SLOVENSKI STANDARD
oSIST prEN 17485:2020

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Vzdrževanje - Vzdrževanje znotraj obvladovanja premoženja - Okvir za izboljšanje vrednosti fizičnih premoženj skozi njihov celoten življenjski cikel

Maintenance - Maintenance within physical asset management - Framework for improving the value of the physical assets through their whole life cycle

Instandhaltung - Instandhaltung im Rahmen des Anlagenmanagements - Teil 2: Methodik zur Verbesserung der Leistung während des gesamten Lebenszyklus und der Nachhaltigkeit einer Anlage

Ta slovenski standard je istoveten z: **prEN 17485**

ICS:

03.100.10	Nabava. Dobava. Logistika	Purchasing. Procurement. Logistics

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English Version

Maintenance - Maintenance within physical asset management - Framework for improving the value of the physical assets through their whole life cycle

Instandhaltung - Instandhaltung im Rahmen des Anlagenmanagements - Teil 2: Methodik zur Verbesserung der Leistung während des gesamten Lebenszyklus und der Nachhaltigkeit einer Anlage

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 319.

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

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Contents

Page

European foreword

This document (prEN 17485:2020) has been prepared by Technical Committee CEN/TC 319 “Maintenance”, the secretariat of which is held by UNI.

This document is currently submitted to the CEN Enquiry.

Introduction

EN 16646 ' Maintenance - Maintenance within physical asset management' was published in December 2014. It gives a general framework to determine the role and tasks of the maintenance within the larger framework of physical asset management. In EN 16646, neither the methods and procedures to implement and establish the standard are defined nor which kind of methods would be available when applying the instructions of the standard are recommended. EN 17485 introduces methodological support for Maintenance within Physical Asset Management.

This document introduces methods and procedures about maintenance within physical asset management for all the levels and functions of the organisations' management, including corporate planning management, plant management, technical management, production management, financial management, asset management, maintenance management, and quality management.

This document is targeted to promote the principles of physical asset management, which can be considered essential to meet with success the increasing requirements of the organization's business and technological environment, including safety and environmental issues. Similarly, this document gives direction to maintenance activities within the physical asset management framework, offering methodological support for a systematic and systemic management approach. The aims of this document are to:

- create and systematize the link between business, physical asset management and maintenance activities of organisations;
- indicate external and internal influencing factors and their effect on physical asset and maintenance management;
- prevent silo behaviour and promote cooperation between different organizational functions;
- promote transparency in organisational decision making;
- promote simulation and visualization as effective tools to support decision making;
- promote uncertainty management to improve the quality of decision making;
- improve information management as an activity to achieve the above-mentioned objectives;
- promote sustainability of operations.

These targets improve the chances of success in meeting the physical asset management challenges mentioned in EN 16646. EN 16646 mentions several reasons why physical asset management is nowadays more important than ever before. The same reasons are valid when we evaluate the importance of methods and procedures.

Physical asset management and maintenance as a part of physical asset management has become a more essential part of the organizations' activities during the last decades for several reasons, including:

— globalization and increasing competition;

— growing turbulence in the market;

— growth of capital intensity in some industry sectors;

— aging of asset systems;

- increased pressure to improve the added value of maintenance;
- increased requirements from the safety and environmental point of view;
- organisations are in tighter collaboration and networking with other businesses, posing pressing requirements for managing the dependability of physical assets;
- 'silo' behaviour which keeps maintenance and other life cycle processes separated.

The above changes in the organisations' working environment create demand for more holistic approaches in business planning, better cooperation between different functions of the organisations, more systematic and analytic management, deeper understanding of effects of uncertainties on the activities of the organisations and more frequent modification of prevailing plans and business approaches. Therefore, maintenance is one of the important functions. This document introduces methods and approaches to build a bridge between maintenance and the other functions.

