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GLOSSARY OF TERMS RELATING TO RIVER VALLEY PROJECTS

PART XV CANAL STRUCTURES

Section 2 Transitions

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Terminology Relating to River Valley Projects
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Indian Standard

GLOSSARY OF TERMS RELATING TO RIVER VALLEY PROJECTS

PART XV CANAL STRUCTURES

Section 2 Transitions

0. FOREWORD

0.1 This Indian Standard (Part XV/Sec 2) was adopted by the Indian Standards Institution on 4 April 1973, 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 has already been printed covering various aspects of river valley projects and a large number of 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 Indian Standard glossary of terms relating to river valley projctes, which is being published in parts.

0.3 Part XV covers the important field of canal structures and in view of the vastness of this subject, it is proposed to cover it in different sections. Other sections in the series will be the following:

Section 1 General terms
Section 3 Flumes
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. Bangkok.

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.

NOMENCLATURE FOR HYDRAULICS. 1962. American Society of Civil Engineers. New York.

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

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1. SCOPE

1.1 This standard (Part XV/Sec 2) covers the definitions of terms relating to transitions in canal structures.

2. TRANSITIONS

2.1 Angle of Flare, Angle of Splay — It is the inclinations both in elevation and plan of the transition sides expressed as an angle or tangent of that angle.

2.1.1 The inclination in vertical is specified as 'angle of vertical flare' or 'vertical flare' or 'angle of vertical splay' or 'vertical splay' and that in horizontal as 'angle of horizontal flare' or 'horizontal flare' or 'angle of horizontal splay' or 'horizontal splay'.

2.1.2 The angle between the center line of a structure and a wall.

2.2 Broken Back — It is the line of intersection of the vertical and sloping plane surfaces on the sides of the transition.

2.3 Broken Back Transition — A transition having a broken back.

2.4 Compound Transition — A combination of transitions, where more than one form is involved.

2.5 Conical Diffuser — A diverging cone of a pipe.

2.6 Control — A section or a reach of a conduit or open channel, where conditions exist that make the water level above it a fairly stable index of discharge. A control may be complete or partial. A complete control is independent of downstream conditions while partial control exists where downstream fluctuations have some effect on the upstream water level.

2.7 Conversion Loss* — The loss of energy due to change in velocity at the entrance and exit section of the transition, usually expressed in terms of head of water.

2.8 Diffuser — *See* 2.5.

2.9 Dog Leg Transition — *See* 2.3.

2.10 Elongated Transition — A transition whose length is more than required by the standard design procedure or test research.

2.11 Fillet — The filling required in the transition section between a trapezoidal and a curved conduit.

2.12 Flare, Flare Angle — *See* 2.1.

2.13 Flaring — The place or part that spreads in the direction of flow; used as a noun, namely, flaring of wall.

2.14 Flow Spreading Hump — A hump built on the transition invert of expansion side within open transition to reduce scour (*see* Fig. 1).

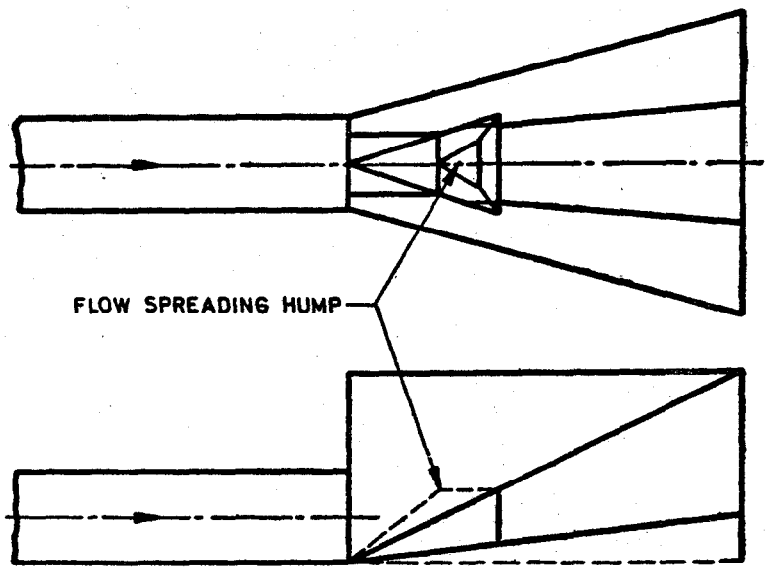

FIG. 1 FLOW SPREADING HUMP

2.15 Gate Transitions — Closed conduit transitions provided on both sides of the gate recess of chamber. Similar are valve transitions.

