

Nederlandse norm

# NEN-EN 17023

(en)

Railtoepassingen - Onderhoud van  
spoorwegvoertuigen - Opstellen en aanpassen van  
een onderhoudsplan

Railway applications - Railway vehicle  
maintenance - Creation and modification of  
maintenance plan

ICS 45.060.01  
januari 2019

Als Nederlandse norm is aanvaard:  
 - EN 17023:2018,IDT

Normcommissie 345051 'Spoorwegen'



**THIS PUBLICATION IS COPYRIGHT/PROTECTED**

**DEZE PUBLICATIE IS AUTEURSRECHTELIJK BESCHERMD**

Apart from exceptions provided by the law, nothing from this publication may be duplicated and/or published by means of photocopy, microfilm, storage in computer files or otherwise, which also applies to full or partial processing, without the written consent of the Royal Netherlands Standardization Institute.

The Royal Netherlands Standardization Institute shall, with the exclusion of any other beneficiary, collect payments owed by third parties for duplication and/or act in and out of law, where this authority is not transferred or falls by right to the Reproduction Rights Foundation.

Auteursrecht voorbehouden. Behoudens uitzondering door de wet gesteld mag zonder schriftelijke toestemming van het Koninklijk Nederlands Normalisatie-instituut niets uit deze uitgave worden verveelvoudigd en/of openbaar gemaakt door middel van fotokopie, microfilm, opslag in computerbestanden of anderszins, hetgeen ook van toepassing is op gehele of gedeeltelijke bewerking.

Het Koninklijk Nederlands Normalisatie-instituut is met uitsluiting van ieder ander gerechtigd de door derden verschuldigde vergoedingen voor verveelvoudiging te innen en/of daartoe in en buiten rechte op te treden, voor zover deze bevoegdheid niet is overgedragen c.q. rechtens toekomt aan de Stichting Reprorecht.

Although the utmost care has been taken with this publication, errors and omissions cannot be entirely excluded. The Royal Netherlands Standardization Institute and/or the members of the committees therefore accept no liability, not even for direct or indirect damage, occurring due to or in relation with the application of publications issued by the Royal Netherlands Standardization Institute.

Hoewel bij deze uitgave de uiterste zorg is nagestreefd, kunnen fouten en onvolledigheden niet geheel worden uitgesloten. Het Koninklijk Nederlands Normalisatie-instituut en/of de leden van de commissies aanvaarden derhalve geen enkele aansprakelijkheid, ook niet voor directe of indirecte schade, ontstaan door of verband houdend met toepassing van door het Koninklijk Nederlands Normalisatie-instituut gepubliceerde uitgaven.



©2019 Koninklijk Nederlands Normalisatie-instituut  
 Postbus 5059, 2600 GB Delft  
 Telefoon (015) 2 690 390, Fax (015) 2 690 190

EUROPEAN STANDARD

**EN 17023**

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2018

ICS 45.060.01

English Version

## Railway applications - Railway vehicle maintenance - Creation and modification of maintenance plan

Applications ferroviaires - Maintenance des véhicules  
ferroviaires - Création et modification du plan de  
maintenance

Bahnwendungen - Instandhaltung von  
Eisenbahnfahrzeugen - Erstellung und Änderung von  
Instandhaltungsplänen

This European Standard was approved by CEN on 12 October 2018.

CEN 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 CEN-CENELEC Management Centre or to any CEN 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 CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

