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**Guidelines for the management of
assets of water supply and wastewater
systems —**

**Part 1:
Drinking water distribution networks**

*Lignes directrices pour la gestion d'actifs des systèmes d'eaux usées et
d'eau potable —*

Partie 1: Réseaux de distribution d'eau potable





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Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Principles aspects of the management of assets	5
4.1 Objectives and requirements	5
4.1.1 Objectives	5
4.1.2 Functional requirements	5
4.1.3 Performance requirements	6
4.2 General aspects	7
4.2.1 General	7
4.2.2 Principal aspects — Drinking water utilities	7
4.2.3 Principal aspects — Drinking water systems	8
4.2.4 Integrating the principal aspects	8
4.3 Risks and life cycle aspects	9
4.3.1 Risk	9
4.3.2 Life cycle	10
4.4 Structuring the process for management of assets	10
4.4.1 General	10
4.4.2 Strategies for the management of assets	11
4.4.3 Periods of planning	12
4.4.4 Strategic level activities	13
4.4.5 Tactical level activities	13
4.4.6 Operational level activities	13
5 Investigation	14
5.1 General	14
5.2 Purpose of investigation	14
5.2.1 General	14
5.3 Determine the scope of the investigation	14
5.4 Data collection	14
5.4.1 General	14
5.4.2 Data requirements	15
5.4.3 Inventory data	15
5.4.4 Failure data	16
5.4.5 Further condition data	16
5.5 Data registering and data assignment	18
5.5.1 Data registering	18
5.5.2 Data assignment	18
5.5.3 Geo-referencing	19
5.6 Review of existing information	19
5.7 Inventory update	19
5.8 Types of investigation	20
5.8.1 Hydraulic investigation	20
5.8.2 Structural investigation	20
5.8.3 Operational investigation	20
5.9 Review of performance information	21
5.10 Planning of investigation	22
5.11 Performance testing	22
6 Assessment	22
6.1 Principles	22
6.2 Assessment of the hydraulic performance	23

6.3	Assessment of the structural condition.....	23
6.4	Assessment of operational performance.....	23
6.5	Compare with performance requirements.....	23
6.6	Identification of unacceptable impacts.....	24
6.7	Identify causes of performance deficiencies.....	24
7	Planning.....	24
7.1	General.....	24
7.2	Develop integrated solutions.....	25
7.3	Assess solutions.....	25
7.4	Prepare action plan.....	26
8	Implementation.....	26
8.1	General.....	26
8.2	Create/update plan.....	27
8.3	Carry out work.....	27
8.4	Monitor performance.....	27
8.5	Review performance.....	27
9	Operation and maintenance.....	27
9.1	General.....	27
9.2	Operation.....	28
9.3	Maintenance.....	29
10	Rehabilitation.....	29
10.1	General.....	29
10.2	Strategic plan for rehabilitation of physical infrastructure (long-term planning).....	30
10.2.1	General.....	30
10.2.2	Service life and failure rate development.....	31
10.2.3	Determining the need for rehabilitation of physical infrastructure.....	33
10.2.4	Budgeting.....	34
10.3	Tactical plan for rehabilitation of physical infrastructure (mid-term planning).....	34
10.3.1	Risk-based evaluation approach.....	34
10.3.2	Individual evaluation and prioritizing.....	35
10.3.3	Coordination with other construction activities.....	36
10.4	Operational plan — Implementation of rehabilitation measures (short-term planning).....	36
11	Documentation and efficiency review.....	36
Annex A (informative) Further objectives of the management of assets of drinking water networks.....		38
Annex B (informative) Examples for the assessment of service life and failure rates of pipes.....		40
Annex C (informative) Examples for risk consideration in management of assets.....		42
Bibliography.....		45

საინფორმაციო ნაწილი. სრული ტექსტის სახსრავად შეიძინეთ სტანდარტი.

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is Technical Committee ISO/TC 224, *Service activities relating to drinking water supply systems and wastewater systems — Quality criteria of the service and performance indicators*.

