

A  
PRESENTATION  
ON  
*SPILLWAYS*

# SPILL WAYS

- When the water in the reservoir increases, the large accumulation of water endangers the stability of the dam structure. To avoid this a structure is provided in the body of a dam or near the dam or periphery of the reservoir. This structure is called as spillway.
- Mainly used to discharge water during flood period.

## Requirements:

- Provide structural stability to the dam under all condition
- Should able to pass the designed flood without raising the reservoir level above H.F.L.
- Should have an efficient operation
- Should be economical

# FUNCTION

- The spillway has the function of discharging all the water not utilized for generation. The maximum discharge capacity of the spillway is 62.2 thousand  $\text{m}^3/\text{s}$ ; 40 times greater than the mean discharge of the Iguaçu Falls.

# LOCATION OF SPILLWAY

- Generally, the spillways are provided at the following places
- Spillways may be provided within the body of the dam.
- Spillways may sometimes be provided at one side or both sides of the dam.
- Sometimes by-pass spillway is provided which is completely separate from the dam.

# TYPES OF SPILLWAYS

- Overfall spillway
- Chute spillway
- Saddle spillway
- Shaft spillway
- Side channel spillway
- Emergency spillway
- siphon spillway

# FIGURES

## Overfall spillway:

- that allows water to pass over its crest widely used on gravity, arch, & buttress dam
- This is a simplest type

## Chute spillways:

In this type water is conveyed from the reservoir to the river or to nalla below the dam through an excavated open channel, through fairly steep slope



Overfall spillways



# SHAFT SPILLWAY

- The shape is just like a funnel .
- water drops through a vertical shaft in a the foundation material to a horizontal conduit that conveys the water past the dam.
- Lower end of shaft is turned at right angle and then water taken out below the dam horizontally.
- Also called as glory hole spillway.