2.16 Hydraulic Elements — The depth, area, perimeter, mean depth, hydraulic radius, velocity energy and other quantities pertaining to a particular stage of flowing water.

2.17 Hydraulic Transition* — A length of conduit or channel wherein the cross-sectional shape is gradually changed from that of the conduit or channel upstream to that of the conduit or channel downstream. The transitions are characterized by adjectives bearing on their length (for example, short, long, sudden or gradual); geometrical shape of the side walls (for example, conical frustum); or by the physical appearance of side walls (for example, flared, splayed, straight, warped, or streamlined); or by reference to the adjacent structures (for example, tunnel subcritical, one-dimensional, valve, gate, inlet, outlet, or tail); or by reference to type of flow in the transition length (for example, subcritical, supercritical, one-dimensional or two-dimensional). This is sometimes referred to as 'conversion'.

2.18 Perfect Transition* — A transition conforming in its shape and size with that evolved by standard procedures of design or test research, and in which rate of the acceleration or deceleration so changes that the water surface profile becomes a smooth, continuous curve.

2.19 Portal Transition — The transition section restricted within the portal length of a tunnel. In case of inlet portal, a bell-mouth can also be provided at its inlet face. Such a portal is called 'bell-mouthed portal'.

2.20 Proper Transition* — *See* **2.19**.

2.21 Regular Transition* — *See* **2.19**.

2.22 Reverse Warped Transition — A warped transition in which alignment of the side walls is of 'S' shape, and may not necessarily be streamlined.

2.23 Sharp Transition — A transition whose length is less than required by the standard design procedure or test research.

2.24 Short Transition — *See* **2.23**.

2.25 Side Transitions — The portions of the sides of transition, in a closed conduit or open channel.

2.26 Slender Transition — *See* **2.10**.

2.27 Splay, Splay Angle — *See* **2.1**.

2.28 Sudden Transition* — A transition where the change in cross-section occurs in a relatively short distance inducing rapidly varied flow, namely, sudden contraction and expansion vertically, horizontally, or both.

2.29 S-Warped Transition — *See* **2.22**.

2.30 Tail Inle Transition — The transition provided upstream of a tail structure or at the tail end of, and contained within, the conduit length.

2.31 Tail Outlet Transition — The transitions provided partly or wholly downstream of a tail structure or tail end of a conduit.

2.32 Tail Transition — A transition or system of transitions provided at the tail end of a conduit or at a tail structure.

2.33 Transition* — *See* **2.17.**

2.34 Transition Curve — Profile of the transition, which may be parabolic, elliptical, circular or compound.

2.35 Transition Curve Length — The length measured along the transition curve at any elevation. Also referred to as 'transition face length' or 'transition surface length'.

2.36 Transition Element — A small length along a transition curve.

2.37 Transition Energy Loss* — The sum of the friction loss and the conversion loss in a transition, usually expressed in terms of head of water.

2.38 Transition Length — The length of the transition measured in the direction of the flow as given below:

a) Longitudinal axis in case of closed conduits, and

b) Centre line of the bed in case of open channels.

2.39 Transition Loss — *See* **2.37.**

2.40 Warp — A gradual and uniform flaring out between the two different side slopes.

2.41 Warped Transition* — A transition in which side walls are warped.

2.42 Wedge Transition — *See* **2.2.**

2.43 Well-Designed Transition — *See* **2.19.**

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

Quantity	*Unit*	*Symbol*
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

Quantity	*Unit*	*Symbol*
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

Quantity	*Unit*	*Symbol*	*Conversion*
Force	newton	N	1 N = 1 kg.1 m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

INDIAN STANDARDS INSTITUTION

Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones : 26 60 21, 27 01 31 **Telegrams : Manaksanstha**

Regional Offices:		Telephone
Western : Novelty Chambers, Grant Road	BOMBAY 400007	37 97 29
Eastern : 5 Chowringhee Approach	CALCUTTA 700072	23-08 02
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