A list of all parts in the ISO 24516 series can be found on the ISO website.

Introduction

This document is written within the overall concept of management of assets which is an activity all organizations undertake in some manner and to some degree. It focuses on the details of managing the physical assets at the operational level rather than the organizational (corporate management, structural or process) level.

Drinking water utilities are reliant on their assets to deliver their services to the resident populations in their jurisdictions. The assets (underground pipes, reservoirs, storage tanks, treatment plants, etc.) collectively form the physical infrastructure of the drinking water utilities and are the consequence of the accumulated capital investments and operational expenditures on maintenance and rehabilitation over many years. In many of these utilities, the replacement value of these past investments will amount to many millions (even billions) of US dollars depending on the size of the community served. The infrastructure represents therefore a major societal investment in essential services contributing to public health and the protection of the environment.

In many countries, these assets have been identified as critical infrastructures, and programmes are in place to assure their protection or their sustainability. Like many other organizations having assets, drinking water utilities undertake programmes of activities to manage the assets to ensure they continue to meet the needs of the community for reliable delivery of drinking water. These management activities can be at the strategic, tactical or operational level. The activities can be part of a formal management system, the result of specific legislative requirements, or simply the result of due diligence by the service operators and managers.

This document can serve as a supporting document for utilities operating an asset management system regardless of whether the utilities make use of any management system standard (e.g. ISO 55001).

In many countries, there is a recognized sustainability problem, sometimes referred to as the infrastructure gap, which recognizes that for various reasons, the infrastructure has not been maintained over the years on a truly sustainable basis, i.e. funding and implementation of rehabilitation programmes have been postponed, with a focus instead on short-term repairs or an allowed decrease in the level of service provided.

The condition of water infrastructures greatly influences the adequacy of the water service from aspects of quality, quantity, pressure, safety, reliability, environmental impact, degree of treatment and economic efficiency. System condition-based rehabilitation approaches serve to meet these requirements with a focus on a holistic approach of condition-based, risk-oriented maintenance.

As the installation and development of water assets mature, the optimization of networks will become necessary in many places in order to respond to changing societal and economic conditions. Consequently, networks are subject not only to ageing as well as wear and tear but also to adaptation processes resulting from growth, new legislative requirements, or changing customer service level expectations. This requires drinking water utilities not only to focus on maintenance and rehabilitation but also to keep future requirements and developments in mind. Rehabilitation will thus become essential in management of assets, with ever more stringent requirements on the design and execution of rehabilitation (partial replacement of specific sections of the entire network is also considered as rehabilitation).

In recent years, much effort has been applied to the whole issue of management of assets on two levels:

- What are the principles and structure of an asset management system?
- What are the good practices that can be implemented on a technical level to assess the condition of the assets and help decide when asset interventions (repair, renovation or replacement) take place?

This document describes the information required and how to collect and process reliable inventory, condition, operational and context data about drinking water systems. Condition data for the underground water infrastructure notably include data on failure. These data serve mainly as a basis for systematic maintenance and can also contribute data needed for benchmarking.

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Reliable failure statistics and the database description of the condition are of particular significance for establishing investigation, maintenance and rehabilitation priorities.

This document also provides guidance on how to define a strategy on management of assets with regard to the overall performance expected by the drinking water utility and other stakeholders. It includes several aspects of the operation and maintenance, including asset condition assessment and investment strategies (new assets and rehabilitation).

The approaches offered in this document are intended to be universally applicable, regardless of the structure of a given water system.

The usual and expected goal of the effective management of assets is to provide an appropriate service life while fulfilling given requirements in a cost-effective manner.

This document is intended to provide guidance on the assets typically owned or operated by drinking water utilities (networked drinking water systems) that are expected to meet customer needs and expectations over longer (multi-generational) periods.

Additional information on objectives of management of assets is provided in [Annex A](#). Information on the assessment of typical service life and age-based failure rates of pipes is shown in [Annex B](#) and risk-based prioritization of pipe rehabilitation in [Annex C](#).