CENTRAL WATER AND POWER RESEARCH STATION

GEOTECHNICAL STUDIES FOR SUGGESTING SEEPAGE MITIGATION AND STABILITY MEASURES FOR TELEWADI EARTHEN DAM, DIST. RATNAGIRI, MAHARASHTRA

Dam Location

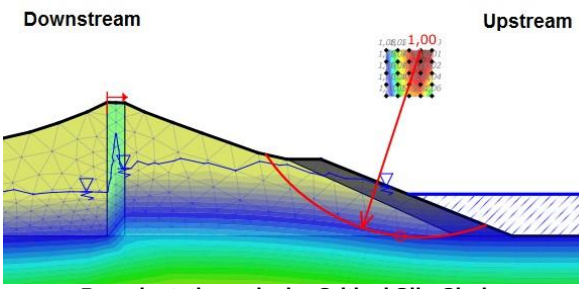
STUDY OVERVIEW

To meet the drinking water and irrigation requirement, Minor Irrigation (MI) tanks have been built by Govt. of Maharashtra in Ranagiri District. Many of these dams including Telewadi dam have developed leakages, resulting in depleted storage. Considering the acute storage of water and safety of the structures, it is proposed to carry out detailed studies of Telewadi dam for recommending suitable remedial measures to arrest leakages and improve stability.

APPROACH

- Conducted seepage analysis to obtain Phreatic line, seepage flow path, quantity of seepage discharge, pore pressures and hydraulic heads in dam body and foundation.

- Conducted Slope stability analysis of downstream and upstream slopes by Bishop's limit equilibrium method of slip circle analysis (method of slices) for conditions of steady seepage and sudden drawdown respectively.



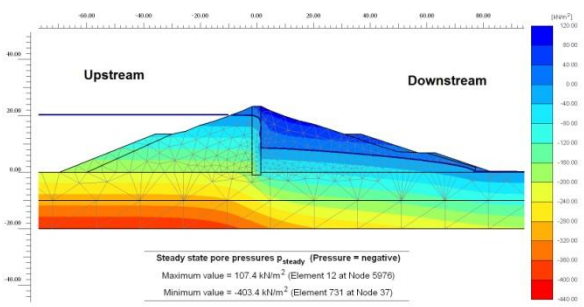
Pseudostatic analysis- Critical Slip Circle

KEY FINDINGS

- Seepage studies indicated that the phreatic line was elevated on downstream side of the dam giving rise to seepage through dam body.
- During drawdown condition also, un-dissipated pore pressures existed in upstream zone of the dam.
- In view of the above, rehabilitation measures for seepage mitigation as well as stability improvement are required to be implemented for the dam.
- Following rehabilitation measures are recommended based on studies:
  (i) Grouting through dam body
  (ii) Flattening of upstream and downstream slopes
  (iii) Provision of berm on upstream slope
  (iv) Grouting around right side HDPE conduit to seal cracks, joints and cavities
- The upstream and downstream slopes should be protected against wave action by rip-rap/ pitching.
- Regular maintenance of the dam as per CWC guidelines is recommended.

• SIGNIFICANCE

The stability analysis of dam provided a comprehensive overview of existing dam conditions. Based on these conditions, remedial measures were suggested. To minimize seepage, grouting was suggested along with flattening of slopes to stabilize the dam for various conditions such as steady seepage and sudden drawdown.



Seepage analysis – Pore pressure –Modified section