SLOVENSKI STANDARD
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Sistemi za odvod odpadne vode in kanalizacijo zunaj zgradb - 7. del: Vzdrževanje in obratovanje

Drain and sewer systems outside buildings - Part 7: Maintenance and operations

Entwässerungssysteme außerhalb von Gebäuden - Teil 7: Betrieb und Unterhalt

Réseaux d'évacuation et d'assainissement à l'extérieur des bâtiments - Partie 7: Entretien et exploitation

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This European Standard was approved by CEN on 5 March 1998.

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 Central Secretariat 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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 165 "Waste water engineering", 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of an identical text or by endorsement, at the latest by October 1998, and conflicting national standards shall be withdrawn at the latest by October 1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

This part is the seventh in a series relating to the functional requirements of drain and sewer systems outside buildings that operate essentially under gravity. There will be seven parts, as follows: Drain and sewer systems outside buildings -

Part 1 Generalities and definitions

Part 2 Performance requirements

Part 3 Planning

Part 4 Hydraulic design and environmental considerations

Part 5 Rehabilitation

Part 6 Pumping installations

Part 7 Maintenance and operations.

In drafting this part of this European Standard account has been taken of other available standards, in particular EN 476 "General requirements for components used in discharge pipes, drains and sewers for gravity systems".

1 Scope

This European Standard is applicable to drain and sewer systems, which operate essentially under gravity, from the point where the sewage leaves a building or roof drainage system, or enters a road gully, to the point where it is discharged into a treatment works or receiving water.

Drains and sewers below buildings are included provided that they do not form part of the drainage system of the building.

This European Standard sets out the principles for the operation and maintenance of drain and sewer systems.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 752-1	Drain and sewer systems outside buildings - Part 1: Generalities and definitions.
EN 752-2:1996	Drain and sewer systems outside buildings - Part 2: Performance requirements.
EN 752:4-1997	Drain and sewer systems outside buildings - Part 4: Hydraulic design and environmental considerations
EN 752-5	Drain and sewer systems outside buildings - Part 5: Rehabilitation

EN 752-6 Drain and sewer systems - Part 6: Pumping installations

3 Definitions

For the purposes of this European Standard, the following definitions, together with those given in EN 752-1 apply:

3.1 dam board: Removable plank or section placed across a sewer or drain to divert or hold back the flow.

3.2 cleaning ball: Spherical device, having an indented surface, designed to be carried through a drain or sewer by the flow to facilitate removal of sediments.

3.3 confined space: Space with restricted ventilation where special safety precautions may need to be taken.

3.4 flushing: Use of a temporary substantially increased flow to facilitate removal of obstructions or sediments from drains or sewers.

3.5 jetting: Use of high pressure water jetting equipment to facilitate removal of obstructions or sediments from drains or sewers.

3.6 pumping installation: Pumping station together with any associated rising main(s). [EN 752-6]

3.7 pumping station: Building, structures and equipment used to transfer sewage through a rising main or otherwise to raise the sewage. [EN 752-6]

3.8 renovation: Work incorporating all or part of the original fabric of the drain or sewer by means of which its current performance is improved. [EN 752-5]

3.9 rehabilitation: All measures for restoring or upgrading the performance of existing drain and sewer systems. [EN 752-1]

3.10 repair: Rectification of local damage. [EN 752-5]

3.11 replacement: Construction of a new drain or sewer, on or off the line of an existing drain or sewer, the function of the new drain or sewer incorporating that of the old. [EN 752-5]

3.12 rodding: Use of appropriate device on the end of flexible rods to facilitate removal of obstructions (or sediments) from drains or sewers.

3.13 winching: Use of a bucket or other device pulled through a drain or sewer to facilitate removal of sediments (or obstructions).

4 Sources of additional information

This European Standard sets out the essential requirements for good practice in various engineering activities relating to the planning, design and operation of drain and sewer systems. For supplementary detail and guidance reference should be made to national documents until such time as fully comprehensive European Standards are available.

The documents listed in annex A contain details which may be used in the framework of this part, given approval by the relevant authority.

5 General

5.1 Objectives

The purpose of operations and maintenance is to ensure that the drain and sewer system performs in accordance with the requirements defined in EN 752-2, as follows:

a) the pipework operates without blocking;

b) flooding frequencies shall be limited to prescribed values ;

c) public health and life shall be safeguarded;

d) sewer surcharge frequencies should be limited to prescribed values;

e) the health and safety of operator personnel shall be safeguarded;

f) receiving waters shall be protected from pollution within prescribed limits;

g) drains and sewers shall not endanger existing adjacent structures and utility services;

h) the required design life and structural integrity shall be achieved;

i) drains and sewers shall be watertight in accordance with testing requirements;

j) odour nuisance and toxicity do not arise;

k) appropriate access shall be provided for maintenance purposes.

In particular operations and maintenance has the following objectives:

- to ensure that the entire system is operationally ready at all times and functions within the performance requirements.
- to ensure that the operation of the system is safe, environmentally acceptable , and economically efficient;
- to ensure that as far as possible the failure of one section of a sewer system will not adversely affect the performance of the other parts.

Planning, design, construction and rehabilitation shall take into account the operation and maintenance requirements.

5.2 Operations

Operations involves the monitoring and regulation or diversion of wastewater by for example:

- starting or stopping pumps;
- inserting dam boards;
- regulating valves and weirs;
- the use of detention tanks;
- action taken in accordance with contingency and emergency plans;
- wastewater quality measurement;
- periodical inspections.

