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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 21562.3-2015

**Railway applications -- Specification and demonstration of
reliability, availability, maintainability and safety (RAMS) -- Part
3: Guide to the application for rolling stock RAM
(English Translation)**

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Table of Contents

Foreword...	3
Introduction...	5
1 Scope...	6
2 Terms and definitions...	7
3 Approach...	7
3.1 General...	7
3.2 Entities involved in the life cycle phases of rolling stock...	7
4 Application...	8
4.1 Object of the application...	8
4.2 Application of GB/T 21562-2008...	8
5 SPECIFY RAM requirements...	10
5.1 Introductory remarks...	10
5.2 Preliminary RAM analysis...	10
5.3 RAM requirements...	19
5.4 Process for choosing RAM figures...	29
5.5 RAM program...	29
6 RAM assurance during life cycle...	44
6.1 General...	44
6.2 Tender phase...	46
6.3 Design phase...	47
6.4 Demonstration phase...	50
7 RAM parameters of LCC model...	54
7.1 General...	54
7.2 Overview of LCC modelling...	55
7.3 RAM parameters for LCC model...	56
Appendix A (Informative) Breakdown structure (examples)...	58
References...	83

1 Scope

This Part of GB/T 21562 provides guidance on applying the RAM requirements in GB/T 21562-2008 to rolling stock during the system life cycle phases from invitation to tender to

demonstration in operation.

The Part is aimed at the customers/operators and main suppliers of rolling stock (including D-series high-speed train). It mainly specifies the following contents.

- Tasks which the customer/operator of rolling stock is responsible for.

lambda SPECIFY the RAM requirements, ADDRESS the type of operation in terms of the end customer needs, service availability, and economic considerations;

lambda EVALUATE different tenders, in terms of RAM requirements, on a common basis with the aid of specific RAM documents;

lambda CONFIRM whether, during design/development phase, the rolling stock satisfies the RAM requirements by examining step by step detailed and specific RAM documents as an output of the RAM activities performed; VALIDATE that the rolling stock, as delivered, satisfies the specified RAM requirements.

- Tasks which the main supplier of rolling stock is responsible for.

lambda UNDERSTAND the customers/operators' RAM requirements;

lambda PROVIDE substantive performance in a tender to show that the product offered is likely to satisfy the RAM requirements by performing preliminary RAM analysis;

lambda PROVIDE substantive performance during design/development phase to show that the product offered is likely to satisfy the RAM requirements by performing detailed RAM analysis;

lambda DEMONSTRATE that the product delivered satisfies the RAM requirements.

Regarding LCC model, this Part specifies only the required key RAM parameters.

This Part excludes the following contents.

- RAM values connected to the different RAM requirements (However, 5.4 provides a simple guideline of actions for more in-depth decision making and selection of appropriate values);

- Specific RAM documents and activities (However, this Part provides, only as an example, typical data and document templates for recording the output of a RAM analysis).

2 Terms and definitions

The following terms and definitions are applicable to this document.

2.1 Part number

The alphanumeric code, generally assigned by the main supplier, to represent a family of products with the same characteristics of form, fit, and function.

3.1 General

To determine the requirements of GB/T 21562-2008 and the basic conditions for these requirements, for each phase of the life cycle, the following questions shall be addressed.

- WHAT. What activities/tasks are to be performed and the supporting documents to be produced?
- WHO. Who has the responsibility for these activities/tasks?
- HOW. Which type of method or tool shall be used?

This process is adopted for the development of the Part and shall be applied in accordance with the structure of the application.

3.2 Entities involved in the life cycle phases of rolling stock

Depending on the organizational and management structure of the railway system concerned, a number of entities, performing different functions, may be involved within the life cycle phases of rolling stock. The entities in the contract e) ESTABLISH and IMPLEMENT an adequate and effective configuration management system including, at least.

- 1) All system documentation;
- 2) All other system deliverables.

Both the customer and the main supplier shall provide evidence by documents about the fulfilment of the above mandatory requirements, within their responsibility. The RAM program shall include these documents.

5.1 Introductory remarks

The purpose of this chapter is to establish the process to define RAM requirements for rolling stock and for the subsystems, assemblies, and parts (distinguished by their boundary limits) belonging to the rolling stock.

This chapter gives detailed information on the requirements of phases 1, 2, 4, and 5 of system life cycle described in 6.1, 6.2, 6.4, and 6.5 of GB/T 21562-2008.

The system definition process shall first collect all available data and relevant information

about the rolling stock under consideration.

The final goal is the derivation of RAM targets through the appropriate analysis of all the information collected and organized in a structured way.

5.2.1 General

This clause complements 6.1.3.4, 6.2.3.1, 6.2.3.2, 6.4.3.1, and A.2 of GB/T 21562-2008 and gives further details.

The preliminary RAM analysis shall identify the application environment and the operating conditions of the rolling stock, to recognize the fundamental concepts based on the overall RAM requirements.

The analysis includes.

- Similar system review. CREAT a list of similar existing rolling stock, and

EXTRACT suitable RAM-related information;

- Preliminary system analysis. All available and relevant rolling stock documentation is reviewed in order to define, at a preliminary level, the maintenance conditions (including logistic support). Items contained in each of these are listed below.

- a) Mission profile.

- 1) Reference route;

- 2) Commercial operating speed (operating distance/operating time);

- 3) Mean distance of a run;

- 4) Mean distance between two train stops;

- 5) Operating time or distance per year;

- 6) Revenue of operating time or distance per year;

- 7) Stand-by time per day;

- 8) Idle time per day (i.e. time when the rolling stock is neither in operation nor stand-by);

- 9) Planned total time of use (life expectancy in years).

- b) Route profile.

- 1) Number of tunnels related to reference route;

- 2) Number of viaducts related to reference route;

- 3) Cumulative distance in tunnels;

- 4) Cumulative distance on surface, including viaducts;