UNIT III - CONSTRUCTION PRACTICE - SUB STRUCTURE

Topic – 2: Dewatering

Dewatering: Definition and Purpose

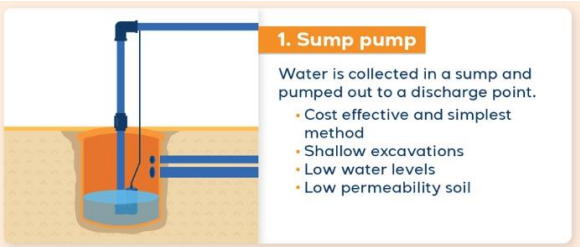
- **Dewatering** is the process of removing groundwater or surface water from a construction site or excavation area.
- It is essential for maintaining dry and stable soil conditions to ensure safe and efficient construction work, especially in foundation or substructure projects.

Objectives of Dewatering

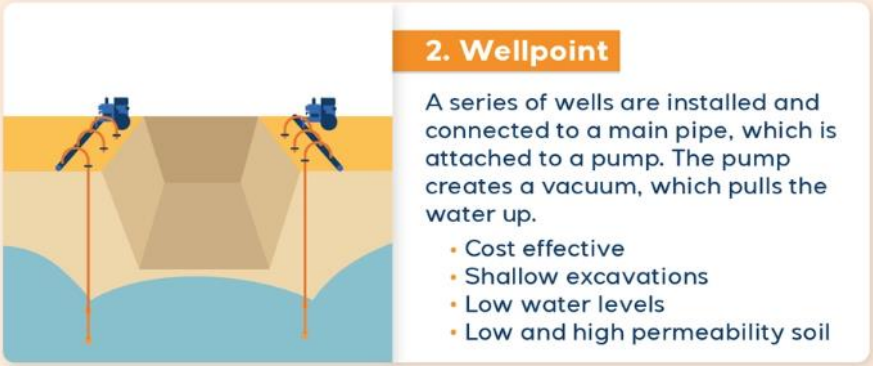
- **Soil Stabilization:** Reducing the water content in the soil to increase its bearing capacity.
- **Workability:** Creating a dry and safe work environment for excavation and other construction activities.
- **Preventing Flooding:** Managing water levels to prevent the accumulation of water in trenches or foundation pits.
- **Preventing Damage:** Avoiding the risk of structural damage due to water pressure or soil erosion.

Methods of Dewatering

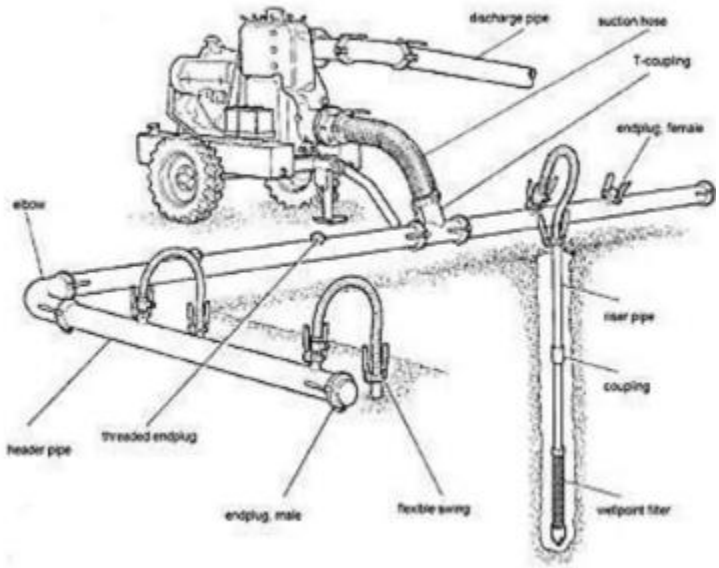
1. **Sump Pumping:**
    - The simplest method of dewatering where water is collected into sumps (pits) and then pumped out.
    - Best suited for low water table areas or small construction sites.
    - Effective in handling minor water seepage in shallow excavations.



2. **Well point System:**
    - Consists of a series of small-diameter wells (well points) installed around the excavation area.
    - Water is pumped out from these well points using a suction pump, lowering the water table effectively.
    - Suitable for moderate to high water table conditions in sandy or gravely soils.

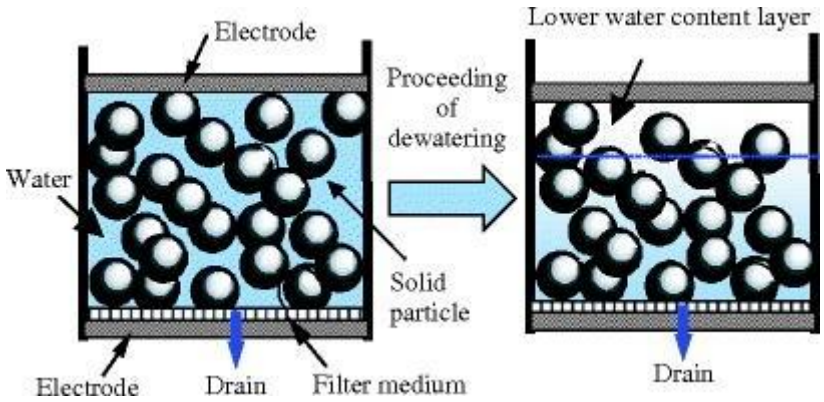


3. **Vacuum-Assisted Dewatering:**
    - Uses a vacuum pump to create negative pressure in well points or wells, enhancing the water extraction process.
    - Ideal for silty and fine-grained soils with low permeability where other methods may not be efficient.
    - Can control the seepage of water more effectively in difficult soil conditions.



4. **Deep Well Dewatering:**
    - Involves the use of deep wells with submersible pumps to extract large volumes of groundwater.
    - Capable of lowering the water table significantly in deep excavations.
    - Effective for large construction projects with high water inflow rates.

5. **Electro-Osmosis Dewatering:**
    - A technique that uses an electric current to move water through fine-grained soils towards a discharge area.
    - Most suitable for soils with very low permeability, like clay or silty soil.
    - Enhances the stability of soil by reducing its water content.



Factors Affecting Dewatering Method Selection

- **Soil Type:** The nature of the soil (sand, clay, silt) influences the efficiency of different dewatering techniques.
- **Depth of Excavation:** Determines the extent to which groundwater needs to be lowered.

- **Water Table Level:** A high water table may require more advanced dewatering systems.
- **Site Conditions:** Space constraints and nearby structures can impact the choice of dewatering method.

Safety Considerations in Dewatering

- **Monitoring Water Levels:** Regular checks to ensure that the water table is maintained at the desired level.
- **Preventing Soil Erosion:** Proper control measures to avoid soil instability and erosion around the excavation.
- **Managing Discharge Water:** Ensuring that discharged water does not contaminate nearby water bodies or flood adjacent areas.

Applications of Dewatering in Construction

- **Foundation Construction:** Essential for creating a dry base for laying strong and stable foundations.
- **Tunneling and Substructure Work:** Helps maintain a safe environment for underground construction.
- **Pavement and Road Construction:** Dewatering ensures a firm subgrade for roadbeds and pavements.

Dewatering is a critical practice in construction substructures that ensures stability, safety, and efficiency during excavation and foundation work. Choosing the right dewatering technique based on soil conditions and project requirements is essential for successful construction operations.