Many benefits can be achieved when applying the methodology presented in this document:

- economically more efficient, effective and profitable use of capital: "turnover of and return on assets";
- more accurate long-term life cycle decisions;
- integrated investment and maintenance planning;
- integrated approach for production function (assets, operation and maintenance);
- direction to maintenance strategies and activities;
- improved position for the maintenance among the other company functions;
- improved assessment of performance and control;
- enhanced capability to operate within extended enterprise ecosystems (including customers/suppliers);
- enhanced reputation;
- more sustainable use of capital.

Further and maybe even greater benefits are now being found through improved credibility in the eyes of customers, regulators and other stakeholders. Physical asset management also results in much greater engagement and motivation of the workforce, and in more sustainable, continual improvement business processes. Physical asset management builds up the required link between maintenance management and organizational strategic plan and gives direction to maintenance activities.

The standards EN 16646 and EN 17485 build the bridge between ISO 5500x (Asset management system standards) and the EN maintenance standards. While maintenance standards define required elements ("What to do"), EN 17485 guides through the implementation of maintenance of physical assets. As a methodological framework it overlaps slightly with the above-mentioned standards in order to give an applicable starting point to the more detailed documents for the specific subfunctions of maintenance (See Figure 1).

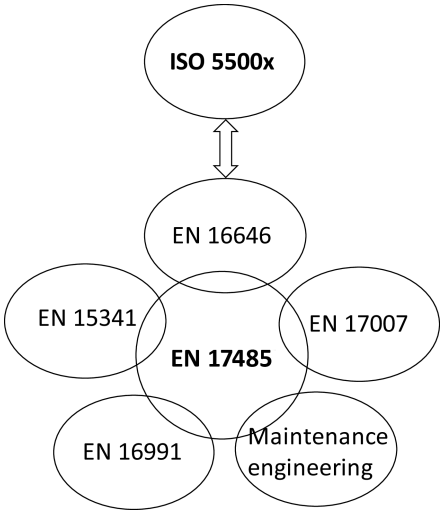

Figure 1 —Links between EN 17485 and other standards

In this document, the following verbal forms are used

— “shall” indicates a requirement; this standard is not a management system standard and therefore this form has only been used when referring to management system requirements standards;

— “should” indicates a recommendation;

— “may” indicates a permission;

— “can” indicates a possibility or a capability.

The structure of the core chapters of the document follows Figure 2 below.

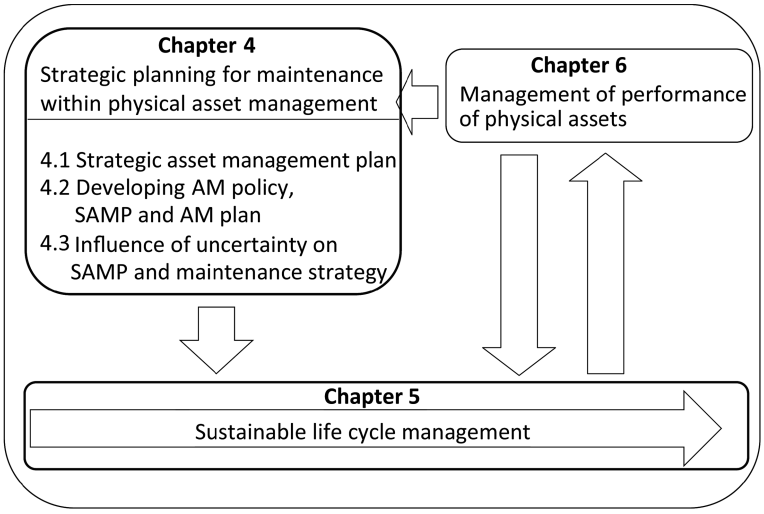

Figure 2—The structure of the core chapters

1 Scope

This document introduces methods and procedures when applying physical asset management as a framework to take maintenance into account as an influencing factor within an organisations' strategic and tactical decisions on its physical assets, and when applying physical asset management as a framework to maintenance activities. It also introduces the relationship between organisational strategic plan and the maintenance management system at a methodological level and describes the interrelations between maintenance process and all the other physical asset management processes at a procedural level.

