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Soil and water Conservation Engineering

Presented By-

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PERMANENT GULLY CONTROL STRUCTURES

Main Functions:

- To **halt** the advancement of gully head at overfall.
- To **control and stabilize** the gully grade.
- To **convey the water safely** from grassed waterways into drainage ditches very smoothly.
- Where the **volume and peak rate of runoff to be handled is very large** and can not be controlled by vegetative measures and simple field structures.
- Where high degree of **safety against** the loss of **life and property** is warranted.



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Site to be protected is inaccessible and regular maintenance of structure is not possible.

General requirements for pgcs:

- They should be constructed with **permanent materials**.
- They should have adequate capacity to handle the **peak rate of runoff**.
- They should help in **stabilizing the gully** and **store water** wherever necessary.

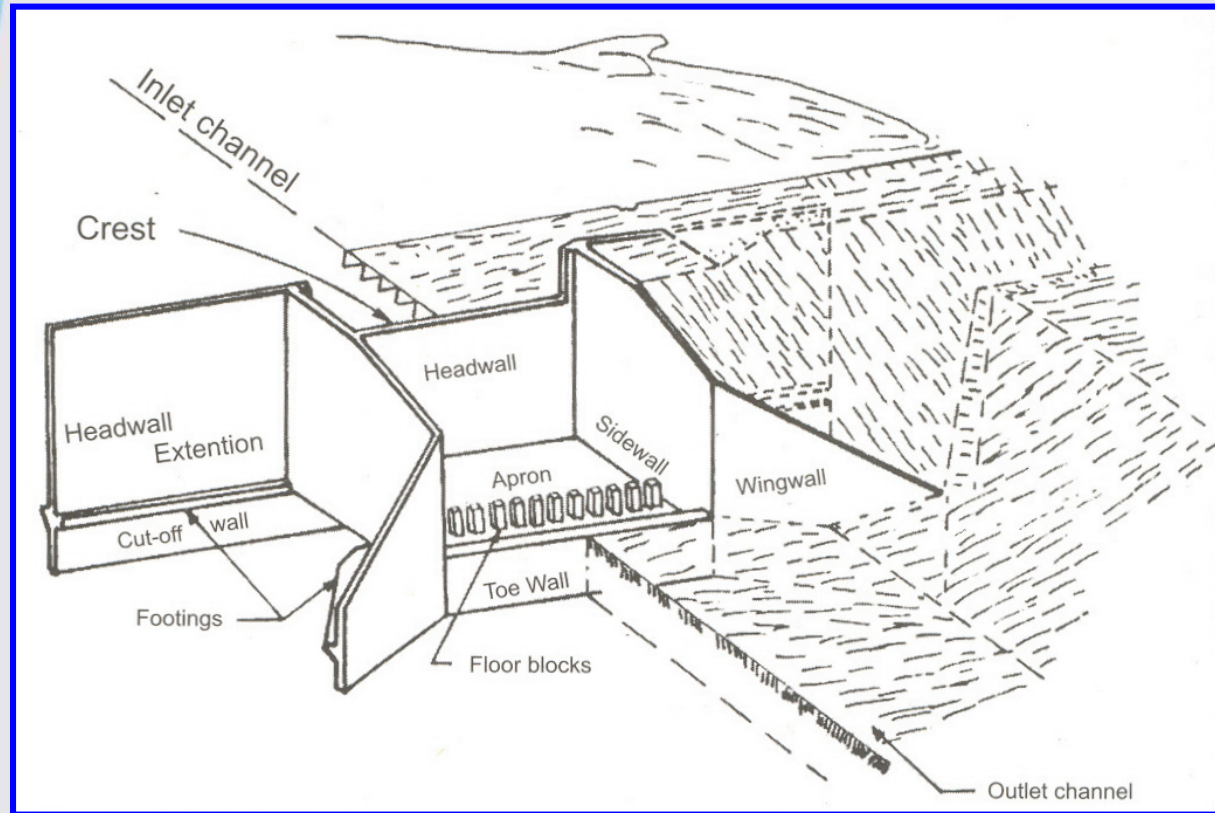


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Permanent Structures

1. DROP SPILLWAY





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Advantages

1. **Stability:** Drop spillway is very stable and likelihood of serious structural damage is less than other types of structures.
2. **Non-clogging of weir:** The rectangular weir is less susceptible to clogging by debris than the openings of other structures of comparable discharge capacity.
3. **Low maintenance cost.**
4. **Ease and economy of construction:** They are relatively easy to construct.



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Disadvantages

1. It is more costly than some other types of structures where the required discharge capacity is less than 3 cumecs and the total head or drop is greater than 3m.
2. It is not a favourable structure where temporary spillway storage is needed to obtain a large reduction in discharge.
3. A stable grade below the structure is essential.

