



Feasibility Study :
Establishing a Regional Centre of Railways Excellence for the Western Balkans

Annexes

ANNEX 5: EXAMPLES OF RELEVANT TRAINING COURSES



DB Rail Academy
by DB Engineering & Consulting GmbH

Rail Operations & Maintenance

Keeping timetables and ensuring railway operations run smoothly are key objectives for rail operators as these factors directly affect customer satisfaction. Maintenance is a key issue here: Trains require special facilities for storage and maintenance, and regular inspections help to identify and eliminate potential safety hazards. By keeping the infrastructure and rolling stock in good condition, the risk of accidents, derailments, and other incidents can be significantly reduced – which, in turn, helps improve reliability and efficiency.

Deutsche Bahn's maintenance practices adhere to the highest standards to ensure safety, reliability, efficiency, cost-effectiveness and customer satisfaction. Our vehicles are maintained by highly experienced staff at our state-of-the-art maintenance facilities, some of which are even climate neutral. There, we focus not only on general inspections and accident repairs, but also on predictive maintenance.



Rma1093

External and Internal Maintenance Guidelines

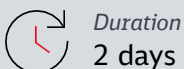
Get an introduction into the external and internal maintenance guidelines and an overview of relevant standards (DIN/EN/ISO) and get to know the relevant excerpts from applicable EU directives & regulations.

Course content

- Legal maintenance provisions
 - General Railway Act (AEG)
 - German Railway Construction and Operating Regulations (EBO)
- Government regulations (international regulations) and their interpretation
 - EU regulations (European Union)
 - EN standards (European standards)
 - EG directives, e.g. TSI (technical specification for interoperability)
- National regulations
 - DIN standards (national standards) e.g. DIN 27201
- Internal maintenance guidelines
 - GLs (guidelines), MMs (maintenance manuals)
- Manufacturers' documents
 - Sets of drawings, maintenance instructions, vehicle descriptions

Requirements

This training requires basic knowledge as a prerequisite.



Duration
2 days



Target group
Specialists &
Executives



Course level
Advanced
Training



Type of training
Single



Methodology
Lecture



Certification
Attendance
Certificate

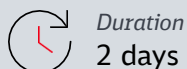
Rop1047

ETCS: Adaptation Training for Dispatcher

Learn about the ETCS regulations according to the adaptation training “European Train Control System (ETCS) for Dispatchers”.

Course content

- Facilities and functioning of ETCS
- ETCS-guided trains in regular operation
- Train operations on ETCS lines in special operating situations, during operations and disturbances
- Use of the ETCS operating device



Duration
2 days



Target group
Specialists



Course level
Advanced
Training



Type of training
Single



Methodology
Seminar



Certification
Attendance
Certificate

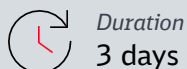
Rma1058

Key Components: Maintenance Depths of Each Component

Get an overview of the various maintenance measures for the individual components and learn the maintenance depths and work steps that contributes to a successful component maintenance.

Course content

- Maintenance measures, maintenance levels in connection with maintenance depths
- Explanation of work steps of each maintenance level (work instructions) in connection with the maintenance depth
- Cooperation with manufacturers of individual components and devices and assemblies (several devices together)
- Spare parts procurement (delivery times, internal storage and provision of spare parts, etc.) at Deutsche Bahn
- Obsolescence management and asset management
- Warranty claims against manufacturers and recourse claims (downtimes)
- IGBT maintenance and errors. (IGBT=Insulated-gate bipolar transistor)
- Measures to avoid/reduce IGBT damage



Duration
3 days



Target group
Newcomers



Course level
Fundamental
Training



Type of training
Single



Methodology
Lecture



Certification
Attendance
Certificate

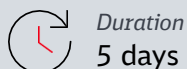
Rma1094

Maintenance Information System

Get familiar with managing the long-term sequence of non-scheduled work and the depot management. Get an introduction into several processes.

Course content

- Monitoring vehicle condition and managing sequence of work steps on vehicle faults
 - SAP ISI: lead maintenance system, system for organizing trains' delivery to depots for maintenance work, system for ordering unscheduled work
 - DIVA: application for electronic dispatching and order management on a mobile end device
 - Process for handling maintenance orders and vehicle approval (QSI processes)
- Coordinating sequence of work steps on complex vehicle faults in cooperation with depots via technical fault elimination preparation
- Quality check following fault elimination
- IT tools and KPIs for checking effectiveness of fault elimination (MTBF, TEV tool)
- Cross-location knowledge management



Duration
5 days



Target group
Newcomers &
Executives



Course level
Fundamental
Training



Type of training
Single



Methodology
Lecture



Certification
Attendance
Certificate

Rail Quality, Safety & Security

Ensuring a safe and risk-free railway system is critical for long-term success. A good understanding of relevant regulations and how to embed legal requirements into business processes is therefore essential. Functional safety is also an issue in this context: As rail technology becomes increasingly complex, the risk of the faulty behavior of railway equipment and systems is increasing. For this reason, employees must have a good understanding of how various components of the rail system, including hardware and software, interact.

