[1] Recommendation L.1 "Construction, installation and protection of telecommunication cables in public networks".

BIBLIOGRAPHY

Branches, splices, spurs and other details are entered either on the plans or in special files. The distribution ducts for the different fluids should be indicated by conventional signs.

So many ducts and cables are usually either hung, laid or fixed inside tunnels that it is not possible to represent each duct individually. They are therefore represented as cross-sections of the tunnel, which are placed next to the pipeline or on separate sheets with an indication of their location.

Representation of ducts

The tunnels and pipelines should be drawn to scale, corresponding in width to the internal diameter of the tubes.

Graphic representation

The model plan in Annex 3 shows distribution duct pipelines in addition to transport duct tunnels.

Content

6.10Model plan

Localization documents should be available for consultation at any time between the completion of duct laying and the entry of data in the plan.

Access to localization data

- basic plans must be kept up to date.

- data on new or modified ducts must be collected and processed as soon as work is completed;

Duct plans cannot fulfil their purpose unless they are constantly updated. The following principles should be observed:

Updating

6.9 Keeping plans up to date

An underground duct information system has to be designed as a continuous sequence of operations, including data capture in the field or in the office, memorizing and processing, and the printouts of plans and lists.

A very large volume of data on underground ducts needs to be captured, stored, updated, processed and reproduced, and they have to be extractable in different combinations. It is therefore advisable to use computer techniques, since this is the only way of establishing an integrated system of information on underground ducts. Such a system can meet various requirements, such as combining different data levels by the automatic process of separate superimposable plans; it can also produce extracts (plans, lists etc.) with a differentiated content.

General analysis

6.8Use data processing systems

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Writing must be clearly legible and uniform and must be suitable for reduction and reproduction.

Writing

Ducts are represented graphically by means of conventional signsdescribed in special standards.

Representation

With this system, each level of data appears on a separate sheet. The basic plan, duct data and network data can appear as different data levels.

- System of separate superimposable plans:

The basic plan and duct data should appear on the same medium. Ducts have to be copied onto the basic plan.

- Single-plan system:

Procedure for preparing plans

- prolongations.

- distance resection,

- orthogonal coordinates,

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- polar coordinates,

One of the following survey methods must be used:

Survey methods

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The accuracy of the points used to locate ducts must comply with land survey rules.

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Location:

Accuracy

If excavations reveal ducts which were hitherto unknown or the location of which had been uncertain, these ducts must be surveyed. This rule also applies to ducts located by detection.

Whenever ducts are laid or altered, their location and, if necessary, their level should be surveyed.

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Principles:

Surveys

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By preparation of plans and data management the capture, updating, processing and representation of all data relating to underground ducts is understood. Any information system for underground ducts can thus be run either manually or by computer.

Definition

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6.7Preparation of plans

The following scales are recommended: 1:100, 1:200, 1:250 or 1:500 according to the concentration of buildings in the area.

The choice of scale depends on the density of ducts. The scale of the duct plan should correspond, if possible, to that of the basic plan drawn up in accordance with the survey.

Scales

-Protective devices

Auxiliary installation data:

- Identification

-Construction or duct components

-Operational condition

-Material

-Dimensions

-Profile

-Type and content

- Function

-Managing enterprise

- Fluid transported

Duct data:

-Duct level

- Duct location

Geometric data:

A duct plan generally comprises the following data:

Contents

- it must supply operators and third parties with information on the location and level of ducts.

- it must contain instructions for use in the event of breakdown or malfunction;

- for ducts, it must give information on their development, construction, operation and maintenance;

- it must contain all legally required information;

Every duct or network plan must meet the operational requirements of the network concerned.
The following rules shall apply:

Special rules

- water.

- collective antenna installations,

- gas,

- district heating,

- telecommunication installations,

- electricity,

- drainage water,

The network plan contains references to all the equipment and telecommand devices of a distribution or drainage network. Network plans are of the following types:

Types of plan

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6.6Duct or network plans

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- types and boundaries of crops.

