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Maintenance - Maintenance engineering - Requirements

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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English Version

Maintenance - Maintenance engineering - Requirements

Maintenance - Ingénierie de maintenance - Exigences

Instandhaltung - Instandhaltungsengineering - Anforderungen

This European Standard was approved by CEN on 16 October 2022.

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European foreword

This document (EN 17666:2022) has been prepared by Technical Committee CEN/TC 319 “Maintenance”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by May 2022, and conflicting national standards shall be withdrawn at the latest by May 2022.

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.

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0 Introduction

0.1 Scope and benefits of maintenance engineering

Maintenance engineering is a discipline applying competencies, methods, techniques and tools to develop and support maintenance in order to ensure that an item is able to perform its required functions in a safe, sustainable and cost-effective manner throughout the life cycle.

The prime aim of maintenance engineering is to contribute to the achievement of overall stakeholder requirements through optimized and cost-effective maintenance as part of physical asset management.

The benefits of the contributions from maintenance engineering include, but are not limited to:

— achievement of dependability goals by influencing design;

— risk analysis related to maintenance;

— application of sustainability principles;

— achieved required integrity and safety level;

— achieved required performance and technical condition;

— improved life extension decisions;

— improved maintenance support performance;

— reduced environmental footprint by saving energy and raw materials consumption;

— improved competitiveness and output value.

0.2 Use of this document

This document is generic and provides guidance on the methodology to achieve maintenance engineering aims.

The intended users of this document are personnel involved in design, procurement, construction, commissioning, operation, improvement, maintenance and disposal/transition or decommissioning of physical assets. No specific structure or size of organization is assumed so that maintenance engineering effort should be tailored to suit specific applications and organisational requirements.

This document is based on the maintenance terminology as defined in EN 13306 Maintenance — Maintenance terminology. Adjustments and additional terminology used, are found in Clause 3.

Clause 5 of this document describes maintenance engineering discipline and its objectives.

Clause 6 of this document describes maintenance engineering activities during the life cycle stages. Activities are used to express the application of knowledge, skills and tools in maintenance engineering. The following life cycle stages and substages are used, see 6.1:

1) concept stage with the following substages: feasibility and concept baseline;

2) development stage with the following substages: preliminary design and detailed design;

3) realization stage with the following substages: build and implementation / commissioning;

4) utilization stage with the following substage: operation and maintenance;

5) disposal/transition stage with the following substage: reuse, recycling or disposal.

NOTE These life cycle stages are harmonized as far as possible and based on what are used in EN 16646 [7] and IEC 60300 series [see Bibliography]. Disposal and transition are used instead of retirement used in IEC 60300 series. See an overview in Annex D.

While maintenance engineering has the most impact when applied during the concept stage and design of a physical item, this document is applicable to maintenance engineering in all life cycle stages, and for different scenarios, for example:

— manufacturer producing one equipment and then maintaining it;

— transfer of property at commissioning to a buyer who will be in charge of maintenance;

— transfer of property at commissioning followed by a warranty period. The seller is responsible during the warranty and the buyer thereafter;

— maintenance service (sub) contract by the seller to the buyer or to a third party.

Clause 7 of this document describes maintenance engineering and digitalization.

The document also includes informative Annexes A to D with additional guidance.

Processes are defined as set of interrelated or interacting activities that use inputs to deliver an intended result (3.24). In the context of this document, the term “maintenance engineering activities” is used to express the application of knowledge, skills and tools to support the processes given in EN 17007 [10]. While EN 17007 describes the processes, this document FprEN 17666 follows the life cycle stages.

0.3 Related standards

This document is part of a group of European maintenance standards published by CEN/TC 319 *Maintenance* giving requirements and guidance on maintenance, see the committee site on https://standards.cencenelec.eu/dyn/www/f?p=CEN:105::RESET and Bibliography [2] to [7] and [9] to [12].

In addition, there are a number of standards published in CEN, ISO and IEC which address maintenance as part of asset management and dependability view.

The asset management standards in the ISO 55000 series [59 to 61] address the overall requirements for assets, decision criteria, strategic asset management plan (SAMP) and asset management plan. EN 17485 [12] and EN 16646 [7] create a bridge between these ISO standards and the EN maintenance standards which determine the requirements for maintenance engineering.

The IEC dependability standards (principally the IEC 60300 series) address the management and technical activities to produce and / or sustain a dependable item, which is one where there is justified confidence that it will operate as desired and satisfy agreed stakeholder needs and expectations.

1 Scope

This document specifies the maintenance engineering discipline throughout the entire life cycle.

This document gives guidance on how maintenance engineering can contribute to the assurance of required dependability to achieve a sustainable balance between performance, risk and costs.

This document refers to standards that further describe detailed methods and techniques.

This document does not give guidance on how to set up systems and infrastructure for maintenance engineering nor does it include guidance on software maintenance.

NOTE 1 For software components of an item, the maintenance activities are covered in ISO/IEC/IEEE 14764 [54].

NOTE 2 The overall maintenance process is covered by EN 17007 [10].

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 13306, *Maintenance — Maintenance terminology*