SNS COLLEGE OF TECHNOLOGY

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COIMBATORE

Department of civil engineering

19CET305-IRRIGATION AND WATER RESOURCE ENGINEERING

III YEAR / VI SEMESTER

Unit 2 : CANAL IRRIGATION

Canal Linings

Canal Linings

- Canal Linings are provided in canals **to resist the flow of water through its bed and sides**.
- These can be constructed using different materials such as **compacted earth, cement, concrete, plastics, boulders, bricks etc.**
- The main advantage of canal lining is **to protect the water from seepage loss.**

- Canal Lining is an **impermeable layer** provided for the bed and sides of canal **to improve the life and discharge capacity of canal.**
- **60 to 80% of water lost** through seepage in an unlined canal **can be saved** by construction canal lining.

Types of Canal Linings

1. **Earthen type lining**
2. **Hard surface lining**

1. Earthen Type lining

i. **Compacted Earth Lining**

ii. **Soil Cement Lining**

Compacted Earth Lining

- Compacted earth linings are preferred for the canals when the **earth is available near the site** of construction or In-situ.
- Compaction **reduces soil pore sizes** by displacing air and water.
- **Reduction in void size increases the density**, compressive strength and shear strength of the soil and **reduces permeability.**

Compacted Earth Lining

Soil Cement Lining

Soil-cement linings are constructed with **mixtures of sandy soil, cement and water**, which harden to a concrete-like material.

The **cement content should be minimum 2-8% of the soil** by volume. However, larger cement contents are also used.

In general, for the construction of soil-cement linings following **two methods** are used.

1. **Dry-mix method**
2. **Plastic mix method**

Soil Cement Lining

2. Hard Surface Canal Linings

It is sub divided into 4 types and they are

1. **Cement Concrete Lining**
2. **Brick Lining**
3. **Plastic Lining**
4. **Boulder Lining**

Cement Concrete Lining

- Cement Concrete linings are **widely used**, with benefits justifying their **relatively high cost**.
- They are **tough, durable, relatively impermeable** and **hydraulically efficient.**

There are several procedures of lining using cement concrete

- **Cast in situ lining**
- **Shortcrete lining**
- **Precast concrete lining**
- **Cement mortar lining**

Cement Concrete Lining

Brick Lining

In case of brick lining, **bricks are laid using cement mortar on the sides and bed of the canal.**

After laying bricks, **smooth finish is provided on the surface** using cement mortar.

Plastic Lining

Plastic lining of canal is **newly developed technique** and holds good promise.

1. **Low density poly ethylene**
2. **High molecular high density polythene**
3. **Polyvinyl chloride**

Brick Lining

- The advantages of providing plastic lining to the canal are many as **plastic is negligible in weight, easy for handling, spreading and transport, immune to chemical action** and **speedy construction**.
- The **plastic film is spread on the prepared sub-grade** of the canal.
- To **anchor the membrane** on the banks **'V trenches are provided**.

  The film is then covered with protective soil cover.

Plastic Lining

Boulder Lining

- This type of lining is constructed with **dressed stone blocks laid in mortar.**
- Properly dressed stones are not available in nature. Irregular **stone blocks are dressed and chipped off** as per requirement.
- When **roughly dressed stones** are used for lining, the **surface is rendered rough** which may put lot of **resistance to flow.**

Boulder Lining

Advantages of Canal Lining

- Seepage Reduction
- Prevention of Water Logging
- Increase in Commanded Area
- Increase in Channel Capacity
- Less Maintenance
- Safety Against Floods