

भारतीय मानक

नदी घाटी परियोजना सम्बन्धी पारिभाषिक शब्दावली

भाग 12 पथान्तर कार्य

( पहला पुनरीक्षण )

*Indian Standard*

**GLOSSARY OF TERMS RELATING TO  
RIVER VALLEY PROJECTS**

**PART 12 DIVERSION WORKS**

*( First Revision )*

UDC 001.4 : 627.81 : 627.80

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## FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Terminology Relating to River Valley Projects Sectional Committee had been approved by the River Valley Division Council.

A large number of Indian Standards have already been printed covering various aspects of river valley projects and some more similar standards are in the process of formulation. These standards include technical terms, and precise definitions for these are required for avoiding ambiguity in their interpretation. To achieve this aim, the terminology relating to River Valley Projects Sectional Committee is bringing out Indian Standard Glossary of terms relating to river valley projects ( IS 4410 ), being published in parts. This part 12 contains definitions of terms relating to temporary diversion works.

The revision of this standard was first published in 1973. The present revision of the standard has been taken up in the light of the experience gained during the last 20 years in the use of this standard. In this revision, additional terms have been added besides modifying some of the terms so as to bring them in line with latest technology. Some of the terms not concerning this subject have been transferred to the relevant parts.

In the formulation of this standard due weightage has been given to international co-ordination among the standards and practices prevailing in different countries. This has been met by deriving considerable assistance from ' Multilingual technical dictionary on irrigation and drainage ', published by International Commission on Irrigation and Drainage ( ICID ) and other sources.

*Indian Standard***GLOSSARY OF TERMS RELATING TO  
RIVER VALLEY PROJECTS****PART 12 DIVERSION WORKS***( First Revision )***1 SCOPE**

This standard ( Part 12 ) covers the definitions of terms relating to temporary diversion works.

**2 GENERAL TERMS****2.1 Abutment**

- a) It is a wall constructed by the side of the waterway of diversion structures to:
  - 1) retain the backfill,
  - 2) protect the banks from erosion,
  - 3) support the load from superstructure, and
  - 4) confine the flow to the desired waterway at the structure.
- b) The well defined bank on either side of the river flow particularly in a deep gorge is called the abutment of a river.

**2.2 Afflux**

The rise of water level above its original level upstream of the diversion structure, in a channel or river.

**2.3 Afflux Bund**

An embankment or dyke designed to ensure that the structure is not outflanked during flood flows. In some cases, it also acts as an embankment to prevent flooding to the country side due to an afflux.

**2.4 Apron**

A protective layer of stone or concrete block or other material, extending out from a structure on or extending beyond the toe on the bed of a channel, or situated at some other location in the bed of a channel, laid in order to prevent erosion.

**2.5 Aggradation of River Bed**

A general increase in the bed level of a river over a sufficiently long length. This is caused either due to increase in sediment load, decrease in water discharge or reduction in the energy slope in a stream, which is otherwise in equilibrium.

**2.6 Backwater Curve**

The upstream longitudinal profile of the surface of water in a stream or a conduit from a point where such water surface is raised above its normal level by a diversion structure.

**2.7 Baffle Piers/Baffle Blocks or Friction Blocks**

Obstruction set in path of high velocity water flow constructed for the purpose of energy dissipation or for controlling the position of hydraulic jump in a stilling basin.

**2.8 Barrage**

A structure built across a river, for diverting water into a canal or for providing a small storage pond. It comprises a series of gates for regulating the river flow and water level, while keeping the afflux during floods within acceptable limits. The structure may or may not have a raised sill. It is constructed to regulate the water-surface level and to divert the water flow from upstream of the gates.

**2.9 Bed Sill**

A sill in a river or canal the crest over which is at or very close to the normal bed of the river or the canal.

**2.10 Bay**

One of the main divisions of a diversion structure such as spillway, undersluice or regulator between two piers or a pier and abutment or a pier and a divide wall.

**2.11 Blanket**

Relatively thin layer of material covering material of a different properties.

