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Criteria for design, management and control of maintenance services for buildings

Kriterien für Entwicklung, Leitung und Überwachung von Instandhaltungsdienstleistungen von Gebäuden

Critères pour la conception, la gestion et le contrôle des services de maintenance dans les constructions

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Kriterien für Entwicklung, Leitung und Überwachung von Instandhaltungsdienstleistungen von Gebäuden

This European Standard was approved by CEN on 8 July 2011.

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Foreword

This document (EN 15331:2011) 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of an identical text or by endorsement, at the latest by February 2012, and conflicting national standards shall be withdrawn at the latest by February 2012.

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Introduction

A building presents a challenging set of maintenance related requirements which, although not unique, are not often found together:

— the need to maintain property value of the building over time;

— the possibility that the property may undergo a significant change in its intended use during its service life;

— the number of persons responsible for maintenance and the different type of responsibility (owner, administrator, tenant, users,...);

— its long service life (decades).

Under these conditions, it is difficult to predict with any degree of precision the service life of each component. Budgeting for maintenance, and specifically the scheduling of maintenance interventions, requires the availability and the analysis of feedback data obtained from maintenance activities.

The purpose of building maintenance is to ensure utilisation of the asset by maintaining its value (see 3.3) and initial performance within acceptable limits for its whole service life, as well as promoting technical and regulatory modifications to initial or new technical requirements as selected by the operator or demanded by law.

To achieve this goal, the definition of general criteria to collect data that is essential for maintenance activities and the use of suitable information systems may be used to develop database and management tools to improve the profitability of buildings.

1 Scope

This European Standard specifies the criteria and the general methods that can be used in the planning, management and control of maintenance in buildings and their surrounding area according to the applicable legal requirements, objectives of the owners and users and the required quality of maintenance.

This European Standard applies to the maintenance management of buildings.

For informative purposes, a possible classification of buildings is given in Annex A.

2 Normative references

The following referenced documents are indispensable for the application 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 13306:2010, *Maintenance — Maintenance terminology*

EN 13460:2009, *Maintenance — Documents for maintenance*

ISO 6707-1:2004, *Building and civil engineering — Vocabulary — Part 1: General terms*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13306:2010, EN 13460:2009, ISO 6707-1:2004 and the following apply.

3.1
building
construction works that have the provision of shelter for its occupants or contents as one of its main purposes; usually partially or totally enclosed and designed to stand permanently in one place

[ISO 6707-1:2004]

NOTE Including envelope, structural and non structural elements, finishing, fitments, equipment and installations and external works.

3.1.1
maintenance of buildings
combination of all technical, administrative and managerial actions during the lifecycle of a building (or a part of it), intended to retain it, or restore it to, a state in which it can perform the required function

3.2
item
part, component, device, subsystem, functional unit, equipment or system that can be individually described and considered

NOTE A number of items e.g. a population of items or a sample, may itself be considered as an item.

[EN 13306:2010, see 3.1]

3.2.1
system
set of interrelated items considered as a whole for a defined purpose, separated from other items

3.2.2
subsystem
system that is part of a more complex system being considered

3.2.3
component
construction element or functional grouping of several elements considered as part of a single system

3.3
property value
minimum production cost for a building, inclusive of business profit, that assures the compliance with predetermined requirements

3.4
diagnostic
assessment activities aimed at acquiring knowledge of the status and operating conditions of the building and its component parts

3.5
mid and long term budgeting
determination of the general extent of expenses in respect of pre-established objectives; also intended to schedule interventions, and therefore costs and resources, evenly over time if possible

3.6
short term cost budgeting
more specific quantification of expenses compared to the mid and long term budgeting of interventions for a given year, for the purpose of optimising the workload

3.7
corrective maintenance
maintenance carried out after fault recognition and intended to put an item into a state in which it can perform a required function

[EN 13306:2010, see 7.6]

3.8
preventive maintenance
maintenance carried out at predetermined intervals or according to prescribed criteria and intended to reduce the probability of failure or the degradation of the functioning of an item

[EN 13306:2010, see 7.1]

3.9
condition based maintenance
preventive maintenance which includes a combination of condition monitoring and/or inspection and/or testing analysis and ensuring maintenance actions

NOTE The condition monitoring and/or inspection and/or testing may be scheduled, on request or continuous.

[EN 13306:2010, see 7.3]

3.10
opportunity maintenance
preventive maintenance performed in advance of the planned occurrence as a consequence of an unplanned activity which enables it to be performed at reduced cost or with fewer resources

3.11
obsolescence factors
external factors which lead to permanent transition from operability to non-functionality of the building

3.12
instructions for inspection
technical instructions to perform inspection activities on building in order to assess the compliance with specified requirement concerning the function performances of the building or of some selected sub-systems or components

3.13
inspection logbook
collection of inspection records produced during inspection activities

3.14
operation manual
technical instructions to reach a proper item function performance according to its technical specifications and safety conditions

[EN 13460:2009, see 5.2]

3.15
maintenance manual
technical instructions intended to preserve an item in, or restore it to, a state in which it can perform a required function

[EN 13460:2009, see 5.3]

3.16
maintenance plan

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

[EN 13306:2010, see 2.5]

3.17
asset register
item basic information, related to technical, contractual, economic, administrative, location and operational aspects, necessary to define it within the company

3.18
down state
state of an item characterized either by a fault, or by a possible inability to perform a required function during preventive maintenance

NOTE 1 This state is related to availability performance.

