



FOUNDATION ANALYSIS OF UPPER TUNGA PROJECT AT GAJANUR, SHIMOGA DISTRICT, KARNATAKA

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Abstract:

The foundation Engineering technology concerns the dual problem of soil bearing capacity and the design for construction of the foundation. The stability of the soil foundation system depends not only on the strength of the foundation proper as an artificial construction element but also on the strength of the soil or rock beneath the foundation, soil exploration, soil testing, determination of soil bearing capacity, it consist of the dam foundation analysis and included as part of the calculations the shallow foundation to support the proposed loading conditions at each section, foundation are defined as spread footings, reinforced concrete mats.

Key Words: Foundation, Stability, Soil, Rock, Strength, Soil Testing, Detailed Analysis, Loads, Artificial Stabilization & Weak Layers of Soil.

Introduction:

The stability of the soil foundation system depends not only the strength of the foundation proper as an artificial construction element but also on the strength of the soil or rock beneath the foundation. Hence success in foundation engineering requires among other things solid knowledge and good understanding of the physical properties of soil and rock utilized for supporting structures. The foundation can be classified three categories, depends upon the bearing capacity of the soil or rock beneath foundation, shallow foundation, deep foundation and special foundation, the structured loads cannot be reduced in clayey soils, a strong tendency for the structure to settle exists, the stability of one or more types of foundations may have to be compared, the design of the selected foundation checking stresses in the foundation and on soil, the foundation are safety and effectiveness can be assured by the dam of least cost and technical resource which cost of money.

Discussion and Results:

Table 1: Detailed analysis of foundation blocks of Upper Tunga Project

Block No	Chainage (mts)		Strike and dip direction with RL [AFL (mts)]	Observation structures (Geology)	Remarks
	From	To			
BLK-1	219.50	232.50	NNW-SSE dip 80°E AFL- 565.65	Foliation plains and soft rocks	13 No. of grouting
BLK-2	232.50	290	NNW-SSE dip 80°E AFL- 565 d/s	Wrapped and foliated at plains due to folding.	10 No. of grouting
BLK-3	290	298.33	NNW-SSE dip 80°E AFL- 564 to 565 d/s	Horn blend schist and chlorite schist	05 No. of grouting
BLK-4	298.33	316.02	NNW-SSE dip 80°E AFL- 564 d/s	Horn blend schist and chlorite schist	05 No. of grouting
BLK-5	316.02	333.87	NNW-SSE dip 80°E AFL-564.50-566 d/s	Horn blend schist and quartz veins as well as foliation and jointed rocks	10 No. of grouting
BLK-6	333.87	365.85	NNW-SSE dip 80°E AFL-566 d/s	Weathered and soft	08 No. of grouting
BLK-7	333.87	365.85	NNW-SSE dip 80°E AFL-566 d/s	Weathered and soft	12 No. of grouting
BLK-8	365.85	390.12	NNW-SSE dip 80°E AFL-566 d/s	Weathered and soft	18 No. of grouting
BLK-9	365.85	390.12	NNW-SSE dip 80°E AFL-566 d/s	Weathered and soft	15 No. of grouting
BLK-10	365.85	390.12	NNW-SSE dip 80°E AFL-566 d/s	Weathered and soft	15 No. of grouting

