



SLOVENSKI STANDARD SIST EN 17007:2018

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Proces vzdrževanja in z njim povezani kazalniki

Maintenance process and associated indicators

Instandhaltungsprozess

Processus de maintenance et indicateurs associés

Ta slovenski standard je istoveten z: **EN 17007:2017**

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EUROPEAN STANDARD

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Maintenance process and associated indicators

Processus maintenance et indicateurs associés

Instandhaltungsprozess und verbundene
Leistungskennzahlen

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

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European foreword

This document (EN 17007:2017) 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of an identical text or by endorsement, at the latest by April 2018 and conflicting national standards shall be withdrawn at the latest by April 2018.

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

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Introduction

According to EN ISO 9001, maintenance is a process since it consists of organized, coordinated tasks using resources and performed by various stakeholders to obtain a given result.

Terminology standard EN 13306 defines it as the “combination of 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.”

It seemed appropriate to formalize the maintenance process through a breakdown into processes that provides the following advantages:

- it makes it possible to clearly indicate the activities to be carried out with a relevant level of detail;
- it indicates the inputs/outputs of each sub-process and defines all the links that join them together and allow the realization of the overall process;
- it provides the ability to define indicators for measuring the realization of each process and monitoring its effectiveness.

The aim of this document is to allow an understanding of the actions and interactions between maintenance processes. It provides maintenance managers with a management tool by giving them a way to compare their organization to the generic representation described and to detect insufficient actions, unassigned responsibilities and/or poorly established links. It gives information to define indicators, dedicated to specific processes, allowing the creation of scorecards that are appropriate for monitoring activities and measuring performance.

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1 Scope

This European Standard provides a generic description of the maintenance process. It specifies the characteristics of all the processes, parts of maintenance process, and establishes a maintenance model to give guidelines for defining indicators.

This European Standard is applicable to all organizations (company, institution, agency, etc.) in charge of maintaining physical assets. Therefore, it has been established without a particular organization in mind and does not aim to propose one. This description could be adapted based on the type and size of organization chosen to perform the maintenance, the complexity of the systems maintained and the scope of the external contracted services.

The purpose of the breakdown into processes and the representation of their inter-relationships¹⁾ is to help maintenance personnel, and particularly management at different levels, to:

- clearly identify the actions to be taken in order to meet the overall objectives set by Management in terms of maintenance;
- delegate responsibilities that ensure the realization of the actions with the required performance levels;
- for each process, clearly determine:
 - a) the necessary inputs and their origin;
 - b) the required results and their intended uses;
- monitor and quantitatively assess the performance obtained at various levels of the breakdown into processes;
- improve the collection and the distribution of data.

This standard does not cover software maintenance itself, but applies to items containing software.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13306 as well as the following terms and definitions apply.

3.1

activity

set of tasks organized within a process

1) Relationships between several elements or members of the same unit or group.

EN 17007:2017 (E)**3.2
indicator**

measured characteristic (or a set of characteristics) of a phenomenon, according to a given formula, which assess the evolution

Note 1 to entry: Indicators are related to objectives.

[SOURCE: EN 15341:2007, 3.1]

**3.3
exceptional maintenance**

preventive maintenance which is infrequent and has a significant impact in terms of total life cycle costs

Note 1 to entry: Exceptional maintenance includes large maintenance actions that may be:

- unavoidable and planned, thereby leading to the development of alternative strategies (e.g. life extension);
- unexpected, as a result of design, manufacturing, installation, operation or maintenance errors or accidental situations (fire, flood, etc.).

Note 2 to entry: The cost of exceptional maintenance is generally accounted as capital investment.

Note 3 to entry: Exceptional maintenance is sometimes called replacement investments.

[SOURCE: EN 13306, 8.13]

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**3.4
maintenance budget**

determination of the maintenance expenditures over a given period in the future to ensure the availability of the necessary financial resources

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**3.5
maintenance documentation**

set of documents needed to perform the maintenance tasks, including:

- work order;
- technical instructions;
- maintenance procedures;
- list of necessary resources;
- plans;
- schedule;
- maintenance records
- any other document needed to perform maintenance

3.6 maintenance record

part of maintenance documentation which contains the history of all maintenance related data for an item

Note 1 to entry: The history may contain records of all failures, faults, costs, item availability, up time and any other relevant data.

[SOURCE: EN 13306, 10.6]

3.7 maintenance plan

structured and documented set of tasks that include the activities, procedures, resources and the time scale required to carry out maintenance

[SOURCE: EN 13306, 2.5]

3.8 maintenance policy

general approach to the provision of maintenance and maintenance support based on the objectives and policies of owners, users and customers

Note 1 to entry: The maintenance policy entails establishing the direction (method, programme, budget, etc.) based on the goals and objectives set by the company's Management.

