

AS 3778.6.6:2023
ISO 4375:2014



STANDARDS
Australia



Measurement of water flow in open channels

Part 6.6: Measuring devices, instruments and equipment — Cableway systems for stream gauging (ISO 4375:2014, IDT)



AS 3778.6.6:2023

This Australian Standard ® was prepared by CE-024, Measurement of Water Flow in Open Channels and Closed Conduits. It was approved on behalf of the Council of Standards Australia on 04 November 2023.

This Standard was published on 17 November 2023.

The following are represented on Committee CE-024:

- Australian Bureau of Meteorology
- Australian Hydrographers Association
- Australian Industry Group
- Department of Planning and Environment (NSW)
- Engineers Australia
- Institute of Instrumentation, Control and Automation Australia
- Irrigation Australia
- National Measurement Institute
- University of South Australia
- Water NSW

This Standard was issued in draft form for comment as DR AS 3778.6.6:2023.

Keeping Standards up-to-date

Ensure you have the latest versions of our publications and keep up-to-date about Amendments, Rulings, Withdrawals, and new projects by visiting:

www.standards.org.au

ISBN 978 1 76139 433 1

Measurement of water flow in open channels

Part 6.6: Measuring devices, instruments and equipment — Cableway systems for stream gauging (ISO 4375:2014, IDT)

Originated as AS 3778.6.6—1992.
Previous edition 2008.
Third edition 2023.

COPYRIGHT

© ISO 2023 — All rights reserved
© Standards Australia Limited 2023

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher, unless otherwise permitted under the Copyright Act 1968 (Cth).

Preface

This Standard was prepared by the Standards Australia Committee CE-024, Measurement of Water Flow in Open Channels and Closed Conduits, to supersede AS 3778.6.6—2008, *Liquid flow measurement in open channels, Part 6.6: Measuring devices, instruments and equipment—Cableway systems for stream gauging*.

The objective of this document is to define the requirements for equipment, anchorage, supports and accessories for cableway systems for use in stream gauging. This document is only applicable to cableway systems used for hydrometric measurements. For cableway installations to be certified as lifting equipment, other standards or regulations may apply.

This document is identical with, and has been reproduced from, ISO 4375:2014, *Hydrometry — Cableway systems for stream gauging*.

As this document has been reproduced from an International document, the following apply:

- (a) In the source text “this International Standard” should read “this document”.
- (b) A full point substitutes for a comma when referring to a decimal marker.

Australian or Australian/New Zealand Standards that are identical adoptions of international normative references may be used interchangeably. Refer to the online catalogue for information on specific Standards.

The terms “normative” and “informative” are used in Standards to define the application of the appendices or annexes to which they apply. A “normative” appendix or annex is an integral part of a Standard, whereas an “informative” appendix or annex is only for information and guidance.

Contents

Preface	ii
Foreword	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 General description of a cableway system	1
4.1 Elements of a cableway system	1
4.2 Cableway supports	3
4.3 Main track or main cable	3
4.4 Anchorage	3
4.5 Tow cable for a bankside system	3
4.6 Suspension cable	3
4.7 Instrument carriage for a bankside system	4
4.8 Personnel carriage	4
4.9 Winch arrangements for a bankside system	4
4.10 Winch arrangements for a personnel carriage	4
4.11 Lightning protection	4
5 Functional requirements of cableway components	4
5.1 Safety factors	4
5.1.1 General	4
5.1.2 Suspension cable	5
5.1.3 Tow cable	5
5.1.4 Track cable	5
5.1.5 Marking	5
5.2 Cableway supports	5
5.2.1 Approaches	5
5.2.2 Design load	5
5.2.3 Foundation placement	5
5.2.4 Height	5
5.2.5 Corrosion protection	6
5.3 Selection of main cable or track	6
5.4 Anchorage	6
5.4.1 Design	6
5.4.2 Inspection accessibility	6
5.5 Backstays	6
5.6 Tow cable	6
5.7 Carriages	6
5.7.1 Instrument carriage for a bankside system	6
5.7.2 Personnel carriage	7
5.8 Winches	7
5.8.1 General	7
5.8.2 Winches in bankside systems	8
5.8.3 Winches on personnel carriages	8
6 Maintenance, examination and testing	9
6.1 General examination	9
6.2 Routine inspection	9
6.2.1 Bankside systems	9
6.2.2 Systems with suspended personnel carriage	9
6.3 Static testing	9
6.3.1 Bankside system	9
6.3.2 Systems with suspended personnel carriage	10
6.4 Lubrication	10

6.5	Checking the sag.....	10
Annex A	(informative) Cableway characteristics.....	11
Annex B	(informative) Limiting main cable tension in bankside cableways.....	21
Bibliography		23

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. 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. 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 WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 113, *Hydrometric determinations*, Subcommittee SC 5, *Instruments, equipment and data management*.