**2.12 Breaching Section**

A low earth bund or dyke built across a saddle in the rim of the reservoir/different body of the dam, intended and designed to be washed out when the water reaches a predetermined elevation it is also called fuse plug spillway or emergency spillway.

### 2.13 Boulder Stage of River

The reach of a river characterised by steep bed slope and a bed comprising a mixture of boulder, shingle, gravel and sand.

### 2.14 Caisson

A chamber usually sunk by excavation within it for the purpose of gaining access under water to the desired foundation level.

### 2.15 Chute

Pipe, flume or open lined channel with a free surface flow.

### 2.16 Contracted Weir

A weir with its length less than the width of the approach channel, and which is used to give a greater head for relatively low discharges in wide channels.

### 2.17 Crest

The line or area defining the top of a dyke embankment or weir.

### 2.18 Crib Dam

A type of construction consisting of pieces of timber or other suitable material fixed together to form bays or cells called crib which are filled with stone or other suitable materials.

### 2.19 Closing Dyke

A structure built across the branch channel of a river in order to stop or reduce the flow entering that channel or separate dead branch from the main channel.

### 2.20 Curtain Wall, Cut-Off Wall

A wall-like structure, of masonry, plain or reinforced cement concrete or sheet pile, under the floor of a hydraulic structure with the object of:

- a) dividing the work into suitable compartments,
- b) to reduce the percolation of water through permeable strata,
- c) to minimize the likelihood of undermining of the foundation by increasing the path of percolation and reducing the exit gradient,
- d) as a safeguard against erosion and undermining of the structures by scour,
- e) to intercept permeable strata in the foundation and/or, and
- f) to increase the resistance of the structure against sliding.

### 2.21 Chute Blocks

Cement concrete blocks provided at suitable spacing at the toe of the downstream glacis of a structure for moderating the energy dissipation.

### 2.22 Concentration Factor

The factor by which the discharge per unit length of a barrage weir ( assuming uniform distribution ) is required to be increased for purposes of design, to allow for higher concentration of discharge in some parts of the structure.

### 2.23 Cut Offs

A wall or diaphragm of concrete or steel, or a trench filled with impervious soil or a grout curtain extending into the foundation of a structure and providing a water tight anchor to the overlying structure. Its purpose is the prevention or reduction of passage of water under the structure and foundation material or through the upper layers of the foundation material.

### 2.24 Differential Head

The difference in water level between the upstream and downstream of a structure or the difference in water level on either side of a pier or divide wall.

### 2.25 Diversion Ratio

The ratio of the diverted flow to the normal stream flow.

### 2.26 Diversion Work or Diversion Structure or Head Works

A collective term for all works required on the river or channel to divert, control or regulate the water level or water supplies in the river/ channels or offtaking canals.

### 2.27 Divide Wall, Divide Groyne, Division Wall or Dividing Wall

A wall or groyne constructed normally at right angles to the axis of the weir or barrage extending well beyond the main structure to separate the under sluice bays/river sluice bays and barrage or weir bays for facilitating regulation.

### 2.28 Design Flood

Flood adopted for design purpose, which may be probable maximum flood or standard project flood or a flood corresponding to some adopted frequency of occurrence ( 50, 100, 200, 500 years, etc, ) depending on the standard of security to be provided.

### 2.29 Dewatering

Lowering the water table to facilitate construction of the substructure in fairly dry condition and to prevent free flow of particles below the foundation.

### 2.30 Dominant Discharge

A hypothetical constant discharge flowing through an alluvial river which will produce the same specific effect as is caused by a varying

discharge flowing through the channel over a period of years. The specific effect can be the channel width, meander pattern, sediment load, etc.

### 2.31 End Sill

A vertical stepped, sloped or dentated wall, constructed at the downstream end of a stilling basin to help in dissipating residual energy and to reduce the length of the stilling basin.

