RAILWAYS - FROM A to Z

SYS-2

OBJECTIVES

Learn about rail industry around the world.
Fully understand - from a technical point of view - how each rail subsystem works: Rolling Stock, Infrastructure, Electrification, Signalling, Operations and Maintenance.
Understand interactions between subsystems.
Master technical terms for all subsystems.

TARGET AUDIENCE

Engineers and technicians with limited knowledge of railway technology wishing to work in this industry.
French-speaking people working on international rail projects.

PROGRAMME

After a brief overview of the rail industry as a whole focusing on what makes railway transport so specific and successful **(M1),** this 5-day training gets into the technical details of rail subsystems**.**

M9 is also technical but much more practical. This module is actually a very concrete conclusion of what has been covered during the training.

This training gives participants the necessary knowledge and tools to work on rail projects - and to be successful.

M1	Introduction to Railways & Urban guided transport	0.5 day
M2	Railway Systems Overview & Metro specificities	0,5 d
M3	Rolling Stock, Traction systems & Train Dynamics	0.75 d
M4	Track Infrastructure, Track components & Track design	0,75 d
M5	Power supply & Electrification	0.5d
M6	Signalling	0.5 d
M7	Operations & Traffic planning	0.5 d
M8	Maintenance	0,5 d
M9	*Technical visit - Railway facility*	0.5 d

Duration: 5 days
Dates: on our Website – **Locations**: Paris, Sophia Antipolis or Online
Cost: 2795 € per trainee
Registration & Information: formation@nomadconsult.com – 04 92 94 94 27

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M1: Introduction to Railways & Urban guided transport

- Major rail projects around the world: High speed, suburban lines, metro & tramways
- Rail advantages vs. other modes of transport
- Main metro systems around the world
- History & economics of rail transport
- Specificities according to countries & Interoperability
- Rail organizations, rail industry & international key players: Operators, international organisations, engineering companies, manufacturers (infrastructure, rolling stock, signalling, etc.)
- Major rail events around the world, Key rail magazines & Websites

M2: Railway Systems overview & Metro specificities

- Introduction to rail subsystems and their main parameters
- Fundamental principles of guided transport systems
- Infrastructure
- Rolling stock
- Electrification
- Signalling & Telecommunications
- Operations
- Maintenance

M3: Rolling Stock

- Main types of rolling stock and their differences: High speed trains, Suburban trains, Tilting trains, Metro, Tramways, Tram-train, Freight trains
- Major characteristics: Speed, axle load, gauge
- Braking systems
- Traction systems: diesel, electric, etc.
- Vehicle dynamics, wheel-rail interaction
- Innovative projects
- Rolling stock terminology

M4: Track - Infrastructure, Components & Design

- General aspects
- Stresses on railway track
- Track substructure & Structures
- Ballasted track component
- Different slab track technologies & components
- Turnouts & crossings: Types, geometry, components
- Standards & specifications for track components
- Track design & Track geometry

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M5: Power Supply & Electrification

- Historical aspects of rail power supply
- Different systems: Third rail, overhead systems, APS
- Standardised voltages
- Current collection: Pantograph & catenary, third rail
- Power supply & electrical substations
- Return current & regenerative braking
- Electromagnetic compatibility with signalling & telecom rail equipment
- Railway electrification terminology

M6: Signalling

- Objectives of signalling systems
- Safety requirements
- CBTC: Introduction, Benefits & Risks, Architecture
- ERTMS

M7 : Operations & Traffic Planning

- Introduction: Railway risks, different types of traffic
- General principles for Operations: Planning/scheduling & Real-time operations
- Metro operations strategy
- Planning: Running times, graphic timetables, headway, line capacity, robustness in train scheduling
- Normal operating conditions
- Degraded modes of operation
- Exercises
- Operations Terminology

M8: Maintenance – Rolling Stock & Infrastructure

- General principles of maintenance: Maintenance levels, preventive and corrective maintenance
- Rolling stock: Maintenance levels, maintenance facilities and workshops
- Signalling & Electrification (OHL, third rail)
- Infrastructure: Track component wear, track geometry defects, maintenance tolerances, track inspection, maintenance activities (tamping, renewal, etc.) & equipment

M9: Technical Visit – Railway facility

- Operations Control Center – Track maintenance – Rail construction site – Railway testing centre - depending on availability

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