



**GIDC Degree Engineering College**

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# Irrigation Engineering

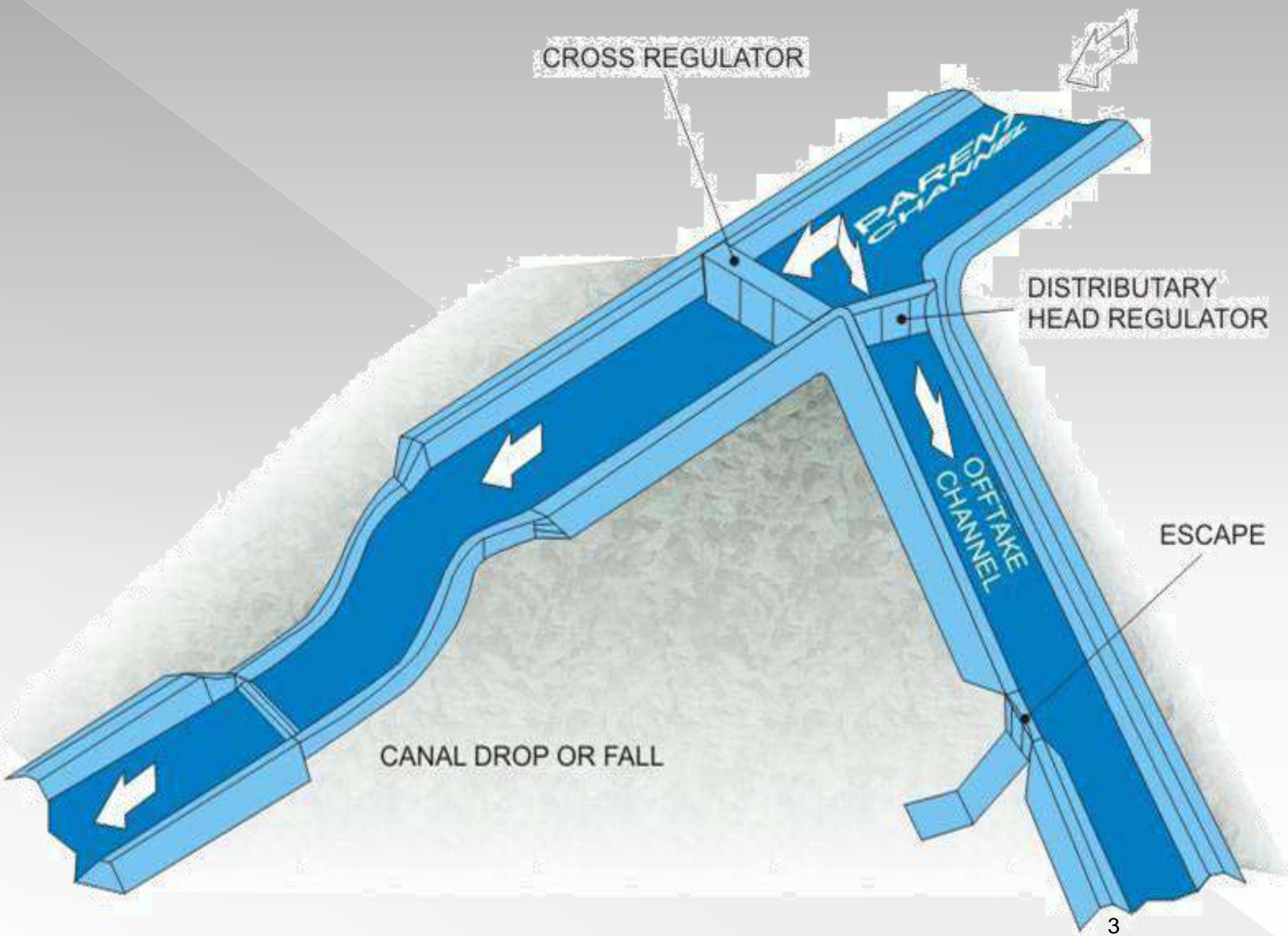
## Topic:- Canal Regulation Work

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# Contents:-

- Cross regulators
- Head regulators
- Canal escapes
- Silt control devices
- Canal outlet works & flow meter



CROSS REGULATOR

DISTRIBUTARY HEAD REGULATOR

ESCAPE

CANAL DROP OR FALL

MAIN CANAL

OFFTAKE CHANNEL

# Cross Regulator

- A cross regulator is provided on the parent channel at the downstream of the off taking canal to head up the water level and to enable the off taking channel to draw the required supply.