5.3 Maintenance

Maintenance involves a combination of planned and reactive tasks necessary to ensure that the system is kept in such a condition that it can perform its function satisfactorily. The tasks may include:

- local repair or replacement of damaged pipes or other structures;
- removal of sediments, obstructions etc. to restore hydraulic capacity;
- maintenance of mechanical plant (e.g. pumps);
- rodent and insect control.

5.4 Requirements

The effective operation and maintenance of the drain and sewer system will require:

- planning;
- rights of access;
- sufficient number of competent personnel;
- clear assignment of responsibilities;
- suitable equipment;
- knowledge of the system, its operational components and the users connected;
- adequate records and analysis.

There may also be requirements relating to the resolution of performance deficiencies. For example to remedy failures and problems within acceptable timescales.

6 Operations and maintenance planning

6.1 Operations planning

6.1.1 General

The operations plan shall indicate the approach to be taken in a particular drain and sewer system. The plan shall include:

- inspection routines;
- the procedures used in the operation of the elements of the system;
- contingency and emergency plans.

6.1.2 Inspection routines

Inspection routines, including frequencies, shall be established for the system, taking into consideration the requirements and importance of each component. Routines shall include the inspection of:

- pipelines including inspection chambers, manholes and outfalls, taking into account the gradient and/or velocity;
- pumping installations, according to potential risk and type of equipment;
- overflows and detention tanks, taking into account storm frequency;
- inverted siphons, depending on risk of blockage and potential consequences ;
- separators, according to technical requirements;

- grit chambers, gullies etc., taking into account storm frequency, capacity and land use.

6.1.3 Operations procedures

Procedures for the operation of the components of the system should include plans:

- for the operation of pumping stations;
- for the operation of any special components (e.g. vacuum or pressure installations within the system);
- for setting dam boards, valves and weirs;
- for the operation of detention tanks;
- showing the assignment of responsibilities for carrying out procedures.

6.1.4 Contingency Planning

Contingency planning is the process of setting out procedures to be used in case of breakdown of a part of the system. It should also include procedures for dealing with major failures and other emergencies. Procedures may be required for a range of possible incidents including:

- accidental spillages of toxic, noxious or explosive substances;
- discharge of special substances used in firefighting;

- failure of pumping stations or pre-treatment facilities;
- flooding due to an exceptional rainfall event;
- major sewer collapse.

Contingency plans shall include:

- details of emergency services;
- estimated times for response (in general terms);
- lists of those to be notified;
- location of available resources;
- procedures to be followed (including protection of receiving waters and sewage treatment works).

The resource requirements shall be determined, including:

- personnel ;
- vehicles;

- equipment;
- materials.

These resources will sometimes need to be available at short notice. This can influence resourcing decisions for normal operations and maintenance work.

6.2 Maintenance planning

The maintenance plan shall include the type of maintenance strategy to be used in each component of the system and the monitoring requirements and frequencies. The plan should also include a risk assessment, taking into account the possibility of failure and its consequences.

The strategies for maintaining drain and sewer systems are planned or reactive maintenance, or a combination of both.

Planned maintenance includes a programme of work to remedy the defects and problems identified during inspection. It is particularly required to reduce the incidence of failure where the consequences are severe.

Reactive (or crisis) maintenance involves responding to failures and problems as they are identified. It is appropriate for those parts of the system that can function with little or no maintenance.

The effectiveness of maintenance should be assessed by comparing the performance of the drain or sewer system with the requirements (see 5.1). In addition, for reactive maintenance, target response times can be used as an assessment.

7 Data requirements

Data shall be collected:

- for management purposes;
- for regulatory reporting purposes (e.g. properties at risk of flooding);
- to meet statutory requirements (e.g. maintaining plans showing the location of the public sewers).

It is possible to store a wide range of data on drain and sewer systems. However, collection, validation, storage and updating the data can be expensive. The amount of data collected depends on the reasons listed above.

The information may include:

- an inventory of the system including records of drains, sewers, manholes, pumping installations, combined sewer overflows, detention tanks etc.;
- details of permits for discharge into the system (trade effluents, hazardous materials etc.);
- details of permits to discharge from the system into receiving waters (combined sewer overflows, pumping installations etc.);
- records of inspections of the system (e.g. closed circuit television survey reports);

- records of incidents such as blockages, collapses, pumping station failures, rising main failures and flooding incidents;
- information on rainfall;
- records of planned maintenance work carried out;
- actual response times for dealing with emergencies;
- information on the cost of incidents and maintenance activities to allow budgetary control and performance review; and
- information about the hydraulic capacity;
- records of system performance (see clause 8 of EN 752-2:1996).

Computer based geographical information systems (GIS) are a powerful tool for storage retrieval and analysis of information on sewer systems.

8 Investigation of operational problems

To deal with operational problems in the most cost effective way, it is necessary to investigate and understand the causes. Investigations can be required to determine:

- route of a pipeline;
- cause of the blockage or collapse;
- location of the blockage;
- cause of a surface depression;
- location of a connection;
- source of a connection;
- quality of making of a connection;
- quality of a repair;
- condition of a pipe;
- extent of scale or grease build up;
- effectiveness of sewer cleaning work;
- origin of influent;
- quantity and composition of the influent;
- quantity and composition of the sewage;
- watertightness;