The management focus in the policy statement can be:

- availability and useful life of the item;
- safety of the items and individuals, product quality, environmental protection;
- optimization of maintenance costs, etc.

In particular, the maintenance policy give guidance to maintenance strategy that leads to choices being made between:

- planning corrective and/or preventive, predetermined or condition-based maintenance;
- internal or external service provision.

[SOURCE: EN 60300-3-14:2004, 3.1.12 – Note 1 to entry has been added.]

3.9 maintenance procedure

document that describes in detail preventive and corrective maintenance tasks

Note 1 to entry: These procedures indicate the dismantling and reassembly actions (with the help of diagrams, expanded views, etc.) and give the time periods of the tasks, permissible wear-out rates, the various faults that may occur, and their diagnosis.

Note 2 to entry: Maintenance procedures also include resources, the company's health and safety rules as well as the regulatory aspects (environment, safety, etc.).

3.10 maintenance strategy

management method used in order to achieve the maintenance objectives

EXAMPLE Outsourcing of maintenance, allocation of resources, etc.

[SOURCE: EN 13306, 2.4]

EN 17007:2017 (E)**3.11****maintenance support equipment**

set of equipment needed to perform the maintenance tasks based on the recommended procedures

Note 1 to entry: This set of equipment includes:

- tools;
- measuring and control equipment;
- computer equipment;
- handling equipment (slings, fork-lift trucks, hoists, etc.);
- means of access (scaffolding, ladders, platforms, etc.);
- individual and collective protective equipment;
- environmental protection equipment;
- etc.

3.12**process**

set of interrelated or interacting activities that use inputs to deliver an intended result

[SOURCE: EN ISO 9000:2015, 3.4.1]

3.13**spare part**

item intended to replace a corresponding item in order to retain or maintain the original required function of the item

Note 1 to entry: The original item may be subsequently repaired.

Note 2 to entry: In English, any item that is dedicated and/or exchangeable for a specific item is often referred to as replacement item.

[SOURCE: EN 13306, 3.5]

4 Abbreviations and notations

For the purposes of this document, the abbreviations and notations given in Table 1 and Table 2 apply.

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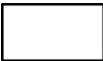


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Table 1 — Abbreviations

ACT	Implement preventive and/or corrective actions on the item
BUD	Budget maintenance of items
COR	Restore the items in required state
DOC	Deliver the operational documentation
DTA	Manage data
HSE	Ensure personal health and safety to individuals and preserve environment in maintenance
IMP	Improve the items
IST	Provide the needed infrastructures
MAN	Manage maintenance (strategy and improvement, human resources, continuous improvement, compliance, etc.)
MRQ	Deliver maintenance requirements during items design and modification
OPT	Improve the results
PRV	Prevent undesirable events by avoiding failures and faults
RES	Provide internal human resources
SER	Provide external maintenance services
SPP	Deliver spare parts
TOL	Deliver the tools, support equipment and information system

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Table 2 — Notations (BPMN 2.0 notations)

	represent processes
	parallel gateway
	sequence flows between processes, defines execution order of activities

5 Principles of maintenance process breakdown

5.1 Process families

To more easily identify processes, it is helpful to classify them into three main families

a) Management process

This includes determining the objectives and the policy to be implemented in order to achieve them, deploying the company's means and allocating the resources. It ensures the coherence of the realization and support processes. It includes measuring and monitoring the process system and using the results to improve performance.

b) Realization processes

These contribute directly to achieving the expected result and are designed to ensure that the needs expressed by the customer are satisfied. They encompass all activities related to the realization cycle of the product or service.

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c) Support processes

These are essential to the functioning of the other processes (realization processes, other support processes, management process) as they provide them with the necessary resources.

They include activities related to:

- human resources;
- financial resources;
- material resources and their maintenance (premises, equipment, software, etc.);
- information processing.

5.2 Breakdown into levels

Level 1 of the breakdown is an overall mapping that identifies the processes and classifies them into each of the families based on the diagram shown in Figure 1.