This document may be applied to managing the physical assets of organisations of all sizes. It introduces methods and procedures for all the levels and functions of the organisations' management such as corporate planning management, plant management, technical management, production management, financial management, asset management, maintenance management, quality management etc. The focus of the document is at the asset portfolio and system levels and consists of guidance and recommendations. It **is not intended** to be used for certification, regulatory, or contractual use.

However, if specific documents exist for a particular application, those documents should also be considered.

NOTE Typical examples for asset systems or composition of asset systems are production processes, production lines, production units, plant with several production lines.

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*

EN 16646, *Maintenance - Maintenance within physical asset management*

EN 17007, *Maintenance process and associated indicators*

ISO 55000, *Asset management — Overview, principles and terminology*

ISO 55001, *Asset management — Management systems — Requirements*

ISO 55002, *Asset management — Management systems — Guidelines for the application of ISO 55001*

EN 60300-3-3, *Dependability management - Part 3-3: Application guide - Life cycle costing (IEC 60300-3-3)*

ISO 15663-2, *Petroleum and natural gas industries — Life-cycle costing — Part 2: Guidance on application of methodology and calculation methods*

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13306, ISO 55000, EN 16646 and the following apply.

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

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1.1
asset portfolio
assets that are within the scope of the asset management system

[SOURCE: ISO 55001:2014]

Note 1 to entry: In this document an asset portfolio consists of several asset systems.

Note 2 to entry: See Annex A.

3.1.2
asset solution
result of concept definition

3.1.3
asset system
set of assets that interact or are interrelated

[SOURCE: ISO 55001:2014]

Note 1 to entry: Assets system consists of several individual assets.

Note 2 to entry: A production line, production process or production subprocess are typical examples of asset systems.

3.1.4
asset, individual asset
item, thing or entity that has potential or actual value to an organization

[SOURCE: ISO 55001:2014]

Note 1 to entry: A machine or device is a typical example of individual assets.

3.1.5
asset specific
in this document means a dedicated investment resulting in the higher return to the investor than to any other investor

Note 1 to entry. As an example, a supplier designs equipment which is dedicated to a buyer's particular need and there is no other buyer who can get the same value ~~of~~ from it.

3.1.6
business environment
all the external factors within the market, technology and community influencing on the decision making of the organization

[SOURCE: EN 16646:2014]

3.1.7
commercially constrained
in this document in the case of disposal, replacement or modernisation reselling of the assets or asset systems is difficult or non-profitable because of asset specificity, competitive reasons, obsolescence or price level

3.1.8
competence
ability to apply knowledge and skills to achieve intended results

[SOURCE: ISO 55001:2014]

3.1.9
creation of physical asset
acquisition process, which can include concept definition, design, manufacturing, installation, commissioning

[SOURCE: EN 16646:2014]

3.1.10
improvement
dependability improvement
combination of all technical, administrative and managerial actions, intended to ameliorate the intrinsic reliability and/or maintainability and/or safety of an asset, without changing the original function

[SOURCE: EN 13306:2017]

Note 1 to entry: An improvement may also be introduced to prevent misuse in operation and to avoid failures.

3.1.11
inertia, economic
in this document means slow-down of economic transactions because of e.g. high investment cost barriers to entry

3.1.12
inertia, technological
in this document means high technological barriers to entry due to patents, missing competences, high product development costs, time requirements for development process etc

3.1.13
integrity
asset integrity
ability of a system to sustain its form, stability and robustness, and maintain its consistency of performance and use

3.1.14
item
part, component, device, subsystem, functional unit, equipment or system that can be individually described and considered

Note 1 to entry: A number of items e.g. a population of items, or a sample, may itself be considered as an item.

Note 2 to entry: An item may consist of hardware, software or both.

Note 3 to entry: Software consists of programs, procedures, rules, documentation and data of an information processing system.

