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Hydrometry — Measurement of liquid flow in open channels — Methods of measurement of bedload discharge

Hydrométrie — Mesurage du débit des liquides dans les canaux découverts — Méthodes de mesurage du débit des matériaux charriés sur le fond

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

In exceptional circumstances, when a technical committee has collected data of a different kind from that which is normally published as an International Standard (“state of the art”, for example), it may decide by a simple majority vote of its participating members to publish a Technical Report. A Technical Report is entirely informative in nature and does not have to be reviewed until the data it provides are considered to be no longer valid or useful.

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ISO/TR 9212 was prepared by Technical Committee ISO/TC 113, *Hydrometry*, Subcommittee SC 6, *Sediment transport*.

This second edition cancels and replaces the first edition (ISO/TR 9212:1992), of which it constitutes a technical revision.

Introduction

The bedload is the material transported on or near the bed by rolling or sliding (contact load) and the material bouncing along the bed, or moving directly or indirectly by the impact of bouncing particles (saltation load). The knowledge of the rate of sediment transport in a stream is essential in the solution of practically all problems associated with the flow in alluvial channels. The problems include river management, such as design and operation of flood control works, navigation channels and harbours, irrigation reservoirs and canals, and hydroelectric installations. Knowledge of the bedload transport rate is necessary in designing reservoir capacity because virtually 100 % of all bedload entering a reservoir accumulates there. Bedload should not enter canals and distributaries, and diversion structures should be designed to minimize the transfer of bedload from rivers to canals.

The bedload-transport rate can be measured either as mass per unit time or volume per unit time. Volume measurements should be converted to a mass rate. Measurements of mass rate of movement are made during short time periods (seconds, minutes), whereas measurements of volume rates of movement are measured over longer periods of time (hours, days). Regardless of whether the mass or volume rate is measured, the average particle size distribution of moving material should be determined. Knowledge of particle size distribution is needed to estimate the volume that the bedload material will occupy after it has been deposited. Knowledge of particle size distribution also assists in the estimation of bedload transport rates in other rivers transporting sediment.

The movement of bedload material is seldom uniform across the bed of a river. Depending upon the river size and gradation, the bedload may move in various forms, such as ripples, dunes, or narrow ribbons. Its downstream rate of movement is also extremely variable. It is difficult to actually sample the rate of movement in a river cross-section, or to determine and verify theoretical methods of estimation.