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Hydrometry — Methods of measurement of bedload discharge

*Hydrométrie — Méthodes de mesurage du débit des matériaux
charriés sur le fond*



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Foreword

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The committee responsible for this document is ISO/TC 113, *Hydrometry*, Subcommittee SC 6, *Sediment transport*.

This third edition cancels and replaces the second edition (ISO/TR 9212:2006), which has been technically revised.

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Introduction

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. The bedload and suspended load broadly constitute total sediment load. 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). 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, hydraulic, and sediment properties (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.