



Irrigation Toolbox Chapter 4

Water Measurement

WATER MEASUREMENT

Introduction

- The material provided in this section is intended to serve as a framework for water measurement training.
- Trainers should modify the training material referenced as necessary to achieve the planned skill level for the trainees.
- Trainers are encouraged to include locally developed training materials to complement and/or supplement the referenced material.
- As new training materials are developed by trainers, they are encouraged to furnish copies to the Irrigation ToolBox Manager for inclusion in future versions of the assembled material.

Suggested Objectives

1. Explain the importance of measuring devices.
2. List and explain the various measuring devices available for irrigation conveyance flow measurement.
3. Describe procedures for using various measuring devices available for irrigation conveyance flow measurement.
4. Apply appropriate technology to select the measuring device best suited to the planned conveyance system.

Suggested Outline

- I. Introduction
- II. Body
 - a. Importance of water measurement devices
 - b. Measuring Devices
 - i. Open channel measuring devices
 - 1. Weirs
 - 2. Flumes
 - 3. Gates and Orifices
 - 4. Current meters
 - 5. Acoustic meters
 - 6. Others
 - ii. Closed conduit measuring devices
 - 1. Differential head meters
 - 2. Velocity meters
 - 3. Acoustic meters
 - 4. Other
 - iii. Secondary Measuring Devices
 - 1. Head and pressure measurement devices
 - 2. Volume totalization devices
 - 3. Data storage and transmission devices
 - c. Procedures for Using Measuring Devices
 - d. Selection of Best Device for Site
- III. Summary

Note: Note all copies of documents that were contained in the original Irrigation Training Toolbox are available electronically.

If you are unable to find a hard copy of a document in your state, you may be able to borrow a copy from the Water Management Engineer at your regional National Technology Support Center.

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Reference Material

- NEH Part 652: Irrigation Guide, Chapters 7 & 9.
- NEH Part 623: Chapter 9 Water Measurement
- ASAE, "Flow Measuring Flumes for Open Channel Systems"
ISBN-929355-15- 6.

Toolbox Material

- Publication "The Surface Irrigation Manual", Chapter 1, Cal-Poly
- Publication "Flow Measuring Flumes For Open Channel Systems", ASAE
- Video 013 "Step Out of The Stone Ages, Water Works: A Guide to Effective Water Measurement", US Bureau of Reclamation (18:45)
- Video 014 "Irrigation Flow Measurement in Piped Systems", Bureau of Reclamation, NRCS & The University of Nebraska (46:16)

Facilitation Options

- Self-paced,
- Facilitator guided, or
- Formal classroom training.

Evaluation

- Each state should develop an evaluation procedure which addresses the level of competence desired before and after training is provided.