CANAL:-

A canal is an artificial channel generally trapezoidal in shape constructed on the ground to carry water to the field either from the river of from a reservoir.

Canal regulations

Any structure constructed to regulate the discharge, full supply level or velocity in a canal is known as Regulation Work.

Types & Location:

1. Head Regulator or Head Sluice → at Barrage/Weir, Dam

2. Cross Regulator → on Parent Canal

3. Distributory Head Regulator → on Off-take Canal

4. Canal Fall → along Parent Canal or Off-take Canal

5. Canal Escape → on any type of canal

6. Canal Outlet → on Distributing Canal

Types & Purpose:

1. Head Regulator or Head Sluice to divert water to parent channel from a barrage or weir

2. Cross Regulator → to head up water in the parent channel to divert some of it through an off take channel or distributory canal

3. Distributory Head Regulator to control the amount of water flowing in to off take channel

4. Canal Fall → to lower the water level of the canal

5. Canal Escape → to allow release of excess water from the canal system

6. Canal Outlet → to take out water for delivery to the field channel or water courses

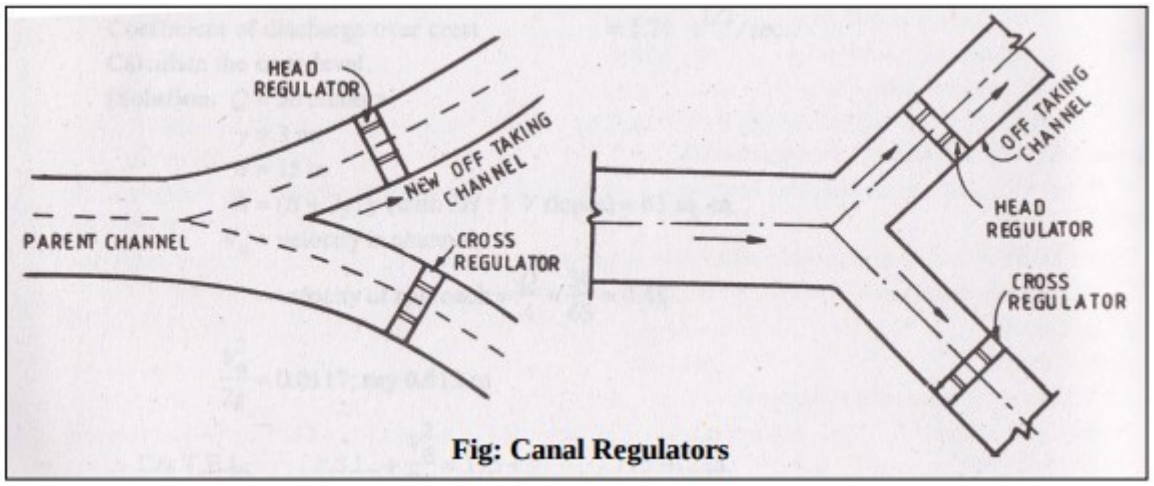

Fig: Canal Regulators

A head regulator provided at the head of the off-taking channel, controls the flow of water entering the new channel.

While a cross regulator may be required in the main channel downstream of the off-taking channel, and is operated when necessary so as to head up water on its upstream side, thus to ensure the required supply in the off-taking channel even during the periods of low flow in the main channel.

Main functions of a head regulator:

1. To regulate or control the supplies entering the off-taking canal
2. To control the entry of silt into the off-taking canal
3. To serve as a meter for measuring discharge.

