

# Appendix-IV



## European CENELEC Railway Standards

### On Track For North America

International Safety Mandates Affecting Railway And Public Transport Market

**Sept/Oct 2006**

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International railway experts notice that the European CENELEC (Comité Européen de Normalisation Électrotechnique) railway standards are beginning making their way into the North American railway and public transport market. For example, the Federal Railroad Administration (FRA) in 2005 issued a performance standard for the development and use of processor-based signal and train control systems (see 49 CFR parts 209, 234 and 236). In appendix C to part 236 - Safety Assurance Criteria and Processes - the CENELEC standards EN 50126, EN 50128 and EN 50129 are recognized as acceptable with respect to applicable elements of safety analysis.

To date, these standards have reached a mature state and are implemented at practically every new international rail technology project. They have been developed by CENELEC, the European Committee for Electrotechnical Standardization in Brussels, Belgium. These standards do not only apply to heavy rail systems, as their heading "Railway applications" may imply, but also to light rail and urban mass transportation, including people-mover systems. Now, North American manufacturers and businesses dealing with the railways and public transport must familiarize and, in due time, adhere to these standards, when called for in the contract document.

EN 50126 is often called the "RAMS standard," since it deals with Reliability, Availability, Maintainability and Safety (RAMS) for the entire railway system. EN 50129 applies to safety-related electronic control and protection systems. EN 50128 applies to (safety-related) software for railway control and protection systems. The standards EN 50128 and EN 50129 represent the railway applicationspecific interpretation of the international standard series - IEC 61508 (Functional safety of electrical/ electronic/programmable electronic safety-related systems). There are further CENELEC standards for rail applications focusing more on technical details, such as EN 50121 on electromagnetic compatibility or EN 50159 on communications. However, the set of the three standards EN 50126, EN 50128 and EN 50129 represents the backbone of the process of demonstrating the safety of a railway system.

The standards introduce a probabilistic approach, while in the past were mainly used in nuclear and aerospace technologies, into rail technology. The standards:

- Provide a structured approach and flexible methodology;
- Standardize the demonstration of system safety of complex rail systems;
- Allow the integration of proven and new technologies; and
- Match the safety case concept to all subsystems.