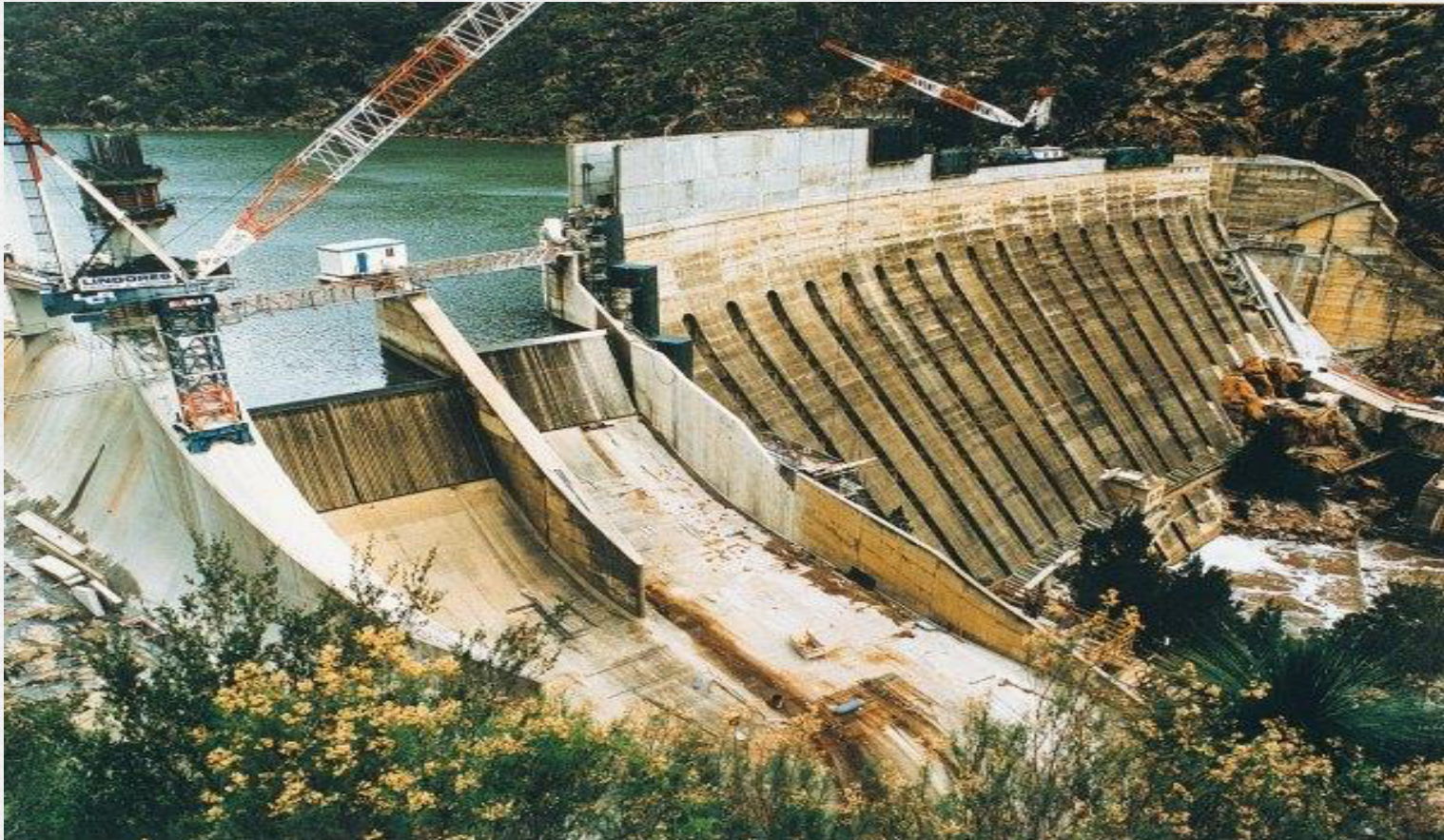
# SADDLE SPILLWAYS

- This type is mainly used when other types are not favourable.
- In some basins formed by a dam, there may be one or more natural depressions or saddles in the rim of the basin, which can be used as spillway.
- It is essential that the bottom of the depression should be at full reservoir level.
- It is usually necessary for the saddle to be on firm rock.



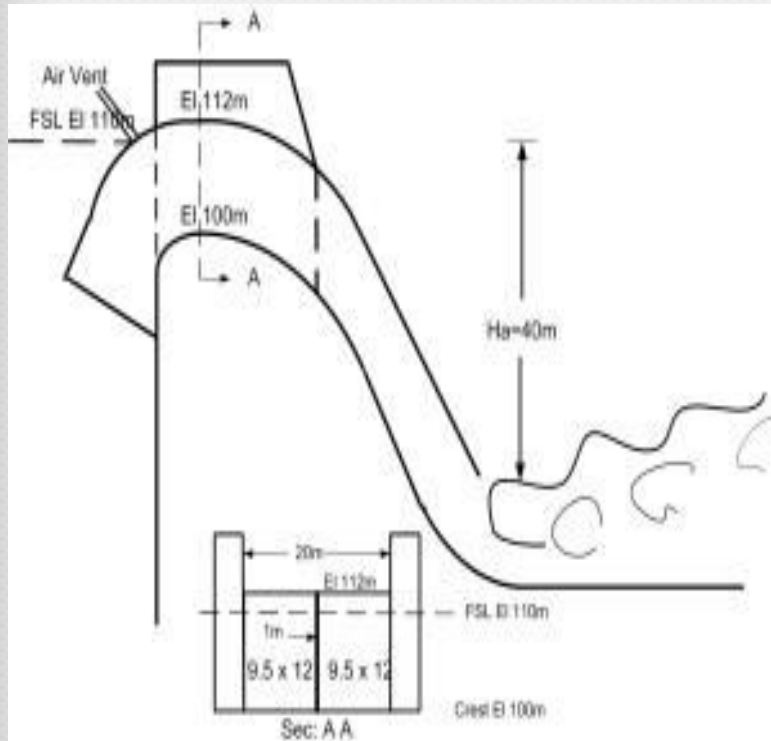
# SIDE CHANNEL SPILLWAY

- When the dam is not rigid and it is undesirable to pass flood water over the dam , this type of spillway is used.
- After passing crossing over the spillway crest ,water flows parallel to the crest.



# SIPHON SPILLWAYS

- It is designed by the principle of a siphon.
- When water rises over the FRL then water start spilling.
- There is a air vent for removing the entrapped pressure from the water.