Deutsche Bahn is committed to ensuring the safety of its passengers and employees. As Germany's national railway company, it places a high priority on maintaining a safe and secure environment for using its services. Thus, it adheres to strict safety standards and regulations set by the government and regulatory authorities such as the Federal Railway Authority.



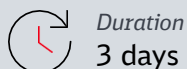
Rqs1906

Safety Management in Railway Business (SMS 1/3) – Legal Basics

Get a good overview of the national and European basics for a railway operation. It also takes a close look at a Safety Management System (SMS) and provides insight into the risk management process and stakeholders according to Common Safety Methods - Risk Assessment (CSM-RA). It also explains technical specifications and monitoring methods. It is particularly aimed at people working with a safety management system and those who are or will be working as safety officers/managers.

Course content

- National legal basics for a railway operation
- European legal basics for a railway operation
- Safety Management System (SMS): policy and effects
- The risk management process and stakeholders according to CSM-RA
- Scope and objective of EU regulations on CSM/ECM (Entity in Charge of Maintenance)
- Monitoring and evaluation of processes in SMS
- Technical specifications for interoperability (TSI)
- Request for a safety certificate/safety permit



Duration
3 days



Target group
All



Course level
Fundamental
Training



Type of training
Single



Methodology
Lecture



Certification
Attendance
Certificate

Rqs1099

Safety Management in Railway Business (SMS 2/3) – Basics & function

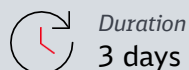
Learn to implement the requirements of the relevant EU directives and EU regulations for the SMS and ECM in the processes of their companies. Become familiar with the risk-oriented approach and learn the procedures and methods from the relevant CSM regulations. Be aware of special aspects of continuous improvement in the SMS as well as the task and roles of the SMS officer. Gain an overview of emergency, crisis and continuity management (BCM - Business Continuity Management).

Course content

- Structure and implementation of a Safety Management System (SMS)
- Functions in a SMS
- Process organization of a SMS organization
- SMS vs. Common Safety Methods (CSM)
- Overview Emergency, Crisis, Continuity Management in SMS
- Overview KRITIS: Implementing IT Security Management

Requirements

The participation in this course requires the completion of the course Rqs1906.



Duration
3 days



Target group
All



Course level
Advanced
Training



Type of training
Single



Methodology
Lecture



Certification
Attendance
Certificate

Rqs1100

Safety Management in Railway Business (SMS 3/3) – Leadership, Task-Competences-Responsibility

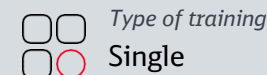
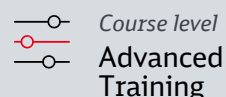
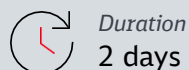
Gain an overview of the legal requirements and tasks of companies when dealing with accidents/incidents. Based on a practical case study, the participants will learn about the first steps of accident investigation, the resulting analysis (including human factors), the derivation of recommendations and the monitoring of accidents.

Course content

- Event investigations
- Delegation of functions
- Leadership in Safety Management System (SMS)

Requirements

The participation in this course requires the completion of the course Rqs1099.



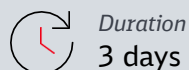
Rqs1083

Safety/Risk Management & Incident Investigation I

Understand the core processes of Safety- and Risk Management Systems (I+II) and the core processes of incident investigation and the integration in safety management systems.

Course content

- The value-added-chain and relevant core processes
- The concept of process based and risk orientated management and the context to railway company
- Risk identification and the definition of processes as risk control measures
- The concept of systematic safety management
- How to ensure effectiveness of the management system – the importance of monitoring and continual improvement
- Get to know the generic risk management process
- The definition of the methodological requirements of a system
- The concept of risk analysis and evaluation by estimation of frequency of an incident and severity of its consequences
- The concept of hazard management
- The concept of incident investigation - What does an incident mean for the SMS (Safety Management System)?
- Emergency Management and on-site investigation
- Concepts & methods of root cause analysis in theory and practice
- Development of implications for safety and just culture
- Understand the concept of Just Culture



Duration
3 days



Target group
Newcomers &
Executives



Course level
Fundamental
Training



Type of training
Single



Methodology
Seminar



Certification
Attendance
Certificate

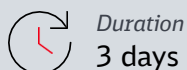
Rqs1084

Safety/Risk Management & Incident Investigation incl. Quality & Audit II

Understand the principal elements of rolling stock and trams and its implications.

Course content

- The value-added-chain and relevant core processes
- The concept of process based and risk oriented management and the context to railway company
- Risk identification and the definition of processes as risk control measures
- The concept of systematic safety management
- Importance of monitoring and continual improvements
- Generic risk management processes
- The definition of the methodological requirements of a system
- The concept of risk analysis, evaluation, hazard management and incident investigation
- Emergency Management and on-site investigations
- Independent safety approval and certification
- ISO 9001 standards
- Quality management system and safety culture
- Audit process
- PDCA concept
- Competence assessment



Duration
3 days



Target group
Newcomers &
Executives



Course level
Fundamental
Training



Type of training
Single



Methodology
Seminar



Certification
Attendance
Certificate

Innovation & Digitalization

Technology today is more than just mechanical or civil engineering; the digital revolution has created more demand than ever for computer-based products and solutions in the mobility and railway industry. Keeping up to date with digitalization and implementing new technologies is vital in the workplace because it enables companies to improve efficiency and effectiveness. This is especially true for the railway industry as digital technologies offer crucial advantages that help companies gain a competitive edge.