This third edition cancels and replaces the second edition (ISO 4375:2000), which has been technically revised.

NOTES

Australian Standard®

Measurement of water flow in open channels

Part 6.6: Measuring devices, instruments and equipment — Cableway systems for stream gauging (ISO 4375:2014, IDT)

1 Scope

This International Standard defines the requirements for equipment, anchorage, supports and accessories for cableway systems for use in stream gauging. Systems which are operated either entirely from the river bank or from a suspended personnel carriage (also called a “cable car”) are discussed. This International Standard is only applicable to the cableway systems to be used for hydrometric measurements. Should the cableway installation be required to be certified as lifting equipment, other standards or regulations may apply. This International Standard does not concern methods for making a discharge measurement which are described in ISO 748.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 772, *Hydrometry — Vocabulary and symbols*

ISO 80000-4, *Quantities and units — Part 4: Mechanics*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 772, ISO 80000-4 and the following apply.

3.1

cable

wire rope of simple or complex structure or wire cord, fixed or moving in a cableway system

4 General description of a cableway system

4.1 Elements of a cableway system

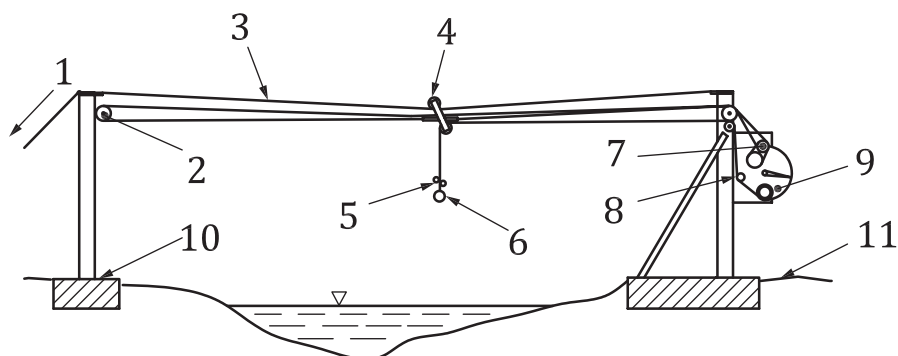
A cableway system can be designed to be operated from the river bank (see [Figures 1](#) and [2](#)) or be designed to be operated from a suspended personnel carriage (see [Figure 3](#)). The general arrangement of the following elements are common to both systems:

- a) towers or cableway supports;
- b) track or main cable;
- c) anchorage;
- d) backstays;
- e) suspension cable.

The main differences are:

- the carriage of a bankside system requires a tow cable;

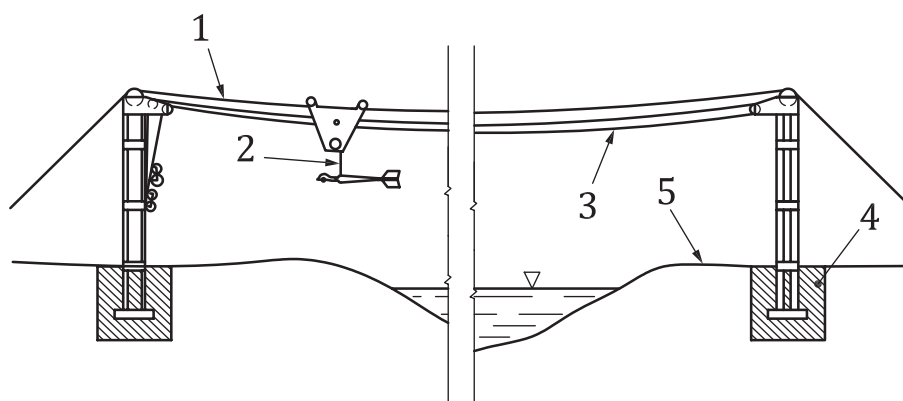
- a bankside system requires a more complicated winch arrangement;
- the personnel carriage has to provide a safe platform for the operator;
- more stringent design requirements may apply to a system which employs a personnel carriage.