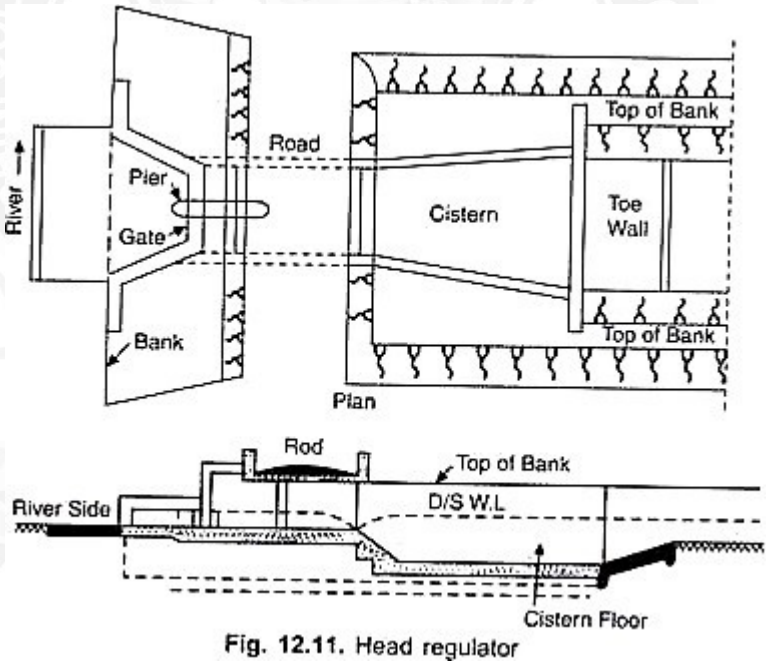

Fig. 12.11. Head regulator

- It consists of a raised crest with abutments on both sides. The crest may be subdivided in

- The piers support roadway and a platform for operating gates.
- The gates control the flow over the crest. They are housed and operated in grooves made in the abutments and piers. Sill of the regulator crest is raised to prevent silt entry.
- Sometimes the gates are provided in tiers. Then lower tiers may be kept closed to raise the sill of the regulator.
- The head regulator is generally constructed with masonry. It should be founded on a good rock foundation. It should be safe against shear, sliding and overturning.
- It should be flanked with adequate wing walls. The head regulator should also be given proper protection by providing aprons on upstream and downstream side of the barrel.
- To prevent seepage cutoff is also essential. To take irrigation water at low velocities waterway of the head regulator should be sufficiently big.

Main functions of a cross regulator:

1. To control the entire Canal Irrigation System.
2. To help in heading up water on the upstream side and to fed the off-taking canals to their full demand.
3. To help in absorbing fluctuations in various sections of the canal system, and in preventing the possibilities of breaches in the tail reaches.
4. Cross regulator is often combined with bridges and falls, if required.

Canal Escapes:

It is a side channel constructed to remove surplus water from an irrigation channel (main canal, branch canal, or distributary etc.) into a natural drain.

The water in the irrigation channel may become surplus due to -

- Mistake
- Difficulty in regulation at the head
- Excessive rainfall in the upper reaches
- Outlets being closed by cultivators as they find the demand of water is over

Functions of Distributary Head Regulator:

- It is a hydraulic structure constructed at the head of a distributary. This regulator performs the same functions as that of a head regulator.

i. It regulates the supply of the distributary.

ii. It can be used many times as a meter.

iii. It is also a silt selective structure.

iv. Distributary head regulator controls the flow in the distributary. By closing the gates distributary can be dried to carry out repairs or maintenance works.

- The points to be considered in design are similar to those considered in the design of a head regulator.
- Only difference is that the distributary head regulator is much smaller in magnitude as compared to the head regulator.

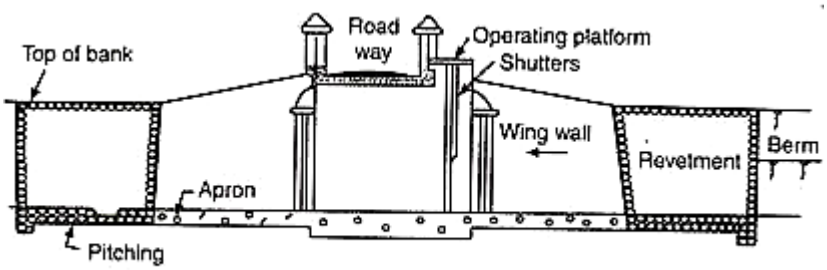

Fig. 12.13. Distributary head regulator