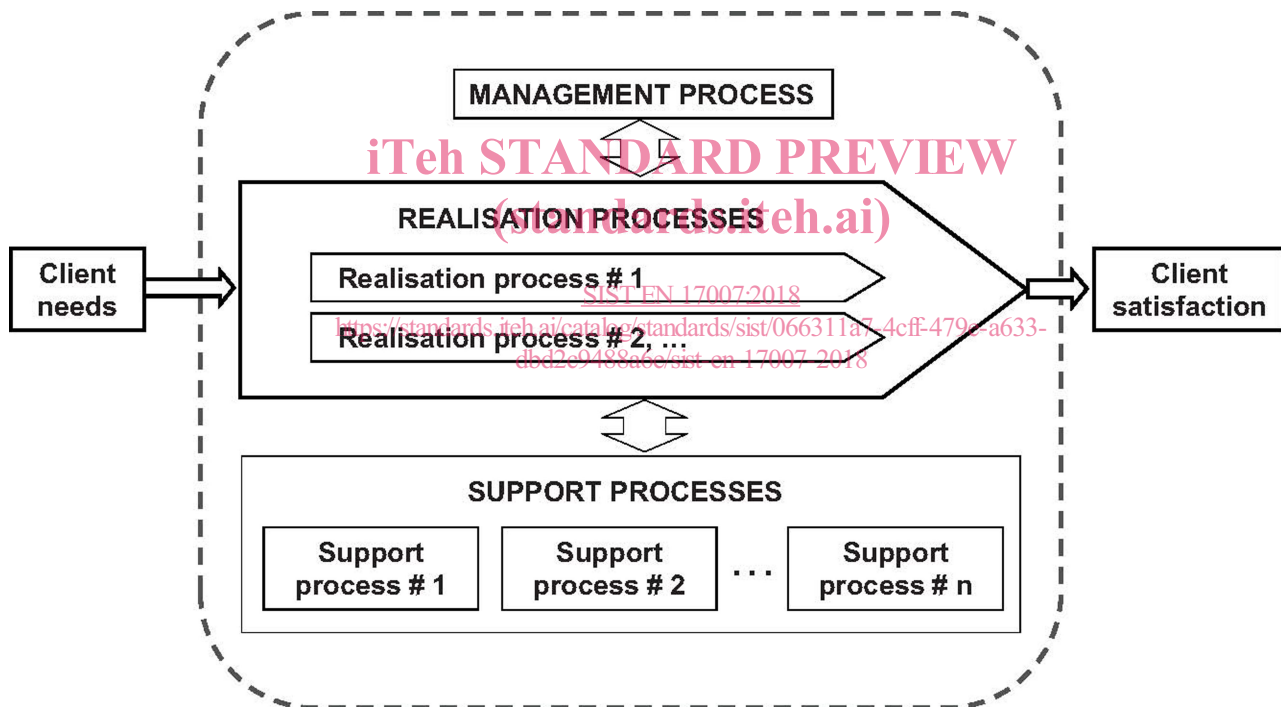
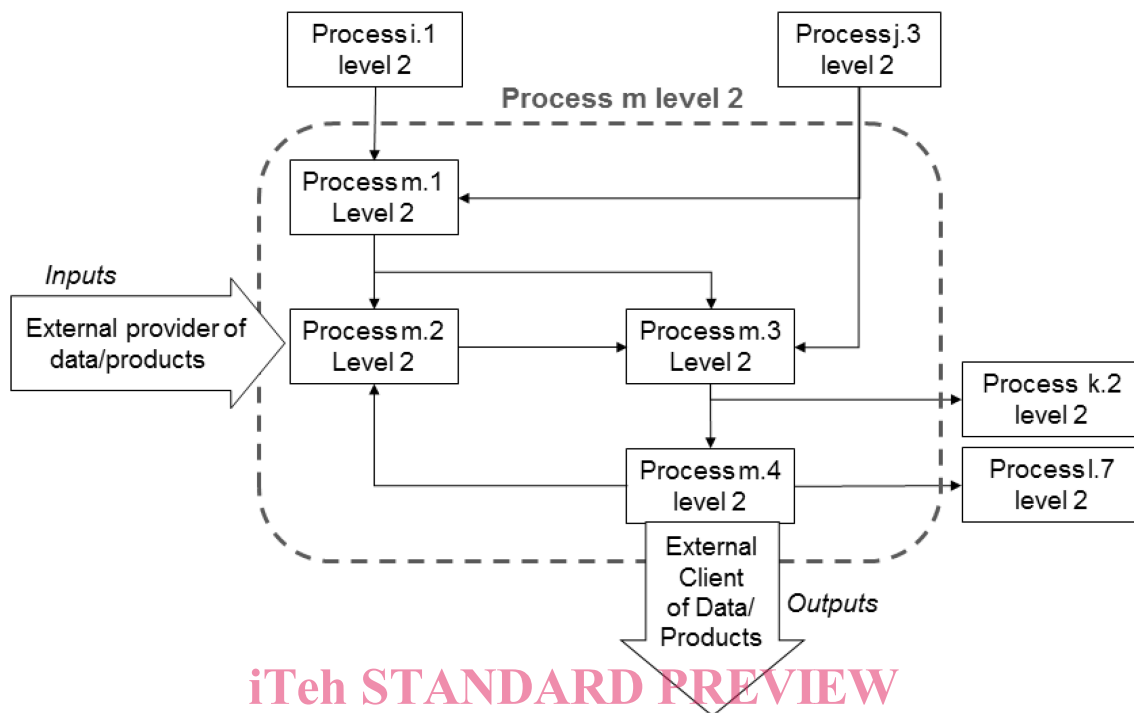


