

# Leakage management and control

A BEST PRACTICE TRAINING MANUAL

LEAKAGE MANAGEMENT AND CONTROL

Leakage is one of the crucial issues to be dealt with in order to improve the efficiency and effectiveness of water supply services. Although the techniques and institutional aspects involved in a leakage control programme are well known, appropriate materials for use in training programmes on this problem are lacking. This training manual aims to fill this gap. Its use should be viewed as part of an overall strategy for the promotion of sound Operation and Maintenance (O&M) practices in the context of a comprehensive approach to institutional development.

This training manual is aimed at professionals responsible for Operation and Maintenance of water supply systems, who already have some experience of training. It has been designed to raise their level of training and to make maximum use of the scarce resources available for this type of activity. The manual will greatly help the implementation of training activities and will be an important tool for trainers in the design, preparation and carrying out of training courses on leakage control. At the end of the course, experienced participants should be able not only to repeat the training course with other professionals, but also to help water agencies in the formulation and implementation of a leakage control programme.



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## Foreword

This training manual, prepared by Malcolm Farley, has been developed for training trainers to run workshop programmes on how to control water loss in water supply systems. The document contains individual modules that link together to form a training course that comprehensively covers the key aspects of controlling water loss.

Once trained, trainers can use the package as a base for developing their own training courses tailored to local conditions and to the needs of different course participants.

The manual has been designed for course participants to learn the theory behind leakage control and how to put it into practice in real life. Thus, an integral part of the course involves participants developing plans to put a leakage control programme into action in their own systems.

This manual focuses on the practical application of new principles and techniques. In doing so, it aims to equip O&M personnel with the skills necessary to optimize water supply services by implementing their own comprehensive leakage control and management programme.

The manual is flexible and can be adapted to suit the needs of O&M personnel at every level within a water supply authority. It is an excellent source of information for decision-makers, planners, economists, consultants and other sector professionals interested in this important issue. It can also be used by other sector participants to gain a fuller understanding of the issues that influence the performance of water supply systems.

Leakage Management and Control is part of an overall effort of the Operation and Maintenance Network of the Water Supply and Sanitation Collaborative Council, to improve management and operational practices of water authorities. By improving such practices and by reducing water loss in distribution systems, it might be feasible to extend coverage to many inhabitants of urban settlements who are not served with water supply services and thus are highly exposed to health risks.

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# 1. Introduction to the training manual

## 1.1 Introduction

### Importance of leakage management and control in institutional development

Leakage is one of the crucial issues to be dealt with in order to improve the efficiency and effectiveness of water supply and sanitation services. Although the techniques and institutional aspects involved in a leakage control programme are well known, appropriate materials for use in training programmes on this problem are lacking. This training manual aims to fill this gap and is a key contribution to the implementation of Operation and Maintenance Programmes in Member States. Its use in countries is part of an overall strategy for the promotion of sound Operation and Maintenance (O&M) practices in the context of a comprehensive approach to institutional development.

### Limitations of the training manual

It is well known that training materials are more effective when they are designed to solve specific problems in situations where performance does not match one's expectations. The preparation of training manuals for the target population of each water agency—after analysis of constraints, profiles of posts and personnel, and the formulation of O&M programmes—is therefore a perfectly good approach. Training materials prepared in this manner would be ideal for each target population. However, as most water agencies in Member States were found to have similar core problems and limitations in their production and distribution facilities, it was proposed that one training manual should be developed for broad application, which would also considerably reduce the cost.

The issues included in this training manual are grouped into specific sections and modules, covering a wide range of techniques and procedures for carrying out leakage management activities. Depending on the problems and constraints faced by the water agencies concerned and the specific characteristics of the target audience for training, appropriate modules can be selected from this manual and assembled for the training course. Preparation of additional modules or adaptation of the available modules may be necessary when problem analysis indicates situations and problems that differ significantly from those foreseen in the manual. Despite these limitations, this manual will help the transfer of information and the development of skills needed for better performance by the water agencies. The training manual is flexible and can be updated from time to time without changing the overall framework.

Courses, workshops and seminars that utilize this manual are intended for managers, engineers and technicians. It is expected that the initial group of trainees will themselves become a core group of trainers, who will exert a multiplying effect by passing on this information and their expertise to workers in national water agencies and users.

## 1.2 Objectives of the training manual

General objectives. This training manual is aimed at professionals responsible for Operation and Maintenance of water supply systems, who already have some experience of training. It has been designed to raise their level of training and to make maximum use

**Specific objectives.** This training manual should:

- ### 1.3 Description of the training manual

Leakage management activities have been grouped into modules, based on the types of professionals involved in their execution (managers, technicians, etc.) and the characteristics and level of development of the water distribution network. The modules incorporate the information required for carrying out combinations of interrelated activities. Each module is self-contained, so that it can be directed to different types of target populations. The modules contain as much information as is required to achieve their particular objectives, and to provide a high degree of flexibility when assembled for use in training courses. These requirements may lead to some overlap between modules.

Thus, a module may include a number of concepts and skills linked to a major issue. Each module can be composed of one or more sections which are interdependent and related to the major theme of the module. There may also be sub-modules dealing with the same issue but differing in complexity.

The training manual adopts a logical and “user-friendly” approach to training water practitioners at levels ranging from senior managers to leak inspectors. It begins by inviting the water practitioner to address some simple questions about the characteristics of

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