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Railway applications – Specification and demonstration of reliability, availability, maintainability and safety (RAMS) – Part 3: Guide to the application of IEC 62278 for rolling stock RAM

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RAILWAY APPLICATIONS – SPECIFICATION AND DEMONSTRATION OF RELIABILITY, AVAILABILITY, MAINTAINABILITY AND SAFETY (RAMS) –

Part 3: Guide to the application of IEC 62278 for rolling stock RAM

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IEC 62278-3, which is a technical report, has been prepared by IEC technical committee 9: Electrical equipment and systems for railways.

This technical report is based on EN 50126-3.

This technical report is to be read in conjunction with IEC 62278 (2002).

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
9/1284/DTR	9/1315A/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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INTRODUCTION

IEC 62278 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 IEC 62278 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, form 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 economic considerations. The contribution of RAMS to the LCC (Life Cycle Cost) of rolling stock could be used to allow 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.

IEC 62278 is a standard, which treats the overall aspects of RAMS in railway applications.

This guide deals with the application of RAM part of IEC 62278 to rolling stock only, as stated in the scope and clarifies areas where IEC 62278 could be misinterpreted.

RAILWAY APPLICATIONS – SPECIFICATION AND DEMONSTRATION OF RELIABILITY, AVAILABILITY, MAINTAINABILITY AND SAFETY (RAMS) –

Part 3: Guide to the application of IEC 62278 for rolling stock RAM

1 Scope

This part of IEC 62278 provides guidance on applying the RAM requirements in IEC 62278 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 IEC 62278 concern the 2002 issue.

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 guideline 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).