Rail Industry

A track record of success

- EN 50129 compliant safety cases
- Managing Safety-Related Application Conditions
- Working with Independent Safety Assessors
- Evaluating the resilience of railway signalling systems to cyber attack
- Rail Code of Practice on security-informed safety
- Training for railway safety engineers on security-informed safety

ASCE, GSN and EN50129

A world leader in railway systems invited Adelard to demonstrate the benefits of using ASCE and goal structuring notation (GSN) to develop EN 50129 safety cases for its railway systems.

The consultation involved the development of a GSN template for an EN50129 safety case. Each branch of the GSN network corresponds to a chapter of the EN 50129 safety case and each node provides safety engineers with guidance and advice on the content expected in that section of the safety case.

This approach allows safety cases for new projects to be created by populating each section of the template with appropriate content. ASCE's 'One click export' feature is then used to convert the GSN network into a Word document, making it possible for an EN 50129 compliant safety case to be produced much more efficiently, reducing cost and the stress associated with this mandated activity.

Safety-Related Application Conditions (SRACs)

Railway systems are typically built from a set of components. The safety case for the overall system depends on the safety cases for its components and must demonstrate that any SRACs for those components are satisfied. By using ASCE's embedded issue feature and the ability to import and export embedded issues from one safety case to another, we developed a tailored approach to managing SRACs across multiple safety cases that enforces the requirements of EN 50129.

Why Adelard?

Adelard, part of NCC Group, is a specialist and influential product and services practice supporting clients in the areas of safety, dependability, security and risk management. We add value by enabling our clients across industry sectors to:

- Efficiently develop, communicate and maintain safety and assurance cases. This process is supported by our ASCE software solution.
- Have confidence in the status of safety and related compliance evidence.
- Respond to regulatory change and manage reputational risk.

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ASCE and Independent Safety Assessors

Altran UK's rail team includes specialist Independent Safety Assessors (ISAs). Altran's ISAs work with the world's major signalling suppliers and use the ASCE tool to present their independent safety assessments as structured arguments expressed in GSN. Working with ASCE in this way allows the lead ISA to question whether sufficient evidence is available to support each GSN goal, and provides confidence that the argument is complete when offering an ISA opinion on a signalling system or deployment.

Altran has used ASCE and a GSN structured argument throughout London Underground's Jubilee and Northern Line upgrade projects spanning from 2002 to 2014, and recently on the Four Lines Modernisation upgrade for the District/ Circle/Hammersmith & City and Metropolitan lines.

Rail Code of Practice for security-informed safety

In consultation with the rail industry, Adelard has developed a Code of Practice (CoP) for security-informed safety in the rail sector. The CoP provides guidance on how to manage security threats to safety by incorporating security processes, procedures and knowledge into the safety life cycle, and forms part of a broader programme of work by the Centre for the Protection of National Infrastructure (CPNI) that is aimed at increasing 'security-mindedness' for engineers.

The CoP is applicable to organisations that are responsible for commissioning, designing, supplying, operating or maintaining systems and services that support the entire rail ecosystem. This includes manufacturers and suppliers of railway equipment or services, rolling stock owners, train operators, rail infrastructure providers, maintenance organisations, and digital service providers.

The next edition of EN 50129, currently in final draft status, includes specific guidance on IT security, and there are also plans to develop a technical specification for cybersecurity in railway applications. Adopting the recommendations in the CPNI CoP will help the rail industry to prepare for the publication of these new standards.

Resilience of railway signalling systems to cyber attack

Adelard has supported government and the rail industry by evaluating the resilience of railway signalling systems to cyber attack. This work has included:

- evaluating the European Railway Traffic Management System (ERTMS) specifications for security vulnerabilities
- performing cyber security risk assessments of ETCS onboard systems from all of the major suppliers
- developing a high-level cyber security risk assessment of a national implementation of ERTMS

Training for railway safety engineers on security-informed safety

Adelard provides a 1-day training course on security-informed safety for safety engineers. The course helps safety engineers understand the risks that cybersecurity threats pose to the safety of systems and provides guidance on how to design systems that are both safe and secure.