
- Railway Safety Management at Overview: Hazard Log, RAMS Targets and Safety Case Structure
- OT Cybersecurity for Rail at Overview: IEC 62443 Zones, Conduits and Security Levels

Day 5: Case Study Work and the Rail Operations and Asset Performance Plan

- Commuter Line Case: Punctuality Loss Diagnosis from Delay Attribution Data
- Freight Corridor Case: Path Allocation and Terminal Slot Conflicts
- Metro Fleet Case: MDBF Decline and Maintenance Interval Revision
- Rail KPI Dashboard Design: Delay Minutes by Cause, Availability and Reliability Trends
- Rail Operations and Asset Performance Plan Drafting and Peer Review

Skills You Will Gain:

- Railway System Interface Mapping
- Signalling Capacity Analysis
- Working Timetable Construction
- Train Service Recovery
- Track and Fleet Maintenance Planning
- Condition Monitoring Analytics
- Rail OT Cyber Risk Screening
- Delay Attribution Analysis

Why Attend This Course:

- Return with a Rail Operations and Asset Performance Plan for a line or network you manage
- Challenge timetable and signalling proposals with a clear view of headway, capacity and recovery margins
- Shift maintenance spending from fixed intervals towards condition data on the assets that cause most delay
- Compare rail practice with peers from metro, mainline passenger, freight and infrastructure organisations

Conclusion:

Railway operations management delivers reliable service when capacity, timetable, control centre practice and asset maintenance are planned as one system. The course moves from system interfaces and baseline performance, through signalling and line capacity, to timetable construction, control centre regulation and incident recovery, then to track and fleet maintenance, predictive analytics, safety management and OT cyber risk. The final day applies these methods to commuter, freight and metro cases to build the Rail Operations and Asset Performance Plan.