Key

1 backstay	7 distance measurement
2 traversing cable return pulley	8 depth measurement
3 track or main cable	9 cable drum
4 traveller and/or instrument carriage	10 footing
5 current meter	11 ground level
6 sinker or sounding weight	

Figure 1 — Cableway system — Bankside operation, with loop-traversing cable and spooled sounding cable



Key

1 track or main cable	4 footing
2 suspension cable	5 ground level
3 tow cable	

Figure 2 — Cableway system — Bankside operation, with spooled tow cable and spooled sounding cable

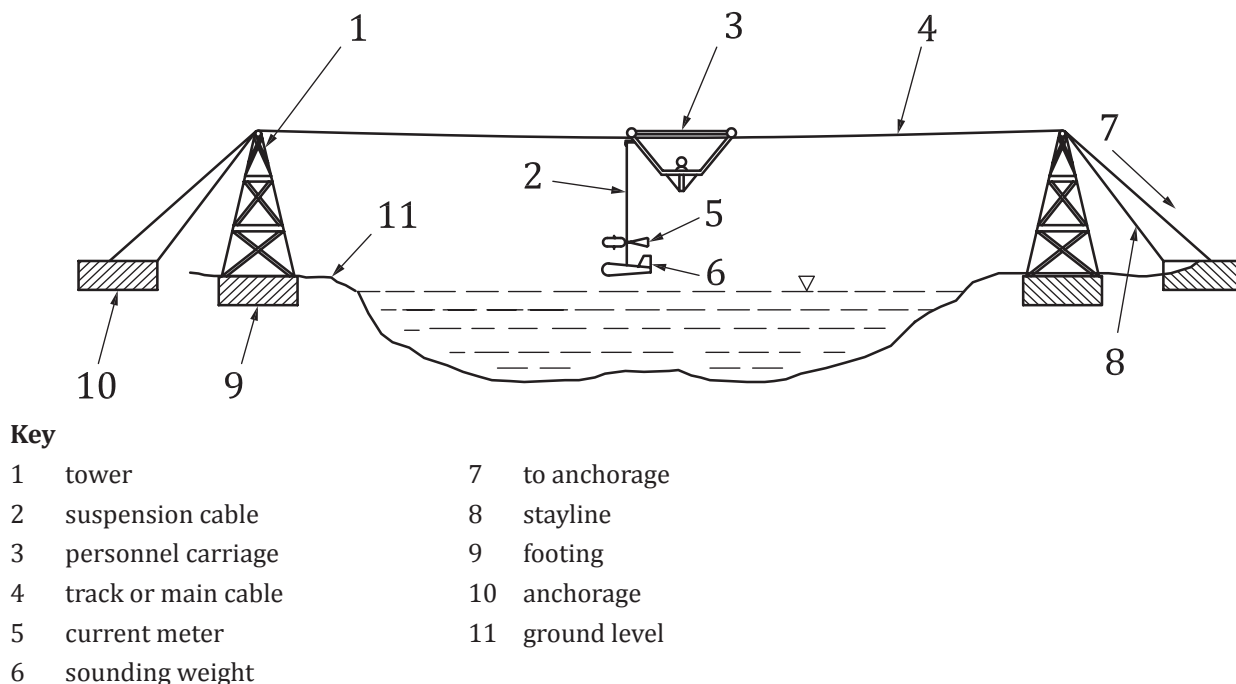


Figure 3 — Cableway system — Suspended personnel carriage

4.2 Cableway supports

The cableway supports, one on each bank, support the main cable span across the stream. They may also provide mountings for the winch and the pulleys (sheaves) carrying the tow and suspension cables.

4.3 Main track or main cable

The track or main cable is designed to carry the whole suspended load. The track may be attached directly to stayed cableway supports or be supported on saddles on the cableway supports and led directly to an anchorage.

4.4 Anchorage

Anchorage points are required to carry the loads induced in the cableway and tower system. Depending upon the design of the system, they may be anchorage points for track and backstays or guy-lines, tower foundations subject to compression or tower foundations subject to compression and moment.

4.5 Tow cable for a bankside system

The tow cable is required to move and position the instrument carriage. Generally the tow cable is arranged as an endless loop from the instrument carriage over guiding sheaves on the winch tower, round a driving pulley or drum, across to an idler pulley (sheave) on the tower on the opposite bank and back to the carriage (see [Figure 1](#)). An alternate arrangement uses a spooled tow cable with a single fixing point on the carriage. This arrangement depends upon the equal and opposite force provided by the suspension cable (see [Figure 2](#)).

4.6 Suspension cable

The suspension cable provides the means of raising and lowering sensing or sampling equipment in the stream. The free end of the cable is fitted with connectors to attach equipment and sounding weights. The suspension cable is likely to contain an insulated conducting core to provide a signal path from suspended instruments.