OR

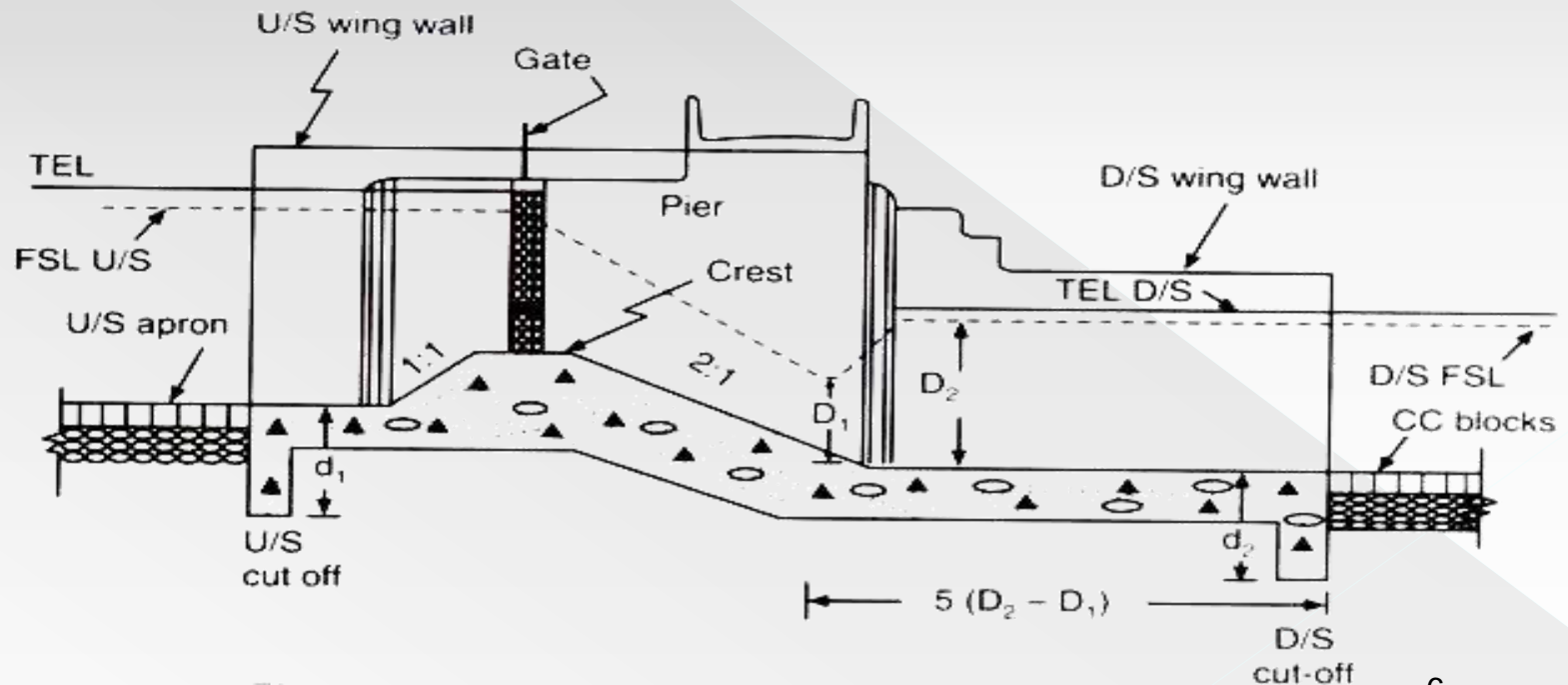
- To head up water in the parent channel to divert some of it through an off take channel, like a distributary.