**Contents**

**Page**

European foreword.....	4
Introduction.....	5
1 Scope.....	6
2 Normative references.....	6
3 Terms, definitions, symbols and abbreviations.....	6
3.1 Terms and definitions.....	6
3.2 Symbols and abbreviations.....	6
4 General requirements for maintenance plans.....	7
4.1 Introduction.....	7
4.2 Input data.....	7
4.3 Structure of a maintenance plan.....	9
4.4 Content of a maintenance plan.....	9
4.5 Periodicity table.....	9
4.6 Maintenance interval limit and step frequency table.....	10
5 Creation of a maintenance plan.....	10
6 Modification of maintenance plan.....	11
6.1 General.....	11
6.2 Project work flow.....	11
6.2.1 Project steps.....	11
6.2.2 System definition and I/O surface.....	12
6.2.3 Description of the modification.....	13
6.3 Impact assessment.....	13
6.3.1 General.....	13
6.3.2 Safety relevance assessment.....	13
6.3.3 Significance analysis.....	13
6.4 Justification methods.....	14
6.4.1 General.....	14
6.4.2 Risk assessment.....	14
6.5 Update the maintenance plan.....	16
6.6 Verification and validation.....	16
6.7 Documentation.....	16
7 Verification, validation, documentation.....	16
7.1 General.....	16
7.2 Verification.....	17
7.3 Validation.....	17
7.4 Documentation, justification file.....	17
8 Roles, skills and knowledge.....	18
8.1 General.....	18
8.2 Roles.....	18
8.2.1 Role A.....	18
8.2.2 Role B.....	19
8.2.3 Role C.....	19
8.3 Skills and knowledge.....	19

**Annex A (informative) Examples of a process to assess the safety significance of a proposed Maintenance Plan modification..... 20**

**A.1 General ..... 20**

**A.2 Example 1 ..... 20**

**A.2.1 Foreword ..... 20**

**A.2.2 Method used to assess the significance ..... 20**

**A.3 Example 2 ..... 22**

**A.3.1 General ..... 22**

**A.3.2 Steps of the method to assess significance ..... 23**

**A.4 Example 3 ..... 24**

**A.4.1 Methodology for using the criteria ..... 24**

**A.4.2 Choosing an approach ..... 25**

**A.5 Example 4 ..... 28**

**A.5.1 Foreword ..... 28**

**A.5.2 General ..... 28**

**A.5.3 Safety relevance ..... 29**

**Annex B (informative) Safety relevant components, functions and maintenance activities ..... 30**

**B.1 Introduction ..... 30**

**B.2 Process for addressing safety relevant functions/components and their maintenance activities ..... 30**

**B.3 Process to determine safety relevance of a maintenance plan change ..... 31**

**Annex C (informative) Structured list of the content of a Maintenance Plan ..... 33**

**C.1 General ..... 33**

**C.2 Cover ..... 33**

**C.3 Approval record ..... 33**

**C.4 Changes control ..... 33**

**C.5 Table of contents ..... 33**

**C.6 Scope of application for this MP ..... 34**

**C.7 Step frequency table ..... 34**

**C.8 Periodicity table and supporting technical documentation ..... 34**

**C.9 Relevant information ..... 34**

**C.10 Definitions and abbreviations ..... 34**

**C.11 List of reference documentation ..... 35**

**Annex D (informative) Examples showing the representation of a Maintenance Plan ..... 36**

**D.1 Examples of a Step frequency representation ..... 36**

**D.2 Maintenance activities ..... 38**

**Annex ZA (informative) Relationship between this European Standard and the essential requirements of Directive 2008/57/EC aimed to be covered ..... 41**

**Bibliography ..... 43**

## European foreword

This document (EN 17023:2018) has been prepared by Technical Committee CEN/TC 256 "Railway applications", the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 2008/57/EC.

For relationship with EU Directive 2008/57/EC, see informative Annex ZA, which is an integral part of this document.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

## Introduction

In the field of railway maintenance, the purpose of this document is to define key processes to create and modify the maintenance plan for railway vehicles.

Each railway vehicle has to be in a safe state of running and achieve performance targets when in service. This is achieved by operating the vehicle under defined conditions, and performing a maintenance system, including corrective and preventive maintenance on certain components/functions at certain periodicities at a maintenance facility.

The maintenance plan is a part of the maintenance system, contains the descriptions of the activities, quality criteria, procedures and intervals to be undertaken during scheduled maintenance with the objective to ensure the vehicle complies with the target condition.

The construction of new vehicles is accompanied by an appropriate set of technical, maintenance and operating documents to support the vehicles along their life cycle.