- buildings;

- property limits, frontiers;

- fixed points (triangulation points, base points, levelling points);

The basic plan essentially contains information on:

Contents

The basic plan provides the basic reference for underground duct plans. Its purpose is to map the layout of areas where ducts are situated.

Special rules

6.5Basic plan

It should be possible to determine from the plans how ducts are connected to the network to which they belong. Overall plans or diagrams will often be required.

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Network connections

It should be possible from the plans to determine the position of ducts and duct components accurately, to transpose it to other documents and to relate it unequivocally to official survey points. Measurements must be taken in conformity with current surveying rules.

Location and level

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Plans must contain all the particulars required for the operation, maintenance and extension of underground ducts, as well as for their protection and maintenance in working order during repairs; they must correspond to the particular features of each network.

Characteristics

- their network connections.

- their location and level,

- the characteristics of the various ducts,

Underground duct plans must contain, for the benefit of their users, complete and up-to-date information on:

Scope of information

6.4Rules applicable to underground duct plans

Underground duct plans form part of a general information system. These ducts, whether situated in public or in private areas, constitute public networks for distribution and drainage and for the protection of the environment.

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6.3Field of application

The term "underground duct" is defined in this document to mean a vector for the distribution of a fluid, connecting the place of production with the place of consumption or drainage. It covers pipelines for electricity as well as telecommunication cables.

6.2Terminology

Plans must contain all particulars required for the operation, maintenance and extension of underground ducts, as well as for their protection and maintenance in working order during repairs.

The graphic representation of underground ducts in joint tunnels is standardized in several countries, and we shall therefore confine ourselves to a general presentation in this document. The management of the network concerned is responsible for updating plans and documents.

This paragraph describes the graphic representation of underground ducts in joint trenches or tunnels.

6.1Introduction

used jointly for pipelines and telecommunication cables

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6.Standardization of plans for underground ducts in tunnels

Since telecommunications cables are vulnerable to thermal load, thermal conditions in tunnels must be taken into account. This applies especially for optical cables.

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- Protection against thermal load

(see section 5).

considered in the light of CCITT Recommendation L.1 [1] Metal components (pillars, racks or supports) should be preferably be made of hot galvanized steel. In some cases, cathodic protection may be applied.

High temperatures may occur in tunnels containing heat evolving ducts. Care should be taken to maintain physiologically acceptable environmental conditions in order to avoid any impairment to health during work or inspections. For the telecommunication cables, see 3.3.2.

devices should be provided at appropriate locations.

- Schedules, Beginning of works, Duration of works (stages), Start-up.

- Subsoil, Type of ground, Groundwater level, Existing ducts, Existing underground constructions;

- Roadway, Road width, Pavement width, Green strip, Traffic density, Surface water drainage, Superstructure;

- Ducts, Network, Dimension (cross-section), Power (capacity), Material, Protection against corrosion, Number, Distribution priority, Duct routing, Compatibility with other ducts, State of ducts, Repairs, Overhaul, Replacement, Reserves, Extensions, Emergency ducts, Provisional installations, Connections to buildings;

The above principles apply to inspectable tunnels, and apply by analogy to tunnels with crawling room only.

Duct tunnels and trenches are constructions containing one or generally more ducts belonging to different networks. Inspectable tunnels include one or more gangways for initial assembly work and subsequent control, maintenance and repair operations. A tunnel without standing room designed for crawling should have a clear internal height of at least 0.8 m. Duct gangways may not be entered.

1.General considerations

that administrations who in future will be interested in this type of installation, follow the rules described in this Recommendation.

recommend

(c) that the importance of the joint use of tunnels increases with density of population and shrinking green spaces, i.e. in large towns;

(b) that the rules governing this type of ducting vary significantly from country to country;

(a) that many countries are interested in the joint use of tunnels and are aware of the advantages, disadvantages and specific dangers they hold out;

considering

The CCITT,

AND THE STANDARDIZATION OF UNDERGROUND DUCT PLANS

JOINT USE OF TUNNELS BY PIPELINES AND TELECOMMUNICATION CABLES,

Recommendation L.11

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