HM 168

Sediment transport in river courses

Description

- **open-channel bed-load transport**
- **observing the formation of meanders**
- **observing fluvial obstacle marks on structures**
- **movable point gauge for profile measurement in the sediment**

HM 168 demonstrates important phenomena of bed-load transport in the area near the bottom at subcritical discharge. The large dimensions of the experimental section enable the modelling of river courses with and without structure.

The core element of the HM 168 experimental flume is the stainless steel experimental section. A sediment layer up to 10cm high covering an area of 5x0,8m allows bed-load transport to be studied. The sediment is held in the experimental section by plate weirs at the inlet and at the outlet. The tank after the water drain contains a sediment trap with a filter element for sand. The water circuit is closed.

In addition to bed-load transport in open channels without structures, some models can also be used to observe fluvial obstacle marks, namely scour formation and siltation at structures. A bridge pier, a plate weir or an island can be inserted into the experimental section. You can also design your own models using deflection plates and angular steel.

Profile measurement in the sediment along the bottom and the determination of the discharge depth at each point on the experimental section is done via a movable instrument carrier and a point gauge. The discharge is measured via an electromagnetic flow meter.

Learning objectives/experiments

- bed-load transport in open channels
- how flow velocity affects bed-load transport
- ripple formation on the river bed
- observing the formation of meanders
- fluvial obstacle marks on structures
  - bridge pier with rectangular profile
  - rounded-nosed bridge pier
  - pointed-nosed bridge pier
  - island (round or rectangular)
- bed-load transport formulae
  - Meyer-Peter and Müller formula
  - Einstein's formula

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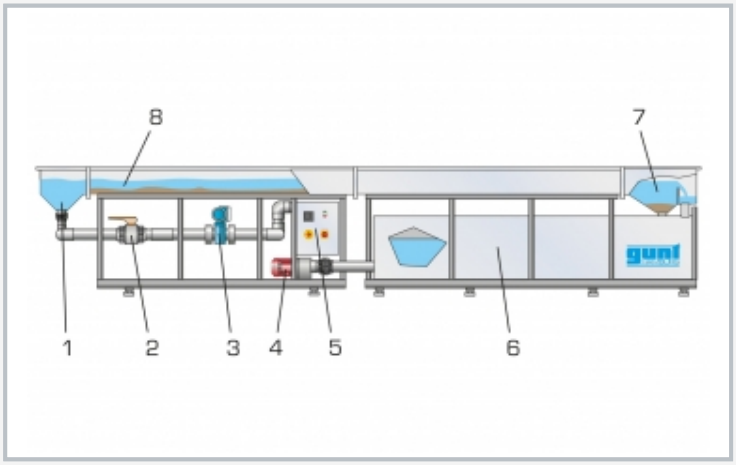
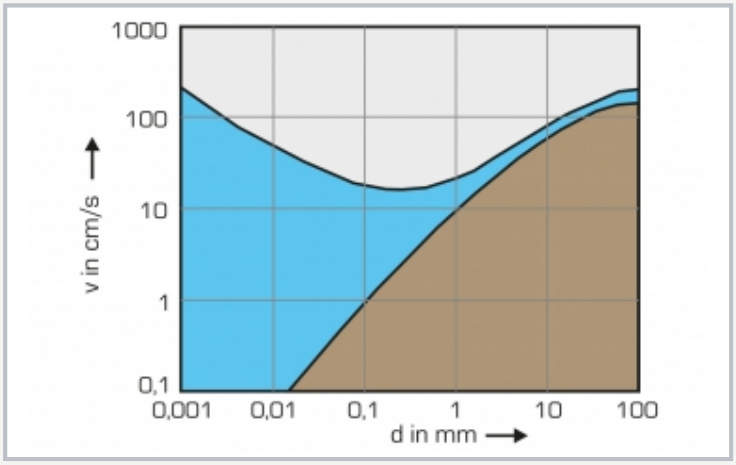


1 inlet element, 2 valve, 3 sensor for flow rate, 4 pump, 5 controls, 6 water tank, 7 outlet element with sediment trap, 8 experimental section



Hjulstroem diagram: d grain size, v flow velocity; grey: erosion, blue: transport, brown: deposition

Erosion and scour formation in nature

Specification

[1] open-channel bed-load transport
[2] experimental flume with experimental section, inlet element, outlet element, closed water circuit, 1 set of models
[3] closed water circuit with water tank with sediment trap, pump, and electromagnetic flow meter
[4] experimental section with grooves for plate weirs to realise different flow conditions
[5] measurement of profiles along the bottom with moveable instrument carrier and point gauge
[6] inlet element with plate weir to protect against sediment flowing back
[7] models supplied 3 bridge piers, 2 islands, set of deflection plates (for your own model ideas)
[8] sediment trap with filter element for sand
[9] experimental section, inlet and outlet element made of stainless steel

Technical data

Experimental flume
- stainless steel
- dimensions of the experimental section: 5000x800x250mm

Pump
- power consumption: 3,6kW
- max. head: 11,5m
- max. flow rate: 74m^3/h

Storage tank, content: approx. 1000L

Sediment trap filter element
- aperture size: 0,3mm (49mesh)

Flow meter
- measuring range: 80m^3/h

400V, 50Hz, 3 phases
400V, 60Hz, 3 phases; 230V, 60Hz, 3 phases
UL/CSA optional
LxWxH: 6250x1000x1300mm
Empty weight: approx. 680kg

Required for operation

sediment: sand (1...2mm grain size), approx. 1m^3

Scope of delivery

1 experimental flume
1 filter element for sediment trap
3 bridge piers
2 islands
8 deflection plates
12 T-pieces + 6x angle profile
1 set of instructional material