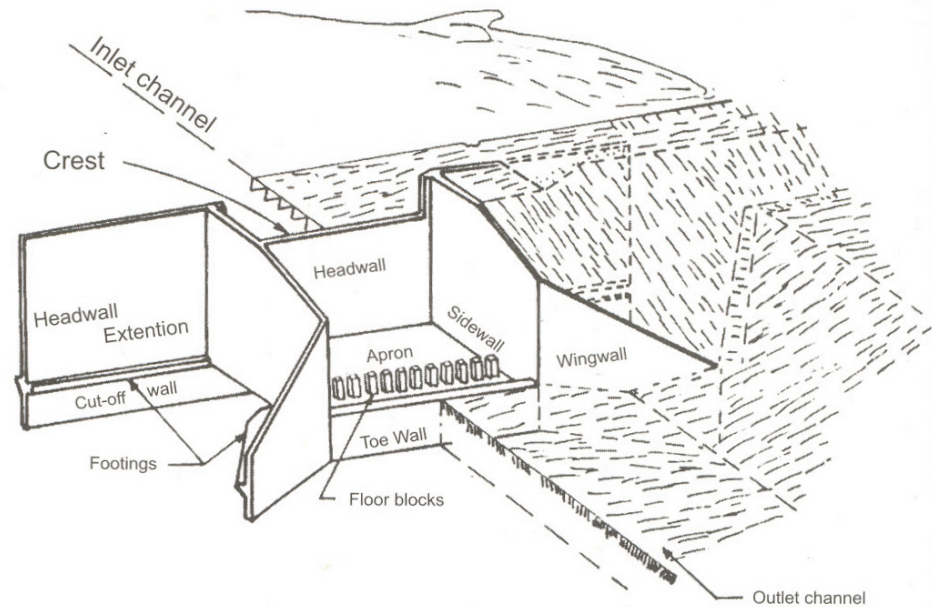


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Structural Parts & Functions

1. Head wall and head wall extension
2. Side walls
3. Wing walls
4. Apron
5. Longitudinal
6. End sills
7. Cut-off walls





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Structural parts

Head wall:

- Acts as a front wall against runoff flow in the drop spillway.
- Constructed across the gully width.
- Suitable notch size (rectangular) is made at the top in the head wall for easy water conveyance over it.
- Size of notch is made sufficient to allow water very safely.



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Head wall extension:

- It is the extended portion of the head wall into the gully sides.
- It provides structural strength against sliding of the structure.
- Check the flow of water from the sides of the drop spillway.

Side wall

- Constructed in the side along the gully wall.
- These two walls determines the apron section.
- Side walls prevent splashing of water over the gully banks and confine the water flow within the apron.



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Wing wall:

- Constructed at the rear end of the structure with some inclination (45^0 from vertical).
- These walls are extended upto the gully sides, which prevents the flow backward into the space left between gully wall and side wall of the structure.
- Vertical walls known as toe walls are built around the apron to prevent under cutting.



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Apron:

- Main component that receives the gully flow with high velocity and makes the flow causing negligible soil erosion/no erosion from the channel d/s side.
- It contains several blocks of some height making apron surface rough and thus dissipates max. K.E. of falling water by creating hydraulic jump.

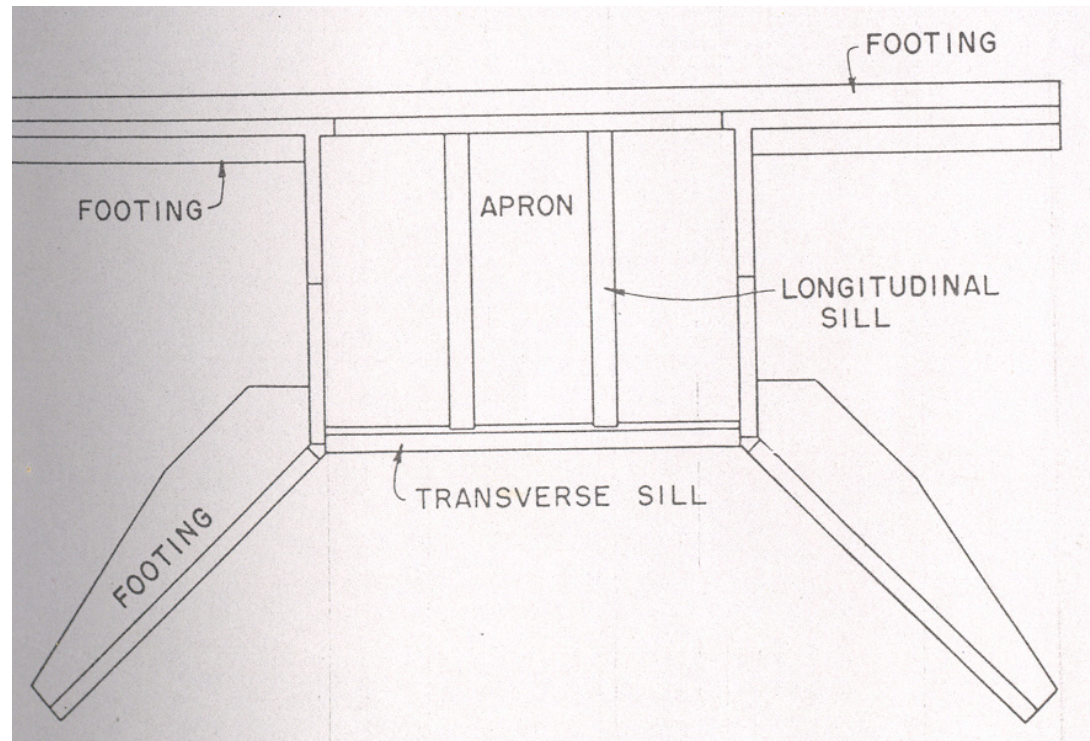


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Longitudinal wall:

- Constructed in length wise parallel to the side wall in the apron section.
- These sills also makes the apron stable.





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End sill or transverse sill:

- It is the elevated portion of the rear end of the apron.
- It obstructs the water going directly into the channel below.

Cut off wall:

Constructed to provide structural strength against sliding.