# □ Function of Cross regulator

1. Usually a bridges on the cross regulator, which provides a means of Communication.
2. During the periods of low Discharge, the cross regulator raises water level on the u/s so that the offtaking channel can takes its full supply.
3. Helps in closing the supply to the d/s of the parent channel, for the purpose of repairs.
4. Used to control the drawdown when the subsoil water levels are high to ensure safety of canal lining.

# Distributary head regulator

- A Distributary Head Regulator is provided at the head of the offtaking channel to control the supplies entering the offtaking canal or distributary.



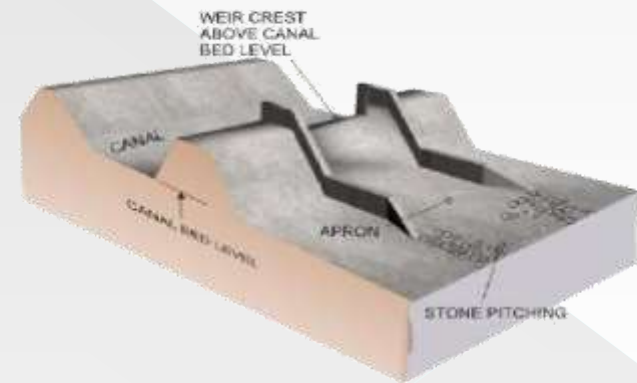
# □ Functions Of The Distributary Head Regulator

1. They regulate or control the supply of water to the offtaking channel from the parent channel
2. They control the entry of silt in the offtaking channel.
3. They serve as meter for measuring the discharge entering into the offtaking canal
4. They help in shutting off the supplies when not needed in the offtaking channel is required to be closed for repairs



# Canal Escapes

- A canal escapes is a structure constructed on an irrigation canal for the disposal of surplus water from the canal.
- Structures meant to release excess water from a canal, which could be main canal, branch canal, distributary, minors etc.
- It is a short of safety value.



Canal Escape



# □ Types Of Escapes

## a) **Classification based on the purpose**

1. Surplus water escape
2. Canal scouring escape
3. Tail escape

## b) **Classification based on the structural**

1. Regulator type escape or sluice type escapes
2. Weir type escapes

# 1. Surplus Water Escape

- A surplus water escape is a structure constructed on the an irrigation channel to the dispose of surplus water from the channel.
- It is also known as **Canal Surplus Escape**.
- The capacity of the escape channel may be  $\frac{1}{3}$  to  $\frac{1}{2}$  of the capacity of the channel.



## 2. Canal Scouring Escapes

- The canal scouring escape is constructed in the bank of the canal for the purpose of scouring off excess silt from time to time.
- The discharge capacity of the canal scouring escape should be about  $\frac{1}{2}$  to  $\frac{2}{3}$  of the capacity of the main canal at the head.

# 3. Tail Escapes

- An irrigation canal generally ends in a natural drain or river.
- An escape is provided across the channel at its tail end to maintain the required **F.S.L** at the tail end.
- Such an escape is called tail escape.

# Silt Control Devices

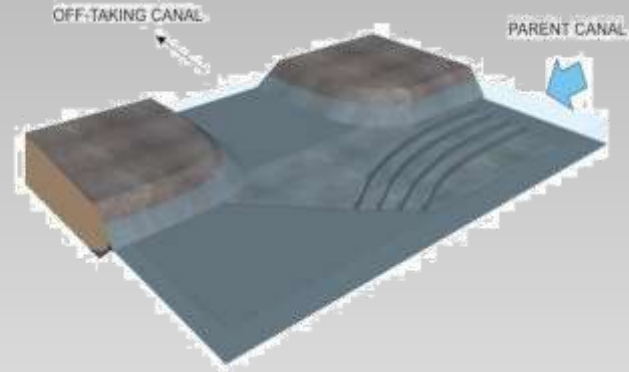
- In order to control the silt entry into the offtaking canal the distributary head regulator is provided with a **Raised Crest**.
- If the Raised Crest level of the distributary head regulator is kept **0.3 to 0.6 m** higher than the u/s bed level of the parent channel.