### 2.32 Erosion

The lowering and wearing away of the land surface by weathering and removal of material by the action of wind, water or waves. The term also includes the erosion of the bed or banks of a river or channel or associated structures.

### 2.33 Embayment

A localized widening of a river or channel brought about artificially or naturally by recession or erosion of the bank.

### 2.34 Exit Gradient

The hydraulic gradient at the point where the seepage streamlines emerge at the end of an impervious apron.

### 2.35 Flank Walls

Retaining wall in continuation of abutments both upstream and downstream.

### 2.36 Flared Wall

Retaining wall with its profile gradually changing from one slope to another as required. Flared walls may be straight or curved.

### 2.37 Filter/Filter Bed

A layer or combination of layers of graded pervious materials designed and placed in such a manner as to provide drainage yet prevent the removal of soil particles by the seepage water, water currents or wave action.

### 2.38 Flexible Apron, Talus or Placed Riprap

A protection at the downstream or upstream end of a weir, fall, etc, consisting of blocks of concrete or masonry or stones or stones in/wire crates ( gabions ). This is also referred to as a loose apron.

### 2.39 Free Board

The vertical distance between a specified water surface and the top of the non overflow section of a structure or embankment.

### 2.40 Fish Ladder/Lock

Device provided in the diversion structure to facilitate the migration of fish from upstream to downstream or *vice versa*.

### 2.41 Friction Block

Staggered R.C.C. blocks provided in the stilling basin for energy dissipation.

### 2.42 Glacis

The sloping portion of the floor upstream and downstream of the crest.

### 2.43 Gauge-Discharge Curve/Stage Discharge Curve

The curve indicating the various level/stages of the river for different values of discharge at a particular section.

### 2.44 Guide Bank

A protective and training embankment constructed at the side of weir/barrage, etc, to guide the flow through the waterway provided in the structure.

### 2.45 Hydrograph

A graph showing the variation of gauge/river stage, discharge velocity, sediment concentration or sediment discharge or some other feature of flowing water with respect to time at a given place.

### 2.46 Intake

A structure to admit, control and regulate water supplies directly from source. Intakes may also be uncontrolled.

### 2.47 Hydraulic Gradient

The slope of the line of piezometric head ( that is sum of the pressure and elevation heads ) at any point in the flow path.

### 2.48 Lining

A protective covering ( over entire or portion of the perimeter ) of a water conductor system or reservoir to reduce seepage losses, to withstand pressure, to reduce and prevent erosion and improve conditions of flow.

### 2.49 Looseness Factor

The ratio of the overall waterway of a weir/barrage actually provided to the regime width of a river or channel at the design flood computed theoretically by using Lacey's theory.

### 2.50 Nappe

A sheet of water overflowing a weir, fall, etc. The nappe has upper and lower surfaces.

### 2.51 Pitching

A protective covering of material on the earthen surface slope ( side pitching ) and beds ( bed pitching ) of rivers or canals.

## 2.52 Pier

Concrete or masonry structures constructed over the crest or floor of a structure supporting loads transmitted by the superstructure like bridge decking, gates and transmitted by the superstructure like bridge decking, gates and hoist operating mechanism. Sometimes loading piers are used on the downstream floor of a structure to counteract uplift pressure.

## 2.53 Pond Level

The level of water immediately upstream of a structure required to facilitate withdrawal into the canal or for any other purpose.

## 2.54 Riprap

Broken stone dumped or placed on the surface and the slopes of embankments for protection against the action of flowing water, wave wash and heavy rain.

## 2.55 Revetment

A protective surface of pitching, concrete blocks or mattresses placed on the bottom or banks of a river to prevent or minimize erosion.

## 2.56 Retrogression/Degradation

A general decrease in the bed level of the river or a channel over a sufficiently long length downstream of a structure. It may be caused by a decrease in sediment load, increase in discharge or increase in the energy slope.

## 2.57 River Sluices

A set of sluices similar to the undersluices located in between the undersluices and spillway bays and separated from them by means of divide walls usually provided for still pond operation.