BLK-11	365.85	390.12	NNW-SSE dip 80°E AFL-566 d/s	Hard chlorite schist quartz veins and fresh foliated joints	15 No. of grouting
BLK-12	390.12	394.40	NNW-SSE dip 80°E AFL-566 d/s	Two sets of joints are found N30°ES 30°W dip 80°S N10°W S10°E dip 70°W	15 No. of grouting
BLK-13	394.40	422	NNW-SSE dip 80°E AFL-566 d/s	Two sets of joints are found N30°ES 30°W dip 80°S N10°WS10°E dip 70°W	15 No. of grouting
BLK-14	422	437	NNW-SSE dip 75-80°E AFL-565.61 d/s	Four sets of joints are found N70°WS 70°E dip 25°NE N60°W S60°E dip 35°S N10°WS10°E dip 35°W N40°WS60°E dip 35°S	18 No. of grouting
BLK-15	437	465	N20°W S20°E dip 80°E AFL-565.61 d/s	Horn blend schist and quartz veins and three sets of joints	22 No. of grouting
BLK-16	437	465	N20°W S20°E dip 80°E AFL-565.61 d/s	Horn blend schist and quartz veins and three sets of joints	22 No. of grouting
BLK-17	437	465	N20°W S20°E dip 80°E AFL-565.40-565.23 d/s	Horn blend schist and quartz veins and three sets of joints	22 No. of grouting
BLK-18	465	495	N20°W S20°E dip 80°E AFL-565.35-565.38	Three sets of joints and weathered and soft rocks with horn blend schist	22 No. of grouting
BLK-19	495	522	N20°W S20°E dip 80°E AFL-565.55-566.25	Two sets of joints and horn blend schist with quartz vein N30°ES30°W dip vertical N75°WS75°E dip 25°S	22 No. of grouting
BLK-20	495	522	N20°W S20°E dip 80°E AFL-565.55-566.25	Two sets of joints and horn blend schist with quartz vein N30°ES30°W dip vertical N75°WS75°E dip 25°S	22 No. of grouting
BLK-21	522	551	N10°WS10°Edip75-80°E d/s AFL-565.46-566.32	Two sets of joints and horn blend schist with quartz vein N60°WS60°E dip 30°SW N40°S40°E dip 40°NW	25 No. of grouting
BLK-22	551	579.6	N20°W S20°Edip60-70°E d/s AFL-566.55-566.62	Two minor sheared zones with strikely weathered and hard schist	30 No. of grouting
BLK-23	551	579.6	N20°WS20°Edip 60-70°E d/s AFL-566.55-566.62	Two minor sheared zones with strikely weathered and hard schist	30 No. of grouting
BLK-24	551	579.6	N20°WS20°Edip 60-70°E d/s AFL-566.55-566.62	Two minor sheared zones with strikely weathered and hard schist	30 No. of grouting
BLK-25	579.6	608	N10°WS10°Edip 70-80°E d/s AFL-566.35-566.52	Moderately and sub joints are found and sound hard rocks are found	12 No. of grouting
BLK-26	579.6	608	N10°WS10°Edip 70-80°E d/s AFL-566.35-566.52	Moderately and sub joints are found and sound hard rocks are found	12 No. of grouting

BLK-27	608	621	NNW-SSE dip 60°E AFL-566.04	Horizontal joints are found u/s and d/s	14 No. of grouting
BLK-28	608	621	NNW-SSE dip 60°E AFL-566.04	Horizontal joints are found u/s and d/s	14 No. of grouting
BLK-29	621	661	NNW-SSE dip 70-80°E AFL-565.05-565.23	Jointed horn blend schist and gneissic quartz vein and four sets of joints are observed.	30 No. of grouting
BLK-30	661	682	NNW-SSE dip 65-75°E AFL-567.32	Foliated horn blend schist and chlorite schist with soft rock	22 No. of grouting
BLK-31	682	701	N10°E S10°W dip 60°E AFL-568	Horn blend schist, gneiss with quartz veins u/s and d/s	18 No. of grouting
BLK-32	701	736	N20°W S20°E dip 20°NE AFL-568.06-568.67	Foliated horn blend schist with two sets of joints as well as soft and hard chlorite schist	24 No. of grouting
BLK-33	701	736	N20°W S20°E dip 20°NE AFL-568.06-568.67	Foliated horn blend schist with two sets of joints as well as soft and hard chlorite schist	24 No. of grouting

Note: AFL = Average Foundation Level

Structural Condition Analysis of Upper Tunga Project:

At some places, in almost all blocks, the formation was showing warping along the foliation planes, which is found to be soft and fissile. Such pockets have been removed and backfilled with concrete before laying the cover-concrete layer.

The following sets of joints are found to be predominant in block No. 1 to 33

- ✓ N 25° W – S 25° E dip 80°-85° due east (Foliation Joint)
- ✓ N 65° W – S 65° E dip 45° due west
- ✓ N 20° E – S 20° W dip 15°-20° due west (Sub horizontal joints filled with clay material)
- ✓ NNW- SSE dip 50° – 60° NE
- ✓ N 60° E – S 60° W dip 60° due NW
- ✓ N 30° E – S 30° W dip 80° due South
- ✓ N 10° W – S 10° E dip 70° due West
- ✓ N 70° W – S 70° E dip 25° due NE
- ✓ N 60° W – S 60° E dip due South West
- ✓ N 25° W – S 25° E dip 80°-85° due east (Foliation Joint)
- ✓ N 65° W – S 65° E dip 45° due west
- ✓ N 20° E – S 20° W dip 15°-20° due west (Sub horizontal joints filled with clay material)
- ✓ NNW- SSE dip 50° – 60° NE
- ✓ N 60° E – S 60° W dip 60° due NW
- ✓ N 30° E – S 30° W dip 80° due South
- ✓ N 10° W – S 10° E dip 70° due West
- ✓ N 70° W – S 70° E dip 25° due NE
- ✓ N 60° W – S 60° E dip due South West

Detailed Foundation Block Map of Upper Tunga Project:

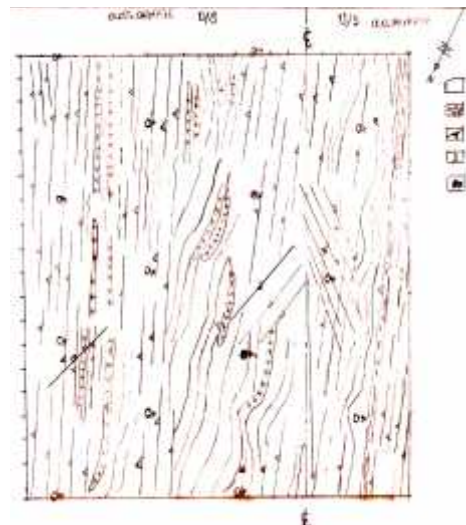


Figure 1: Foundation block map of Upper Tunga Project



Photograph 1: A View of Tunga Anicut open spillway



Photograph 2: A View of schistos rock formation excavation of right bank of UTP



Photograph 3: A View of schistos rock formation excavation of left bank of UTP



Photograph 4: A View of foundation basement structures of block-17



Photograph 5: A back view of Upper Tunga power block



Photograph 6: A View of Final Stage of UTP

Conclusion & Recommendation:

According to the Abutments (Foundation) the lower end of a reservoir is usually the most critical. Here, the water is impounded to the greatest height above the water table. Moreover, the natural wells of the reservoir generally have least thickness at the lower end. The thickness between the water table and water level in the reservoir, a steep hydraulic gradient away from the reservoir and leakage is normal. Therefore, above these conditions as good, but not effect to the Upper Tunga Project. The dam site area is geologically considered as granite-gneissic and domal structures, fresh and hard rock formations. Therefore, the stability of basement rock formation is strong from compressive strength for foundations construction and to predict the stability of the dam site as well as storage and load bearing capacity is holds good and in this study area there is no difference between horizontal and vertical displacement at dam site.

References:

1. Abraham Thomas, Sharma P.K., Manoj K. Sharma and Anil Sood (1999) Hydrogeomorphological Mapping in assessing groundwater by using Remote Sensing Data. A case study in Lehra Ganga Block, Sangrur Dist. Punjab, Jour, of Indian Society of Remote Sensing, Vol.27 No.1.
2. Akram Javed (2000), Geomorphological study of Bulandshahir district (U.P) using remotely sensed data. Tata energy research Institute (TERI), New Delhi, Journal of the Indian society of Remote Sensing, Vol. 28, No. 2 & 3.
3. Alam Singh: Modern Geotechnical Engineering 2nd Edition: CBS Publishers & Distributors (P) Ltd.
4. Krishnan M.S. 91982)., Geology of India and Burma 6th Edition., CBS Publishers & Distributors.
5. Rao, J.U. and Babu V.R.R.M (1995). A quantitative morphometric analysis of Gundalkamma River basin Andhra Pradesh. Journal of Earth Science Vol. 22 No.1-2, pp.74.
6. Serranu. A and C. Olalla (1999). "Tensile resistance of rock anchors "Jour – International Journal of rock mechanics and mining science, Vol. 36, pp. 449 -474.
7. Sharma S.K. and Seetharam A.N. (1981). Design of Dug wells in Hard Rock Areas, A Case Study in Karnataka State., Jour. of Geol. Soc. of India. Vol.22. No.3. pp 131-136.
8. Sheena V. Dev, M. Radhakrishna and C. Subramanyam estimate of Effective Elastic thickness along the South west continental margin of India using coherence. Analysis of Gravity and Bathymetry data-Geodynamic Implications, Jour. Geological Society of India. V-70, September 2007, pp 475 – 487.

9. Singh V.S. and Thangarrajan. M. (1998)., Estimation of parameter of crystalline rock Aquifers: A case study., Jour. of Geological Society of India. Vol. 52. pp. 333-336.
10. Singh. R.N. (2007), Modeling Erosion Induced Subsurface thermal changes and Tectonic considering. Vol 70, September, PP 489 – 498.
11. SOHAMS Foundations Engineers Pvt. Ltd. Soil investigations land, Marine, Micropiling, Rock Anchors, Drilling, Grouting and Ground improvements Geological exploration. Station plaza station Road Bhandup-78.
12. Sreedhara Murthy T.R. Sadatipour S.M.T. and Chandrashekarappa K.N. (1989). Morphometric analysis of Gangolli River basin, Karnataka. The Natl. Geographical Jour. of India. Vol. 35. pp. 213-221.
13. Sridharan and Prakash (1999) Seepage Consolidation Test for Soft Sediment Journal Geotechnical Testing ASTM, Vol, 22- No 3, PP 235-244.