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GLOSSARY OF TERMS RELATING TO RIVER VALLEY PROJECTS

PART XV CANAL STRUCTURES

Section 3 Flumes

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BUREAU OF INDIAN STANDARDS
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0. FOREWORD

0.1 This Indian Standard (Part XV/Sec 3) was adopted by the Indian Standards Institution on 31 March 1977, after the draft finalized by the Terminology Relating to River Valley Projects Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 A number of Indian Standards have been published covering various aspects of river valley projects and a large number of similar standards are in the process of formulation. These standards include technical terms, the precise definitions of which are required to avoid ambiguity in their interpretation. To achieve this end, the Institution is bringing out IS : 4410 ' Glossary of terms relating to river valley projects ' which is being published in parts. This part contains definitions of terms relating to flumes.

0.3 This part (Part XV) covers the important field of canal structures and in view of the vastness of this subject, this is being covered in different sections. Other sections in the series will be the following:

Section 1 General terms
Section 2 Transitions
Section 4 Regulating works
Section 5 Cross drainage works
Section 6 Other structures

0.4 In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country. This has been met by deriving assistance from the following publications:

United Nations. Economic Commission for Asia and the Far East. Glossary of hydrologic terms used in Asia and the Far East. 1956.

India. International Commission on Irrigation and Drainage. Multilingual technical dictionary on irrigation and drainage. 1967.

India. Central Board of Irrigation and Power. Glossary of irrigation and hydro-electric terms and standard notations used in India. 1954. Manager of Publications. Delhi.

ASCE. American Society of Civil Engineers. Nomenclature for hydraulics. 1962. New York.

0.4.1 All the definitions taken from 'Multilingual technical dictionary on irrigation and drainage' are marked with asterisk (*) in the standard.

1. SCOPE

1.1 This standard (Part XV/Sec 3) covers the definitions of the terms relating to flumes.

2. FLUMES

2.1 Bench — A step cut into a hillside to support bench flumes.

2.2 Bench Flume* — A flume supported on a shelf or a bench, cut in a hillside or built around mountain slopes or set on ground.

2.3 Box Flume* — A flume of rectangular cross section.

2.4 Catenary Flume — A suspended flume with cross section conforming to a hydrostatic catenary.

2.5 Control Flume or Critical Depth Flume — A flume containing a constriction which causes the flow to change from sub-critical to super-critical and in which the measurement of one water level, the upstream one, facilitates calculation of the discharge (*see* Fig. 1).

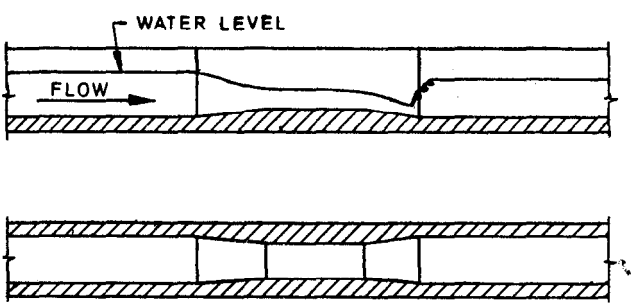


FIG. 1 STANDING WAVE FLUME

2.6 Control Section — The section or reach of a flume (or open conduit or stream channel) at which the water level is a stable index of the discharge.

2.7 Elevated Flume* — A flume built and supported above ground or depressions on trestles, piers or piles.

2.8 Flume — A complete and independently supported, artificially constricted waterway used to carry water across depressions or over difficult terrain, or when other reasons make the construction of a normal conveyance channel or conduit impractical or uneconomical.

Flumes are sometimes constructed for measurement of flow.

