

# Railway Engineering Design Safety Management (EDSM) according to EN50126 *Safeguarding Railway Systems with Safety Management Processes*



Focus on: **The Manager** ☒ **The Specialist** ☒ **Spotlight Programme** ☒ **Hands-on Skills** ☐

## Course Overview

This course addresses **safety-critical systems in railways**, which are essential for the successful deployment of modern technologies such as **ERTMS**. Emphasis is placed on the application of safety standards including:

- **EN 50126** – for lifecycle-based reliability, availability, maintainability, and safety (RAMS);
- **EN 50129** – for developing and assessing safety cases for safety-related electronic systems;
- **EN 50716** – the new standard focused on developing safety critical software.

Together, these standards provide the necessary structure for integrating safety into complex railway systems, ensuring compliance, assurance, and resilience. The course content is mapped to recognised industry competencies, evidence frameworks for railway safety roles, and relevant international and national standards.

Course Objectives		This Course is Ideal For:	
1	<b>Appreciate and Apply Risk in Railway Design and Safety Management</b> Understand hazards, risk assessment approaches, and the principles of SFAIRP; recognise the role of the designer as a 'rail safety worker' and the implications for railway safety and business performance.	✓	Railway Business Leaders and Managers
2	<b>Apply Standards and Best Practice</b> Identify, interpret, and apply relevant railway safety and design standards (EN50126, EN50129, EN50716, EN50155, etc.) to aid risk management and align with current industry best practice.	✓	Railway Inspectors and Legislators
3	<b>Develop and Communicate Safety Assurance</b> Contribute to safety planning and the creation of hazard logs, safety cases, and other records; communicate safety-related information effectively to stakeholders across the project lifecycle. safety within a business context.	✓	Railway Safety Assessors

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4	<b>Integrate Design with the Safety Lifecycle</b> Describe how safety management and engineering design interact, ensuring a risk-based systems engineering lifecycle approach that delivers built-in safety, value, and performance.	✓	Railway Engineers
5	<b>Build Practical Risk Management and Integration Skills</b> Use case studies, project management, systems engineering, integration, and validation to develop practical skills in recognising failures, managing risks, and optimising processes.	✓	Safety Professionals and Planners

### Course Content

Day	Theme	Coverage
1	Foundations of Engineering Design Safety Management (EDSM)	<ul style="list-style-type: none"> <li>• Introduction to EDSM &amp; Acronyms</li> <li>• Understanding risk in the railway context</li> <li>• Examples of engineering and design safety risks in rail</li> <li>• Introduction to EN50126-1/2:2017 (safety lifecycle concepts)</li> </ul>
2	Learning from Experience: Case Studies and Active Learning	<ul style="list-style-type: none"> <li>• Case studies of accidents related to design – lessons from failures</li> <li>• <b>Active Learning:</b> Detailed accident case study (design errors and inadequate EDSM)</li> <li>• Reflection and group discussion: how these lessons inform future design practice</li> </ul>
3	Standards, Risk, and Reliability	<ul style="list-style-type: none"> <li>• Standards for engineering safety (overview of EN50128:2011, EN50129:2017, EN50155:2017, EN50716:2023)</li> <li>• Safety Integrity Levels (SIL) – concepts and applications</li> <li>• Identifying, assessing, and mitigating risk</li> <li>• Reliability, Availability, Maintainability (RAM)</li> <li>• Verification and Validation (V&amp;V) in the rail context</li> </ul>
4	Legal, Legislative and Practical Compliance	<ul style="list-style-type: none"> <li>• Legislative requirements for rail design and engineering safety risk</li> <li>• Demonstration of SFAIRP and compliance obligations</li> <li>• <b>Active Learning:</b> Practical application of SFAIRP in a worked case study</li> <li>• Understanding safety acceptance and approval processes</li> </ul>

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5	Systems Integration, Management, and the Digital Future	<ul style="list-style-type: none"><li>• Safety management systems and quality management frameworks</li><li>• Safety organisational issues – roles, responsibilities, and culture</li><li>• Security from cyberthreats in rail design and operations</li><li>• Railway systems engineering and integration</li><li>• The way forward – the new Digital Railway and emerging challenges</li><li>• Course assessment and wrap-up</li></ul>
Course Assessment		Certification
Participants will be assessed on:		Upon successful completion of the course, participants will receive a <b>Certificate of Successful Completion</b> , along with a <b>Transcript of Marks</b> showing the performance by grade in each element of assessment and overall.
Participation in sessions		
Completion of exercises & case studies		
Performance in assessments		
Course Instructor		
<p>This speaker is a Member of the Institution of Railway Signal Engineers (MIRSE), He holds a doctorate in Mechanical and Aeronautical Engineering and undertakes consultancy and research. He delivers specialised training in engineering, safety, risk management, interoperability, and railway legislation.</p> <p>With over 30 years of international experience, he has held senior roles in signalling, rolling stock, infrastructure, and railway systems, including Systems Assurance Manager and Head of Systems Engineering and Safety. His expertise spans metro, tram, and heavy rail, with a focus on safety, compliance, and reliability. The speaker also sits on the IEC committee for the railway OT Cybersecurity standard.</p>		