## 2.58 Seepage

Movement of water through pores and interstices of unsaturated packed soil material into or out of a surface or subsurface body of water, such as river, canal, reservoir, etc.

## 2.59 Sill

- a) A structure built under water across deep pools of a river course for counteracting the tendency to excessive scour.
- b) A structure built at the outlet of a channel where certain minimum depth of flow is to be maintained in the channel, or a structure built at the head of a channel to prevent flow entering the channel until the main river stage reaches the crest of the structure.
- c) The invert of a gate or sluice opening.

## 2.60 Slope Protection

Riprap, concrete blocks, brush or other material laid for protection of the sloping part of an embankment or levee to prevent erosion, slipping or caving.

## 2.61 Sludging

- a) Flowing of mud, or
- b) The process of filling the crevices left in the dried clay of an embankment with sludge.

## 2.62 Staunching Wall

A transverse wall projecting from an abutment into the embankment acting as cut off and to intercept seepage.

## 2.63 Stembank or Shank

Embankment connecting a groyne head to the river bank or marginal bund.

## 2.64 Stilling Basin

A short reach of paved channel to which a hydraulic jump, used for energy dissipation in hydraulic structures, is usually confined either partly or entirely.

## 2.65 Stone Mesh

A type of construction in which shingle, small boulders, or other form of stone, is held together by a wrapping of wire mesh, to give a heavy but more or less flexible structure used in various forms as groynes, aprons, low weirs, etc. Rounded stone is usually preferable to increase flexibility.

## 2.66 Stone Reserve

A quantity of stone kept as reserve on guidebanks, spurs or groynes for emergency use to prevent deep scour occurring and endangering the safety of the structure.

## 2.67 Silt Excluder

A device constructed for the purpose of preventing entry of excess sediment.

## 2.68 Stoplogs

Fabricated structural steel or wooden units or simple logs, planks, concrete slabs, etc, utilised for temporary closure of an opening for passage of water like any bay of the barrage or regulator in order to facilitate repairs of the gates and other components of the bay.

## 2.69 Toe Protection

Loose stones wire crates or concrete blocks laid or dumped at the toe of an embankment, groyne, etc, or masonry or concrete wall built at the junction of the slope of pitching and the

bed in channels or at extremities of hydraulic structures to counteract erosion.

### **2.70 Toe-Wall**

A shallow wall constructed below the bed or floor level to provide footing for the sloped pitching or the face of an embankment.

### **2.71 Training Wall**

A structure built along or connected to the bank of a river substantially along the direction of flow, for example, an extension to a flank wall, intended to direct fast flow from a sluice or spillway away from erodible banks of a river or canal.

### **2.72 Trash Rack**

A grid or screen made of steelbars installed in front of the entrance to intakes, dam outlets, etc, to prevent entry of floating materials, debris, ice, etc. The size of the screen opening depends upon the maximum size of debris, etc, required to be excluded.

### **2.73 Under Sluices**

The under sluices are bays in continuation of the weir with a crest at lower level on the same side as the canal to maintain a clear and well

defined river channel towards the canal head regulator, to scour the silt deposited on the river bed in the pocket upstream of canal head regulator or to pass winter freshness and low floods without dropping the weir shutters.

### **2.74 Weep Holes**

Opening provided in walls, return walls, aprons, linings, foundations, etc, to permit drainage and reduce pressure.

### **2.75 Weir or Anicut**

An ungated barrier across a stream or a river for the purpose of:

- a) measuring its discharge, or
- b) raising, controlling and maintaining the water level, and/or,
- c) diverting part or all the water from the stream/river into a canal or conduit.

### **2.76 Wing Walls**

Walls joining the abutment of a structure to earth dyke or the banks to retain and protect the earth fill behind and provide a longer path of percolation around the end of a structure or for improving the flow conditions upstream and downstream of the controlling section.

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Doc : No. RVD 2 ( 26 )

**Amendments Issued Since Publication**

Amend No.	Date of Issue	Text Affected

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