NOTE 2 A down state is sometimes referred to as an internal disabled state.

[EN 13306:2010, see 6.7]

NOTE 3 For buildings the down state, intended as inability to perform the required function, can be seen as a whole down state (complete impossibility to use the building) or a partial down state (the impossibility to use the building is limited to a part of it).

3.19
maintenance concept
interrelationship between the maintenance organization, the splitting of the building into sub-systems and components and the maintenance tasks to be applied for the maintenance of an item

3.20
reliability centred maintenance
method for establishing a scheduled preventive maintenance programme which will efficiently and effectively achieve the inherent reliability and safety levels of equipment and structure

NOTE This definition is different from the definition given in EN 60300-3-11.

4 Basic data and requirements

4.1 General

4.1.1 Introduction

The information required to carry out maintenance should be available either for new constructions and restoration of buildings (maintenance plans issued for construction and updated with "as built documentation"); for existing buildings, if not available, this information should be progressively acquired in a systematic manner and controlled and filed appropriately, to be used for subsequent controls.

Since the complete collection of information requires significant time and costs, the procedure shall be planned in advance and the extent of the collection evaluated on a case-by-case basis.

NOTE The information required should describe the assets as a whole and its adequacy with respect to usability and value. The Asset Register (see 3.17) could also be used to collect the required information.

4.1.2 Preliminary data collection

During preliminary data collection the property to be maintained is to be identified and quantified; the data shall include all documents available and the following information, as a minimum:

— location;

— gross volume and surface area, divided according to intended use (refer to standards if applicable);

— general characteristics of component parts (e.g. position inside the building, drawings, technical data sheet, instructions for maintenance issued by manufacturer,...);

— level of compliance with legal and regulatory requirements (objectives to be attained);

— status of maintenance upgrading in accordance with pre-determined operational specifications;

— external constraints (monumental and environmental, servitudes (e.g. right of way), agreements with public bodies and bordering landowners etc.);

— legal and/or technical documents relating to the installation, operation and maintenance of systems and equipment;

— status of distribution systems and data concerning consumption (energy, water, etc.);

— type and characteristics of services required to ensure operation of the building (premises for doorkeeper and cleaners, heating, etc.).

NOTE The construction company should normally provide this information at the time of delivering the building to the owner (handover). In this case, only the update of this information should be performed by the owner or by organization managing the maintenance services.

4.1.3 Specific collection of information

Detailed information shall be collected, after the preliminary data collection; the collected data shall be accurately identified and its presentation format codified (see Clause 7).

The information categories required may include the following (example list):

a) inventory of buildings and equipment: identification, location and description supported by:

   1) an appropriate coding system for the building complex, individual buildings, technological systems for each building subdivided into technological units, technical elements, component parts and the material of which they are made;

   2) a coding system according to its functional dependences;

b) drawings: sizes, position and layout of the various components;

   NOTE 1 To be reliable, the above information shall refer to the 'as built' status of the building and shall be kept updated during maintenance.

   NOTE 2 For example, these may consist of plans and cross-sections, structural drawings and systems layouts. This process is facilitated if the drawings are computerised.

c) data about maintenance activities already performed (history of the components);

d) assessment of efficiency, functionality and compliance with applicable rules and standards (see 4.2);

e) residual service life, for each component, predicted in accordance with age, quality and conditions of use, and in relation with the service life initially foreseen;

f) technical specifications: especially concerning equipment and building services in order to identify characteristics and established operating conditions;

g) repair or replacement costs: for each component, as a basis for a financial assessment of the maintenance plan;

   NOTE 3 The repair cost (i.e. the cost to restore the functionality of a building component) can be estimated with reference to official or regional price list.

h) cost for unavailability and/or down-state: estimate, at least for critical components, costs arising from the down-state of the components or from their inability to provide the services for which they are intended (e.g. costs for liabilities, damages, damage to the corporate image,...);

i) information about critical construction solutions (for example arch vaulting);

j) instruction for inspections, operation manuals and maintenance manuals: experience and recommendations of the builder/manufacturer to be used to develop an appropriate maintenance plan.

4.2 Diagnostic methods and instruments for maintenance

Whenever is possible, maintenance operators should make an appropriate use of diagnostics in managing the buildings subject to the maintenance establishing which type of diagnostic to be used and its physical coverage and duration.

The decisions concerning any maintenance intervention should be based on the results and the information coming from the diagnosis activities.

The effectiveness of the tests and the interpretation of the diagnostic results should be associated with the use of standard methods and instruments to obtain reliable, comparable and traceable results (see Table 1).