2.9 Flumed Structure*

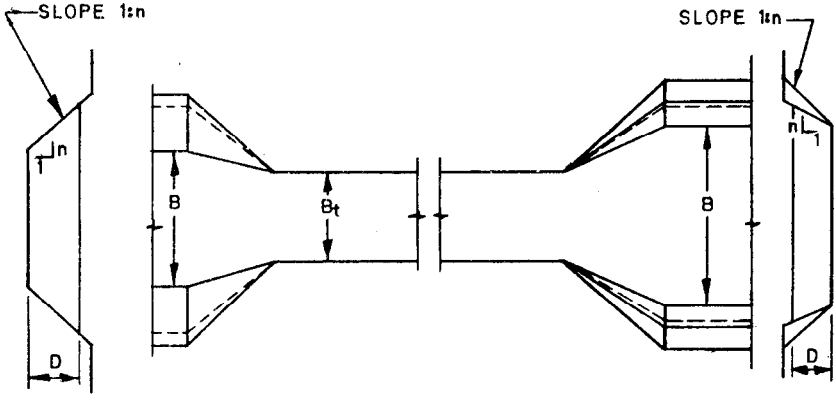
a) A hydraulic structure built in a stream or a channel with contracted waterway, for example, a flumed bridge, flumed fall, or flumed aqueduct.

b) A hydraulic structure with contracted width or waterway for measurement of discharge flowing in channels.

c) An artificial water channel in a laboratory used for model tests.

2.10 Fluming — The purposeful reduction of waterway of a channel below the normal either by a flume or a flumed structure.

2.11 Fluming Ratio* — The ratio of the clear waterway at the throat of a flume or flumed structure to the normal channel width (*see* Fig. 2).



i) Lined

$$\text{fluming ratio} = \frac{B_t}{B + nD}$$

ii) Unlined

$$\text{fluming ratio} = \frac{B_t}{B+nD}$$

FIG. 2 FLUMING RATIO FOR LINED AND UNLINED CANALS

2.12 Flumed Weir Offtake Regulator — A regulator having for its control section a flumed weir.

2.13 H-Flume — A precalibrated flow measuring device, used for measuring run-off from small water-sheds.

2.14 Hydrostatic Catenary, Lintearia or Elastica* — The curve assumed by a non-extensible but flexible cord when subject to a normal load at all points proportional to the distance below the horizontal line joining its supports. The shape which a flume tends to assume when carrying water.

2.15 Meter Flume or Measuring Flume — *See* **2.5.**

2.16 Modified Parshall Flume* — An improved type of Parshall flume, which eliminates the short rise at the end of the dip below the throat and provides a stilling pool for the hydraulic jump at the required place.

2.17 Parshall Measuring Flume — An improved venturi flume to measure the flow of water in open conduits. It consists essentially of a contracting length, a throat and an expanding length.

2.18 Rapid Flow Flume — A meter flume in which the rate of flow is proportional to the square-root of the head in the upstream section. Venturi flume under the super-critical flow conditions is one of its types.

2.19 Rapid Flow Venturi Flume — *See* **2.18.**

2.20 Rating Flume — *See* **2.5.**

2.21 Standing Wave Flume — *See* **2.5.**

2.22 Stave — Each of the narrow strips of wood or metal plates, placed longitudinally edge to edge, to form the periphery of a flume.

2.23 Top Tie — A bar at the top of a flume section and shaped near the ends in order to hold the edges of the flume in position.

2.24 Tranquil Flow Flume — A meter flume in which the rate of flow is proportional to the square-root of the difference between the upstream head and throat depth. Venturi flume under the sub-critical flow conditions is one of its types.

2.25 Tranquil Flow Venturi Flume — *See* **2.24.**

2.26 Trestle Flume — A flume constructed on trestles.

2.27 Venturi Flume — A flume containing a constriction which, in sub-critical flow, causes an increase in velocity and consequent fall in water level; the measurement of the water levels at the constriction and upstream of it facilitates calculation of the discharge (*see* Fig. 3).

2.28 Yokes — Frames of rods and top-ties in a wooden stave flume, spaced at suitable intervals to keep the flume section in position.

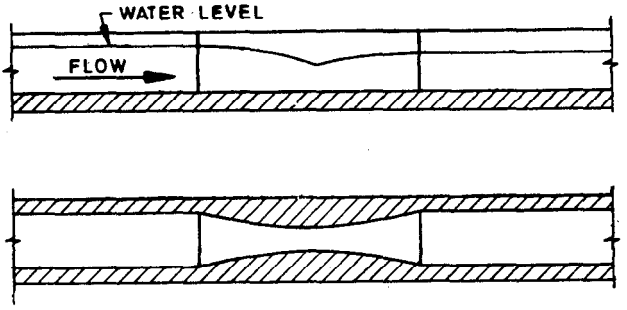


FIG. 3 VENTURI FLUME

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