The digital and technical strategy of Deutsche Bahn is designed to develop an ultra-smart mobility network by 2030 – connected, automated and customer-oriented. As part of the Digitale Schiene Deutschland, the infrastructure is being modernized and digitalized. This together with automation and artificial intelligence (AI) are key to a higher capacity and optimal utilization of the rail network.



Dda5007

AI for Railways: Let Machines Learn for You

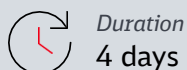
Artificial intelligence (AI) offers endless possibilities for rail companies in terms of using data more efficiently, refining processes and developing new business models.

Course content

Rail infrastructures worldwide must be utilized better, whilst still fulfilling stringent quality requirements. This makes the use of artificial intelligence (AI) simply unavoidable. AI is the key factor when it comes to making the railway even more attractive and efficient. Over the coming years, elements of AI will be incorporated into practically every single digital process – e.g. for optimizing maintenance, damage detection and servicing work or for providing passengers with real-time information.

In this course, you will familiarize yourself with current AI technologies and their impacts on and limitations for railways. “Examining exemplary use cases from the railway business, you will review and reflect on processes to classify and use data.

- Current state of technology and limitations of AI
- Impact on technology, work and society
- Difference between data science and artificial intelligence
- AI technologies, neural networks and examples for their usage
- Usage of neural networks to classify data
- The principal of machine learning and deep learning
- Case examples in the rail business



Duration
4 days



Target group
Executives



Course level
Fundamental
Training



Type of training
Online or
Classroom



Methodology
Lecture



Certification
Attendance
Certificate

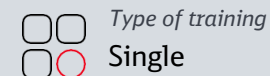
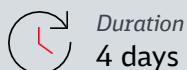
Dte1003

Basics: Digital Planning & Construction (BIM)

Get a general overview of the 5D/BIM methodology and explains the federal initiative to support the introduction of BIM in the construction sector.

Course content

- Definition of BIM
- Status Quo in Europe and the world
- Coordination and integration in the planning phase
- BIM execution plan
- Project implementation plan
- Information delivery
- Common data environment
- Task information delivery plan
- 4D BIM - Model-based scheduling
- 5D BIM – Model-based estimating and cost control
- BIM data exchange



Dte5003

Core Technologies of Digital Railways I

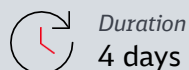
This course explains the core technologies as the basis for connected rail and mobility companies in the digital age.

Course content

Several technologies and concepts build form the basis for the age of connected digital mobility. Computing power is continuously increasing and available everywhere, data-driven solutions are changing decision making, information is being stored in a decentralized and tamper-proof manner, and machines are starting to learn and work for us.

In this course, we will go on a round trip and look at the various technologies that form the foundation of a digital rail company. Digital companies without their own data center, connected with ever-faster wireless connections that provide internet at your fingertips and in faraway located areas; digital contracts that are stored decentrally and secured against manipulation – all these things and more change our business of tomorrow. You will learn about example cases from the Deutsche Bahn Group and other rail companies as well as have time to reflect on sample scenarios for your own company.

- Blockchain
- Cloud
- Internet of Things and Connectivity
- Big Data & Artificial Intelligence
- Example cases of the Deutsche Bahn Group
- Scenarios for usage in your company



Duration
4 days



Target group
Specialists



Course level
Fundamental
Training



Type of training
Online or
Classroom



Methodology
Seminar



Certification
Attendance
Certificate

Dte5004

Core Technologies of Digital Railways II

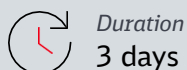
Learn about the core tools and aspects influencing your employees and how they work together as the basis for connected rail and mobility companies in the digital age.

Course content

Beyond the core technologies of the age of connected digital mobility, there are more aspects which influence our employees as well as customers. The office workplace as well as a workplace in operations changes due to digitalization, augmented reality enhances your field of view, and virtual reality enables the simulation of situations before they exist. In addition, since rail companies provide a public infrastructure, they attract the focus of malicious “friends”.

In this course, you will familiarize yourself with important tools and aspects, learning how this influence and affect business and working together in the digital age. You will examine example cases of the Deutsche Bahn Group and other rail companies as well as have time to reflect on sample scenarios for your own company.

- Digital Workplace and digital collaboration to speed up your processes
- Workflow automation for reoccurring tasks to focus on important tasks
- Mixed reality: Augmented and virtual realities change human machine interaction
- Cyber security for rail companies
- Example cases of the Deutsche Bahn Group
- Scenarios for usage in your company



Duration
3 days



Target group
Specialists



Course level
Fundamental
Training



Type of training
Online or
Classroom



Methodology
Seminar



Certification
Attendance
Certificate