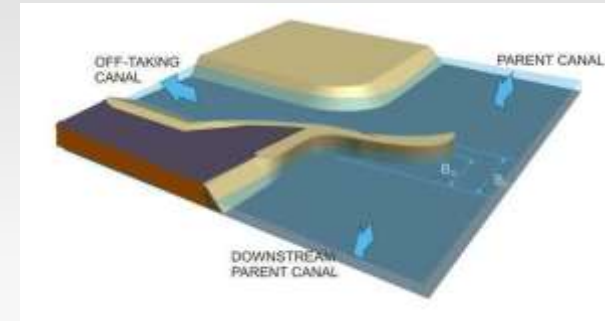
○ **Following devices are used to reduce the silt entry into the offtaking channel :**

1. King's vanes
2. Gibb's groyne wall
3. Cantilever skimming platform
4. Curved wings
5. Curved wings with sediment vanes
6. Desilting basins
7. Vortex tube

# 1) King's Vane



# 2) Gibb's Groyne Wall



# 3) Cantilever Skimming Platform

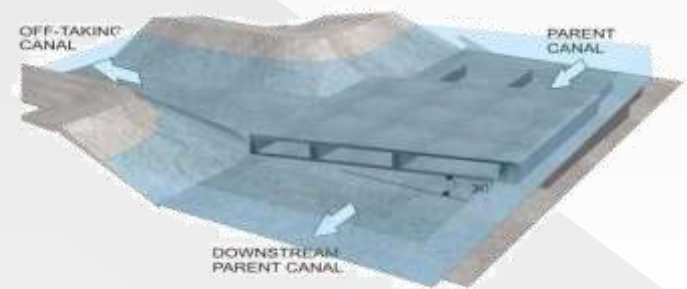


FIGURE 24. View of Skimming Platform



# Canal Outlet

- Canal outlet is a structure or device through which water is released from a disturbing channel into a water course or field channel.
- Thus an outlet is a sort of head regulator for a water course which supplies water to the fields.
- The discharge through an outlet is usually **not less than 0.03 cumec & not more than 0.085 cumec.**



# □ Requirements Of A Good Outlet

- It should be **simple** in design ,construction and maintenance.
- It should be **quite strong and durable**.
- It should not be easily tampered with by the cultivators, but if tampered with it should be easily detected
- It should be **worked efficiently** with a small working load.
- It should **not be expensive**.
- It design should be such that it can be **easily constructed** by the local workers.

# □ Types Of Outlets

- Outlets may be classified as ,
  1. Non-modular outlet
  2. Semi-modular outlet (Flexible modules)
  3. Modular outlets (Rigid modules)

# 1. Non-modular Outlet

- ⦿ A non-modular outlet is the outlet whose discharge depend upon the difference in ware levels of both the distributing channel and the water course.
- ⦿ The discharge through through a non – modular outlet , therefore, varies with the variation of water levels in both the distributary and the water course.

For example:

Submerged pipe outlet

Masonry sluice and orifice

Wooden shoots

## 2. Semi-modular Outlet

- A semi modular outlet is the outlet whose discharge depends only upon the water level in the distributary and is independent of the water level in the water course.

For example :

Pipe outlet

Kennedy's gauge outlet

crump's open flume outlet

Pipe cum open flume outlet

# 3. Modular Outlet

- ⦿ A modular outlet is the outlet whose discharge is independent of the water levels of both the distributary and the water course.
- ⦿ Thus, a modular outlet maintains a constant discharge irrespective of variation of water levels in the distributary and the water course

For example :

Gibb's rigid module

# Flow meter – parshall Flume

- Flow meter or parshall flume is a device for measuring water flowing in irrigation channels or canals by measuring the loss of head of a stream passing through the flume.
- It can be used to measure water flow in streams of varying sizes from of very small one to a very large one.
- Different sizes of parshall flumes are used for the purpose.
- Smaller ones are used in irrigation channels and large ones in canals.



- A parshall flume consists of three main section :
  1. converging or upstream section
  2. Throat or middle section
  3. Diverging or downstream section



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Thanks!

