



NSAI
Standards

Irish Standard
I.S. EN 50126-1:1999

Railway applications - The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS) -- Part 1: Basic requirements and generic process

I.S. EN 50126-1:1999

Incorporating amendments/corrigenda issued since publication:

EN 50126-1:1999/AC:2010

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

<i>This document replaces:</i> EN 50126:1999	<i>This document is based on:</i> EN 50126-1:1999 EN 50126:1999	<i>Published:</i> 15 September, 1999 22 June, 2001
This document was published under the authority of the NSAI and comes into effect on: 24 August, 2010		ICS number: 29.280 45.020
NSAI 1 Swift Square, Northwood, Santry Dublin 9	T +353 1 807 3800 F +353 1 807 3838 E standards@nsai.ie W NSAI.ie	Sales: T +353 1 857 6730 F +353 1 857 6729 W standards.ie
Údarás um Chaighdeáin Náisiúnta na hÉireann		

English version

Railway applications - The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS) - Part 1: Basic requirements and generic process

Applications ferroviaires – Spécification et démonstration de la fiabilité, de la disponibilité, de la maintenabilité et de la sécurité (FDMS) - Partie 1: Exigences de base et procédés génériques

Bahnanwendungen –Spezifikation und Nachweis der Zuverlässigkeit, Verfügbarkeit, Instandhaltbarkeit, Sicherheit (RAMS) - Teil 1: Grundlegende Anforderungen und genereller Prozess

This European Standard was approved by CENELEC on 1998-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This European Standard was prepared by the Technical Committee CENELEC TC 9X, Electrical and electronic applications in railways.

The text of the draft was submitted to the formal vote and was approved by CENELEC as EN 50126-1 on 1998-10-01.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2000-04-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2000-04-01

Annexes designated “normative” are part of the body of the standard.

Annexes designated “informative” are given for information only.

In this standard, annexes A to E are informative.

To assist the user in the application of this standard for safety and for managing RAM performance in the rolling stock procurement process, the following application guides have been produced:

CLC/TR 50126-2 ¹⁾ Guide to the application of EN 50126-1 for safety

CLC/TR 50126-3 Guide to the application of EN 50126-1 for rolling stock RAMS

The contents of the corrigendum of May 2010 have been included in this copy.

¹⁾ In preparation.

Content

	Page
Foreword.....	2
Introduction	5
1 Scope	6
2 Normative references	7
3 Definitions	8
4 Railway RAMS	11
4.1 Introduction	11
4.2 Railway RAMS and quality of service	11
4.3 Elements of railway RAMS	12
4.4 Factors influencing railway RAMS	14
4.4.1 General	14
4.4.2 Categories of factors.....	14
4.4.3 Management of factors	18
4.5 The means to achieve railway RAMS requirements	19
4.5.1 General	19
4.5.2 RAMS specification:.....	19
4.6 Risk	20
4.6.1 Risk concept:	20
4.6.2 Risk analysis:	20
4.6.3 Risk evaluation and acceptance	21
4.7 Safety integrity	22
4.8 Fail-safe concept	24
5 Management of railway RAMS	25
5.1 General	25
5.2 System lifecycle	25
5.3 Application of this standard.....	31
6 RAMS lifecycle	34
6.1 Phase 1: Concept	34
6.2 Phase 2: System definition and application conditions	36
6.3 Phase 3: Risk analysis	39
6.4 Phase 4: System requirements	41
6.5 Phase 5: Apportionment of system requirements	45
6.6 Phase 6: Design and implementation	47
6.7 Phase 7: Manufacturing	50
6.8 Phase 8: Installation.....	52
6.9 Phase 9: System validation (including safety acceptance and commissioning)	54
6.10 Phase 10: System acceptance	56
6.11 Phase 11: Operation and maintenance	57
6.12 Phase 12: Performance monitoring	58
6.13 Phase 13: Modification and retrofit	59
6.14 Phase 14: Decommissioning and disposal	60
Annex A (informative) Outline of RAMS specification - example	61
Annex B (informative) RAMS programme	66
Annex C (informative) Examples of parameters for railway	71
Annex D (informative) Examples of some risk acceptance principles	73
Annex E (informative) Responsibilities within the RAMS process throughout the lifecycle.....	76
Annex ZZ (informative) Coverage of Essential Requirements of EC Directives	77

Figures

Figure 1: Quality of Service and Railway RAMS	12
Figure 2: Inter-relation of Railway RAMS elements	12
Figure 3: Effects of Failures Within a System	13
Figure 4: Influences on RAMS	14
Figure 5: Factors Influencing Railway RAMS	16
Figure 6: Example of a Cause/Effect Diagram	18
Figure 7: Certified Products in Safety Systems	23
Figure 8: System Lifecycle	26
Figure 9: Project Phase Related Tasks (Sheet 1 of 2)	27
Figure 9: Project Phase Related Tasks (Sheet 2 of 2)	28
Figure 10: The V Representation	30
Figure 11: Verification and Validation	31
Figure 12: RAMS Eng. and Manag't Implemented within a System Realisation Process	33

Tables

Table 1: RAM Failure Categories	19
Table 2: Frequency of Occurrence of Hazardous Events	20
Table 3: Hazard Severity Level	21
Table 4: Frequency - Consequence Matrix	21
Table 5: Qualitative Risk Categories	22
Table 6: Typical Example of Risk Evaluation and Acceptance	22
Table B.1: Example of a Basic RAMS Programme Outline	67
Table C.1: Examples of Reliability Parameters	71
Table C.2: Examples of Maintainability Parameters	71
Table C.3: Examples of Availability Parameters	71
Table C.4: Examples of Logistic Support Parameters	72
Table C.5: Examples of Safety Performance Parameters	72

Introduction

This European Standard provides Railway Authorities and the railway support industry, throughout the European Union, with a process which will enable the implementation of a consistent approach to the management of reliability, availability, maintainability and safety, denoted by the acronym RAMS. Processes for the specification and demonstration of RAMS requirements are cornerstones of this standard. This European Standard aims to promote a common understanding and approach to the management of RAMS.

This European Standard can be applied systematically by a railway authority and railway support industry, throughout all phases of the lifecycle of a railway application, to develop railway specific RAMS requirements and to achieve compliance with these requirements. The systems-level approach defined by this European Standard facilitates assessment of the RAMS interactions between elements of complex railway applications.

This European Standard promotes co-operation between a railway authority and railway support industry, within a variety of procurement strategies, in the achievement of an optimal combination of RAMS and cost for railway applications. Adoption of this European Standard will support the principles of the European Single Market and facilitate European railway inter-operability.

The process defined by this European Standard assumes that railway authorities and railway support industry have business-level policies addressing Quality, Performance and Safety. The approach defined in this standard is consistent with the application of quality management requirements contained within the ISO 9000 series of International standards.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

-
- Looking for additional Standards? Visit Intertek Inform Infostore
 - Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation
-