# EMERGENCY SPILLWAY

- This type is rarely used .
- Extra spillways provided on a project in rare case of extreme floods(emergency)
- Used to convey frequently occurring outflow rates.

# ADVANTAGES

- Very stable. The likelihood of serious structural damage is less than for other types of structures.
- The rectangular weir is less likely to be clogged by debris than the openings or other structures of comparative discharge capacities.
- They are relatively easy to construct. The concrete block type can be built with farm labor, while the reinforced concrete or steel sheet piling type usually requires the services of a contractor.

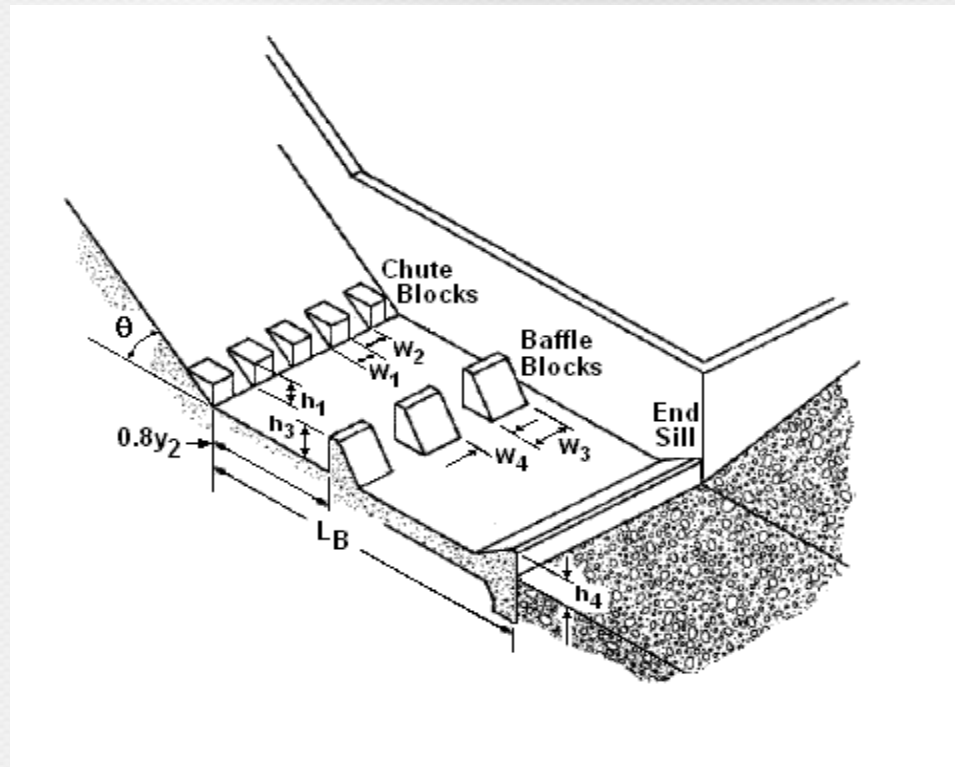
# DISADVANTAGES

- It is more costly than some other types of structures where the required discharge capacity is less than 100 c.f.s. and the total head or drop is greater than 10 feet.
- It is not a favorable structure where temporary spillway storage is needed to obtain a large reduction in discharge.
- A stable grade below the structure is essential.

# ENERGY DISSIPATION

- As water passes over a spillway and down the chute, potential energy converts into increasing kinetic energy capacity of its power plant.
- The energy can be dissipated by addressing one or more parts of a spillway's design

# ENERGY DISSIPATION



# SAFETY

- Spillway gates may operate suddenly without warning, under remote control. Trespassers within the spillway run the risk of drowning. Spillways are usually fenced and equipped with locked gates to prevent casual trespassing within the structure. Warning signs, sirens, and other measures may be in place to warn users of the downstream area of sudden release of water. Operating protocols may require "cracking" a gate to release a small amount of water to warn persons downstream.
- The sudden closure of a spillway gate can result in the stranding of fish, and this is also usually avoided.



# CONCLUSION

- Hydroelectric developments include flood-control structures designed to let excess water escape safely from the reservoir. This "safety valve" prevents water from spilling over the dam crest. It takes the form of a spillway, a weir or sometimes a combination of both.