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**Railway applications -- Specification and demonstration of
Reliability, Availability, Maintainability and Safety (RAMS)
(English Translation)**

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Table of Contents

Foreword...	4
Introduction...	5
1 Scope...	6
2 Normative References...	7
3 Terms and Definitions...	7
4 Railway RAMS...	13
4.1 Introduction...	13
4.2 Railway RAMS and quality of service...	14
4.3 Elements of railway RAMS...	14
4.4 Factors influencing railway RAMS...	17
4.5 Means to achieve railway RAMS requirements...	23
4.6 Risk...	24
4.7 Safety integrity...	26
4.8 Fail-safe concept...	29
5 Management of Railway RAMS...	29
5.1 General...	29
5.2 System life cycle...	30
5.3 Application of this Standard...	36
6 RAMS Life Cycle...	38
6.1 Phase 1. Concept...	38
6.2 Phase 2. System definition and application conditions...	40
6.3 Phase 3. Risk analysis...	45
6.4 Phase 4. System requirements...	47
6.5 Phase 5. Apportionment of system requirements...	53
6.6 Phase 6. Design and implementation...	55
6.7 Phase 7. Manufacturing...	58
6.8 Phase 8. Installation...	60

Foreword

This Standard equivalently adopts IEC 62278.2002 Railway Applications -
Specification and Demonstration of Reliability, Availability, Maintainability and Safety

(RAMS) (English version).

This Standard equivalently translates IEC 62278.2002.

For the benefit of use, this Standard makes the following editorial modifications.

- a) Modify "this International Standard" into "this Standard";
- b) Delete the foreword of the international standard.

The Annex A, B, C, D, E in this Standard are informative.

This Standard was proposed by and shall be under the jurisdiction of National Technical Committee for Standardization of Traction Electrical Equipment and System. Drafting organizations of this Standard. Zhuzhou CSR Times Electric Co., Ltd., CSR Sifang Locomotives & Rolling Stock Co., Ltd., CSR Zhuzhou Electric Locomotive Co., Ltd., China Railway Electrification Survey Design & Research Institute, Tongji University, and Ministry of Railways - Research Institute of Standard and Metrology. Chief drafting staffs of this Standard. Yan Yunsheng, Fan Zuocheng, Liu Gui, Guo Liping, Gao Daoxing, Zhang Zhilong, Su Guanghui, Cheng Zuguo, and Hu Aichan.

1 Scope

This Standard defines RAMS in terms of reliability, availability, maintainability and safety and their interaction; defines a process, based on the system life cycle and tasks within it, for managing RAMS; enables conflicts between RAMS elements to be controlled and managed effectively.

2 Normative References

The provisions in following documents become the provisions of this Standard through reference in this Standard. For dated references, the subsequent amendments (excluding corrigendum) or revisions do not apply to this Standard, however, parties who reach an agreement based on this Standard are encouraged to study if the latest versions of these documents are applicable. For undated references, the latest edition of the referenced document applies.

GB/T 19001-2000 Quality Management Systems - Requirements (idt ISO 9001.2000)

3 Terms and Definitions

For the purposes of this Standard, the following definitions apply.

Ability of a product to be in a state to perform a required function under given conditions at a given instant of time or over a given time interval assuming that the required external resources are provided.

4 Railway RAMS

A system can be defined as an assembly of sub-systems and components, connected together in an organized way, to achieve specified functionality.

5 Management of Railway RAMS

This representation is effective in showing verification and validation tasks within the life cycle. The objective of verification is to demonstrate that, for the specific inputs, the deliverables of each phase meet in all respects the requirements of that phase.

6 RAMS Life Cycle

This clause details objectives, requirements, deliverables and verification and validation activities to be undertaken throughout each life cycle phase. The scope and application of the requirements shall be assessed and adapted to meet the particular requirements of the system under consideration.

The input to this phase shall include all relevant information, and where appropriate, data, necessary to meet the requirements of the phase, including the deliverables of phase 1.

Annex A

(Informative)

Outline of RAMS Specification - Example

In order to facilitate the application of this standard, a principal outline of a RAMS specification for railway systems is presented in this annex. This outline example relates to Figure 8 and Figure 9 of this standard and the corresponding descriptions of

the life cycle phases detailed in Clause 6, using rolling-stock as an example to provide supporting detail within the outline.

Annex B

(Informative)

RAMS Programme

B.1 This annex gives an example of an outline procedure for a basic RAM programme/Safety Plan and shows an example of a basic RAMS programme (RAM programme/Safety Plan). It also lists some methods and tools for RAMS management and analysis.

Annex C

(Informative)

Examples of Parameters for Railway Applications

Examples of typical parameters and symbols, suitable for use in railway applications, are tabulated below.

Annex D

(Informative)

Examples of Some Risk Acceptance Principles

Values given in this annex are only to illustrate the principles and are not intended to be used for any other purpose.

Annex E

(Informative)

Responsibilities within the RAMS Process throughout the Life Cycle

As a general guideline, for a typical railway project, the following applies.

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