Figure 1 — Level 1 of the process mapping

Each level 1 process is in turn broken down into level 2 processes. In addition to the component processes, this level shows the input and output data of each process as well as its origins and destinations.

This provides a sequenced representation of the level 2 processes that contribute to the realization of the level 1 process (see Figure 2).



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Figure 2 — Level 2 of the process mapping — Example

Some input data are output data from processes outside the process broken down or is supplied by entities outside the maintenance process. The same may be true for output destinations. These external origins and destinations are indicated on the diagram.

A third level may be described, where necessary, to further clarify the actions, but this level is not discussed in this standard.

A profile is drawn up for each level 2 process. It includes:

- the name of the process;
- the purpose(s) of the process, which is expressed in terms of action(s) with clearly stated goals;
- the activities that comprise the process. These activities constitute level 3 of the breakdown, which is not shown in the form of a diagram in this document;
- the input data and products which are needed to realize the process. They come from either other level 2 processes, other level 1 processes or entities outside the maintenance process;
- the output data and products which are created or modified by the process and are intended for either other level 2 processes, other level 1 processes or entities outside the maintenance process;

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- regardless of the level of the process, the stakeholders are: the person who requested the process, the process manager, the customer, the beneficiary of the process and input data suppliers. These stakeholders are relative to the company's organization and can therefore not be generic. As a result, information about them is not provided in this standard and it is up to each company to do so. This makes it possible to clearly identify the stakeholders' responsibilities, detect any insufficiencies and assign tasks to each stakeholder, identify customers, objectives and suppliers;
- the interfaces with the other processes summarize all the related processes. These can be data or product suppliers or customers of the output data or products;
- the constraints related to realization of the process are a way to specify certain requirements or situations. They shall be taken into account by the process;
- Elements to define indicators related to the process. Each company shall define its own indicators, first to assess the effectiveness of its processes and attainment of the targets assigned to them, and secondly to monitor the realization of the actions taken to ensure their progress and adherence to timeframes. The proposed elements serve to define relevant indicators.

5.3 Use of the Maintenance process breakdown

The representation of the maintenance process, established according to the aforementioned principles, is provided in Clause 5. It is generic, which means that it is not based on any particular organization and draws on best practices generally implemented in the maintenance sector. It is then up to each company to use this breakdown to build or update its organization.

This can be achieved by identifying, within its own organization, the structural entities that realize the various processes defined. It is then necessary to ensure that:

- each process exists and is managed; [SIST EN 17007:2018](https://standards.iteh.ai/catalog/standards/sist/066311a7-4cff-479e-a633-dbd2c9488a6e/sist-en-17007-2018)
- each process is unique; <https://standards.iteh.ai/catalog/standards/sist/066311a7-4cff-479e-a633-dbd2c9488a6e/sist-en-17007-2018>
- the inputs/outputs are clearly defined (products, data, timeframes, etc.);
- the suppliers and customers of the inputs/outputs are clearly designated by name;
- the responsible persons for the processes (process owners) has been defined;
- the indicators are regularly analysed and published in order to monitor the progress of the actions and measure the effectiveness of the processes and their ability to achieve the assigned objectives.

This task offers many advantages:

- the result obtained provides a basis for understanding how the company's maintenance process is performed and improves the confidence of the customer into the ability of the maintenance provider;
- each entity of the organization clearly sees its position in relation to the others and the importance of its actions within the maintenance process. Each person's work is more easily recognized thanks to a greater ability to communicate the results obtained;
- responsibilities are defined without overlaps or ambiguities and objectives are established and quantified;
- the responsible persons have a better understanding of the objectives, which improves synergy and teamwork;

- management of the processes is significantly easier. Management shall have the means to detect malfunctions, measure non-conformities and any deviations from the objectives and take appropriate measures to correct or update the processes in question (e.g. it provides framework for assessment and benchmarking);
- formalization of the processes is a tool for training the various job profiles and developing the company's knowledge and facilitates changes through a better understanding of their consequences;
- formalizing the sequencing of actions and using indicators to detect deviations helps to ensure the continuous improvement of the maintenance process.
- provides a framework for systematic Information System support.

