SEK SVENSK ELSTANDARD

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Railway specifications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS) – Part 3: Guide to the application of EN 50126-1 for rolling stock RAM

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Standarder underlättar utvecklingen och höjer elsäkerheten

Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

SEK är Sveriges röst i standardiseringsarbetet inom elområdet

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

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Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

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Railway applications – The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS) – Part 3: Guide to the application of EN 50126-1 for rolling stock RAM

Applications ferroviaires – Spécification et démonstration de la Fiabilité, de la Disponibilité, de la Maintenabilité et de la Sécurité (FDMS) – Partie 3: Guide pour l'application de la EN 50126-1 à la fiabilité, la disponibilité, la maintenabilité et la sécurité du matériel roulant

Bahnanwendungen – Spezifikation und Nachweis der Zuverlässigkeit, Verfügbarkeit, Instandhaltbarkeit, Sicherheit (RAMS) – Teil 3: Leitfaden zur Anwendung der EN 50126-1 für Bahnfahrzeuge RAM

This Technical Report was approved by CENELEC on 2008-05-09.

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CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

This Technical Report was prepared by Working Group B11 of SC 9XB, Electromechanical material on board of rolling stock, of Technical Committee CENELEC TC 9X, Electrical and electronic applications for railways.

The text of the draft was submitted to the vote and was approved by CENELEC as CLC/TR 50126-3 on 2008-05-09.

This Technical Report supersedes CLC/TR 50126-3:2006.

This Technical Report forms an informative part of EN 50126 and contains guidelines for the application of EN 50126-1 to Rolling Stock RAM.

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Introduction

EN 50126-1 is likely to enhance the general understanding of the issues involved in achieving RAMS characteristics within the railway field. It defines a comprehensive set of tasks for the different phases of a generic life cycle for a total rail system. Although some of the examples given in the annexes of EN 50126-1 are for rolling stock, the standard is essentially aimed as a top level railway system document.

RAMS characteristics for rolling stock (i.e. its long term operating behaviour performance), as for any other system, forms an important part of its overall performance characteristics. But the consideration of RAMS, in contractual terms, between a customer / operator and a Main Supplier for the procurement of rolling stock has been problematic. Also, in rolling stock contracts, there is now a greater emphasis on the impact on end customers of service failures and on the economic and risk considerations of RAMS (i.e. the business perspective).

Consequently, Life Cycle Cost is being used as a measure of satisfying customer needs and providing a wider perspective of RAMS importance in terms of the business economics.

Life Cycle Cost approach represents a holistic, total cost of ownership philosophy for addressing the economic considerations. The contribution of RAMS to the LCC (Life Cycle Cost) of rolling stock could be used to allow the economic considerations to be addressed.

This application guide focuses mainly on the tasks and issues from procurement, engineering and maintenance, from the tender to the operation/maintenance phase, and is intended to help in establishing a common approach for capturing the different, time dependant, performance requirements of rolling stock from an operator/business perspective.

EN 50126-1 is a standard, which treats the overall aspects of RAMS in Railway Applications.

This guide deals with the application of RAM part of EN 50126-1 to rolling stock only, as stated in the Scope and clarifies areas where EN 50126-1 could be misinterpreted.

1 Scope

This document provides guidance on applying the RAM requirements in EN 50126-1 to rolling stock and for dealing with RAM activities during the system life cycle phases from invitation to tender to demonstration in operation only. All references to EN 50126-1 concern the version of 1998.

The guide is aimed at the customers/operators and main suppliers of rolling stock. The main purpose of the guide is to:

- enable a customer/operator of rolling stock:
  - to specify the RAM requirements addressing the type of operation in terms of the end customer needs, considering service availability and economic considerations;
  - to evaluate different tenders, in terms of RAM requirements, on a common basis with the aid of specific RAM documents;
  - to gain assurance, during design/development phase, that the rolling stock being offered is likely to satisfy the RAM contractual requirements by examining step by step detailed and specific RAM documents as an output of the RAM activities performed during the development phase;
  - to validate that the rolling stock, as delivered, satisfies the specified RAM requirements
- to enable the main supplier of rolling stock
  - to understand the customers/operators RAM requirements
  - to provide substantive information/visibility in a tender to show that the product offered is likely to satisfy the RAM requirements by performing preliminary RAM analysis;
  - to provide substantive information during design/development phase to show that the product offered is likely to satisfy the RAM requirements by performing detailed RAM analysis;
  - to demonstrate that the product delivered satisfies the RAM requirements;

Regarding LCC, this application guide is restricted to providing only the key RAM parameters necessary to be incorporated into an LCC Model.

This application guide excludes:

- RAM values connected to the different RAM requirements (however, it contains a simple guide line of actions for supporting the decision making process and choosing appropriate values, see 5.4)
- specific RAM documents to be produced and activities to be performed. However, it provides, only as an example, typical data and document templates for recording the output of a RAM analysis).