COFFERDAM

Types of cofferdam

1. Cantilever sheet pile cofferdam

2. Braced cofferdam

3. Embankment protected cofferdam

4. Double wall cofferdam

5. Cellular cofferdam

Grout anchors used in constructions

In most cases, however anchorages may be embedded below ground level, with backstays connecting them to adjacent towers, or they may constitute the end abutments of the end spans. In addition to stability sliding, the anchorage structure must also be checked for stability against tilting and overturning.

Methods o f ground water control

Following methods of ground water control are adopted

1. Pumping from open sumps

2. pumping from well points

3. Pumping from bored wells

(1) Pumping from open sumps

This method is most commonly used where area is large enough for allowing excavation to be cut back to stable slopes and where there are no important structures close to the excavation to effect their stability by settlement resulting from erosion due to water flowing towards the sump. This method is also applicable for rock excavations.

This method costs comparatively low for installation and maintenance.In this method one or more sumps are made below the general level of the excavation.In order to keep the excavator area clear of standing water, a small grip or ditch is cut around the bottom of the

excavation failing towards the sump.

For grater depths of excavation the pump is used or submersible deepwell pump suspended by chains and progressively lowered down.Pumps suitable for operating from open sumps are:

- Pneumatic sump pumps
- Self priming centrifugal pumps
- Monopump sinking pumps

Pumping is simple and less expansive, but has serious limitations. When fine sand or cohesion less soil lie below the water, this type of pumping removes the fine material from the surrounding soil and results in settlement of adjacent structures. To product it sumps lined with gravel filter are sometimes used.

(2) Pumping from wellpoints

This system comprises the installation of a number of filter wells generally 1m long, around the excavation. These filter wells are conducted by vertical riser pipes to a large dia header main at ground level which is under vacuum from a pumping unit. The water flows to the filter well by gravity and then drawn by the vacuum upto the header main and discharged through the pump. This system has the advantage that the water is filleted as it removed from the ground and carries almost no soil with it once steady discharge conditions are attained. This system has the limitation of limited suction lift. Therefore for deeper excavations the well points are installed in two or more stages.

The filter wells or well points are usually 1m long and 60 to 75mm diameter gauge screen surrounding a central riser pipe. The capacity of a single we;; point with 50mm raiser is about 10 lit/min. Spacing between two well points depends on the permeability of the soil and on the time available to effect the drawdown. In fine coarse sand or sandy gravels a spacing of 0.75 to 1m is required, while in silty sands of low permeability a 1.5m spacing is sufficient .In permeable

course gravels spacing should be as low as only 0.3m.A normal set of wellpoint system comprises 50 to 60 points to a single 150 or 200mm pump with a separate 100mm jetting pump.

(3) Pumping from bored wells

Pumping from wells, for draw-down depth of than the meters can be under taken by surface pumps with their suction pipes installed in bored wells. When dewatering is required to be undertaken from a considerable depth,electrity driven submersible pumps are installed in deep bore holes with rising main to the surface. Since heavy boring equipment is used, installation of wells can be done in all ground conditions including boulders and rocks. Due to higher costs of installation, this method is adopted where construction period is long and other methods of dewatering are not possible.Installation of bore well consists of sinking of a casting having a dia of about 20-30 cm larger than the inner well casting. The dia of inner well casting depends on the size of submersible pump. This inner well casing is inserted after complete sinking of borehole screen over the length where dewatering of the soil is required and it terminates in a 3-5 m length of unperforted pipe to act as a sump to collect any fine material which may be drawn through the filter mesh. Screen having slots are preferable to holes, since there is less risk of blockage from round stones.

Component parts of pipe jacking

Pipe jacking is specialist tunneling method for installing underground pipelines by assembling the pipes at the foot of an access shaft and pushing them through the ground with the minimum of surface disruption Component parts of jacking systems The pump unit has two distinct hydraulic systems A high pressure systems supplies oil for the main jacking cylinders and till intermediate jacking stations A low pressure system supplies oil, via hydraulic lines, for the boring head and conveyor. An auxiliary power pack may be easily installed to double the low pressure hydraulic flow. This may be necessary for larger and more powerful boring heads

Thrust yoke The yoke is the frame that the main cylinders push against to advance the boring head and pipe. The ring provides a 360 degree surface against the pipe to minimize point pressure and reduce the chance of breakage. Skid base The skid base is the foundation of the pump unit and yoke. It also acts as a guide for launching the boring head and pipe into the ground. Power packs Power packs with high and low pressure systems typically are matched with the multiple cylinder system. When tunneling, a lower pressure power pack may be selected to supply oil for the tunnel boring machine (TBM) Power required depend on the size and features of the boring head A mobile electric power pack may be positioned in the boring head/ TBM Intermediate jacking stations Installing intermediate jacking stations is a simple economical way of adding and distributing thrust for pipe jacking