It should be noted that each company shall adapt the various processes according to its field of activity and economic, geographic, political, cultural and other contexts.

6 Breakdown of the maintenance process and process profiles

6.1 Maintenance process

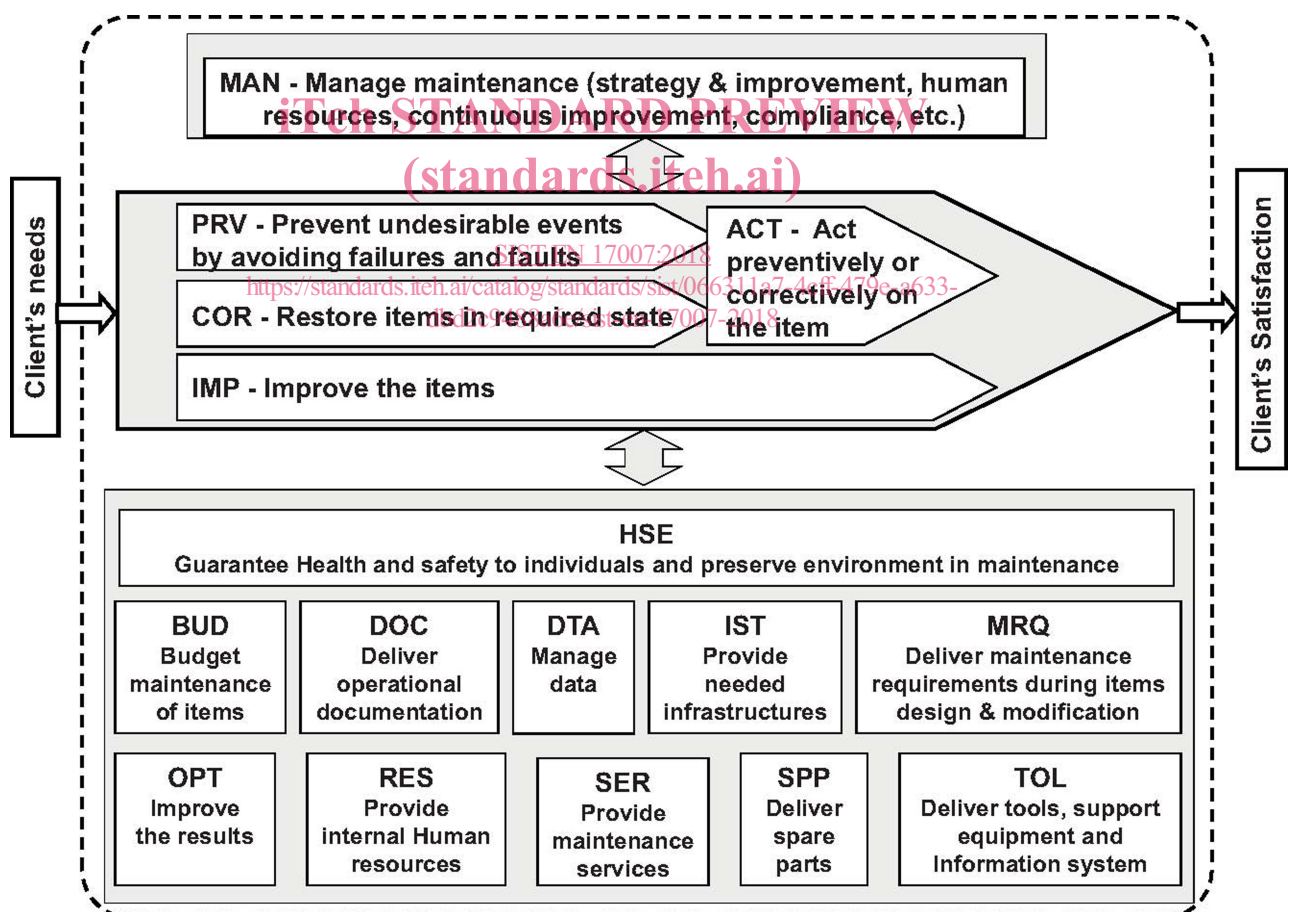


Figure 3 — Maintenance process (level 1 of the mapping)