3.1.15
key success factor
attribute required for an organization to ensure the success of an organization

[SOURCE: EN 16646:2014]

3.1.16
lagging indicators
indicate how the organisation has succeeded, in the past

3.1.17
leading indicators
predict the future development and indicate the probable trend of lagging indicators for the physical asset management

3.1.18
life cycle of a physical asset
period of value realization from a physical asset by an organization including needs identification, creation or acquisition, utilization, maintenance, modernization and disposal

[SOURCE: EN 16646:2014]

Note 1 to entry: Life-cycle of an item may contain several life cycles of a physical asset. An item can have several sequential owners during its life cycle.

Note 2 to entry: Realization of value will normally involve a balancing of costs, risks, opportunities and benefits.

3.1.19
life cycle of an item
series of stages through which an item goes, from its conception to disposal

[SOURCE: EN 13306:2017]

3.1.20
maintenance
is the function which includes all technical, administrative and managerial actions during the life cycle of an item intended to retain it in, or restore it to, a state in which it can perform the required function

[SOURCE: EN 13306:2017]

Note 1 to entry: Maintenance is not limited to a maintenance department

Note 2 to entry: In this document, the maintenance is contributed by all the functions of the organization

3.1.21
minimum efficient scale
any scale that minimizes the average costs of the production unit

3.1.22
modernization
modification or improvement in the case of nonconformity of the asset, regarding technological advances, to meet new or changed requirements

[SOURCE: EN 13306:2017]

3.1.23
modification
combination of all technical, administrative and managerial actions intended to change one or more functions of a physical asset

[SOURCE: EN 13306:2017]

Note 1 to entry: Modification is not a maintenance action but has to do with changing the required function of an item to a new required function. The changes may have an influence on the dependability characteristics.

Note 2 to entry: Modification may involve the maintenance organization.

Note 3 to entry: The change of an item where a different version is replacing the original item without changing the function or ameliorating the dependability of the item is called a replacement and is not a modification.

3.1.24
operating conditions
physical loads and environmental conditions as experienced by the asset during the entire life cycle

[SOURCE: EN 13306:2017]

Note 1 to entry: Operating conditions can vary during the asset's life cycle.

3.1.25
operating constraints
characteristics of the asset, which set limits for the use of the asset and may determine requirements for maintenance activities

[SOURCE: EN 13306:2017]

Note 1 to entry: These characteristics are the results of design and construction of the assets and are influenced by the operational mode and operation conditions.

3.1.26
operational mode
operating profile
configuration in which an item is operated and utilized during a given period characterized by units of use (hours, loads, number of starts/stops, number of transients, etc.)

[SOURCE: EN 13306:2017]

Note 1 to entry: Operational mode determines the frequency, load, continuity and performance rate of utilization.

3.1.27
plant replacement value (PRV), asset replacement value (ARV)
estimated amount of capital that would be required to replace the old plant or asset to the similar new asset

Note 1 to entry: replacement value is often equivalent to the fire insurance value

3.1.28
physical asset
item that has potential or actual value to an organization

[SOURCE: ISO 55000:2014]

Note 1 to entry: Examples of physical assets are components, machines, plants, construction works and buildings.

3.1.29
physical asset management
coordinated activities of an organization to realize value from physical assets

[SOURCE: ISO 55000:2014]

Note 1 to entry: Realization of value will normally involve a balancing of costs, risks, opportunities and benefits.

Note 2 to entry: In the life cycle context, physical asset management is the optimal life cycle management of physical assets to sustainably achieve the stated business objectives.

3.1.30
technical depreciation
difference between the asset replacement value and actual value

[SOURCE: EN 16646:2014]

Note 1 to entry: Technical depreciation should be based on the asset replacement value but not on asset book value.

Note 2 to entry: Technical depreciation are calculated as a ratio of asset replacement value and expected life.

Note 3 to entry: Technical depreciation measures and depicts technical aging of the assets in money terms.

3.1.31
sustainability
aims at balance between environmental, social and economic systems, ideally in mutually supporting ways in which the needs of the present are met without compromising the ability of future

3.1.32
conversion cost
transformation cost
total cost required to convert materials into product or service, excluding cost of raw materials, packaging and auxiliary materials

Note 1 to entry: conversion costs are a manufacturer's production costs other than the costs of raw materials.