



CENTRAL WATER AND POWER RESEARCH STATION

Determination of in-situ permeability for recommending seepage mitigation measures through foundation of Kadaknathwadi Storage Tank Dist. Dharashiv, Maharashtra

STUDY OVERVIEW:

- Constructed in 2019, the earthen dam of Kadaknathwadi storage tank is situated in Tal. Washi, Dist. Dharashiv, Maharashtra.
- The earthen dam extends from RD (Ch.) 0 m to 510 m with maximum height of 37.28 m.
- Designed to serve both irrigation and domestic needs, the tank fulfills water requirement of Kadaknathwadi and nearby villages, contributing significantly to agricultural and household water supply.
- CWPRS conducted in-situ field permeability tests in rock strata of the foundation to assess perviousness of the strata and recommend seepage mitigation measures.
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SIGNIFICANCE:

- The studies helped to identify specific cause of foundation seepage and to recommend appropriate seepage mitigation measures in the form of an impervious barrier i.e. grout curtain from upstream toe (dam base level) of the dam extending in to the foundation strata in seepage affected stretches i.e. from Ch. 90 m to 120 m and between Ch. 450 m to 510 m.
- Once implemented effectively, the remedial measures will help in mitigating foundation seepage and ensure optimum utilization of the storage tank by fulfilling water requirement of nearby areas.



APPROACH:

- To characterize subsurface conditions, seven boreholes were drilled along axis through body of the dam.
- Analysis of borehole data revealed that the foundation consists of an overburden soil layer followed by slightly to highly weathered and fractured basalt rock.
- In-situ permeability tests using double packer Lugeon method were performed to assess perviousness of the rock strata.

KEY FINDINGS:

- Test results indicated that rock strata in foundation up to a depth of about 13 m from dam crest (TBL) is mostly of 'medium' to 'high' permeability with Lugeon value ranging from 0.66 to 61.13.
- Below 13 m depth from TBL, the rock strata is comparatively water tight and mostly of 'very low' permeability ranging from 0.1 to 4.93 Lugeon.
- The change in quality of rock below 13 m depth was also apparent from RQD values. Up to depth of 13 m, the RQD was of 'very poor' to 'poor' category, while below 13 m, the RQD improved and was of 'fair' to 'excellent' category.
- The investigations yielded critical insights into the cause of seepage. It was inferred that the potential source of seepage is the rock strata in foundation up to a depth of about 13 m from TBL, indicating a significant potential for water to flow through it.