Copyright  
Preview

**EN 17023:2018 (E)****1 Scope**

This document describes the methodology and the elements to be considered for the creation and modification of a vehicle maintenance plan, up to the validation. This document describes general requirements (list of input data, structure and content) of a maintenance plan.

For the creation and modification of a maintenance plan, this document lists:

- preparation and selection of documents and input data;
- analysis of input data and development of the maintenance plan up to its validation;
- process to be followed to create a maintenance plan;
- reasons to check a current maintenance plan;
- risk assessment and process to be followed to modify the maintenance plan;
- monitoring conditions (e.g. justification methods, verification, validation, documentation, roles, skills and knowledge).

This document applies only to preventive maintenance.

**2 Normative references**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 17018, *Railway applications — Rolling stock maintenance — Terms and definitions*

EN 31010, *Risk management — Risk assessment techniques (IEC/ISO 31010)*

EN 50126 (all parts), *Railway Applications — The Specification and Demonstration of Reliability, Availability, Maintainability and Safety (RAMS)*

EN 50128, *Railway applications — Communication, signalling and processing systems — Software for railway control and protection systems*

**3 Terms, definitions, symbols and abbreviations****3.1 Terms and definitions**

For the purposes of this document, the following terms and definitions given in EN 17018 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

**3.2 Symbols and abbreviations**

For the purposes of this document, the abbreviations given in Table 1 apply.



**Table 1 — Abbreviations**

Abbreviation	Designation
CSM RA	Common Safety Method in Risk Evaluation and Assessment
EUAR	European Union Agency for Railways
FMECA	Failure Mode, Effects and Criticality Analysis
LCC	Life Cycle Costs
MP	Maintenance Plan
NIB	National Investigation Body
NSA	National Safety Authority
OEM	Original Equipment Manufacturer
RAMS	Reliability, availability, maintainability and safety
REX	Return of Experience
TSI	Technical Specification for Interoperability

## 4 General requirements for maintenance plans

### 4.1 Introduction

Vehicles shall be in a safe state of running by means of a maintenance system. Part of this maintenance system is the maintenance plan which contains the description of activities and procedures to be undertaken during scheduled maintenance with the objective of ensuring that the vehicle complies with the target condition.

Initially, all the information relevant for maintenance is collected, and a maintenance plan for testing and commissioning stages is prepared to ensure the vehicle is in a safe state of running and in good order when released for the beginning of the operation. This testing and commissioning maintenance plan may not cover a part of the components/functions relevant for maintenance (e.g. interior fittings).

However, a complete maintenance plan is prepared and applied from the beginning of the service operation of the railway vehicle and during the lifetime.

The ongoing suitability of the maintenance plan should be checked and over time the maintenance plan can be changed to reflect how components wear or the service usage of the vehicle changes.

Maintenance plans shall be created according to Clause 5 and modified according to Clause 6.

### 4.2 Input data

For the creation or modification of a maintenance plan, all relevant and available input data shall be considered, as follows:

- a) legislation, regulations and standards:
  - national and European legislation where applicable, depending on the operational area of use;
  - national and European standards which apply for the operational area of use;
- b) technical documentation:
  - current and target configuration of the vehicle;

# ALTIJD DE ACTUELE NORM IN UW BEZIT HEBBEN?

Nooit meer zoeken in de systemen en uzelf de vraag stellen:  
“Is NEN-EN 17023:2019 en de laatste versie?”™

Via het digitale platform NEN Connect heeft u altijd toegang tot de meest actuele versie van deze norm. Vervallen versies blijven ook beschikbaar. **U en uw collega's** kunnen de norm via NEN Connect makkelijk raadplagen, online en offline.

Kies voor slimmer werken en bekijk onze mogelijkheden op [www.nenconnect.nl](http://www.nenconnect.nl).

## Heeft u vragen?

Onze Klantenservice is bereikbaar maandag tot en met vrijdag, van 8.30 tot 17.00 uur.

Telefoon: 015 2 690 391

E-mail: [klantenservice@nen.nl](mailto:klantenservice@nen.nl)

