International Journal of Computational Research and Development (IJCRD)
Impact Factor: 4.775, ISSN (Online): 2456 - 3137
(www.dvpublication.com) Volume 2, Issue 1, 2017

GEOLOGICAL CROSS SECTION OF UPPER TUNGA PROJECT (RESISTIVITY METHOD) AT GAJANUR, SHIMOGA DISTRICT, KARNATAKA

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Cite This Article: Dr. N. Venkatesh, "Geological Cross Section of Upper Tunga Project (Resistivity Method) At Gajanur, Shimoga District, Karnataka", International Journal of Computational Research and Development, Volume 2, Issue 1, Page Number 7-11, 2017.

Abstract:

The Present field investigation through resistivity sounding measurements were made 55 locations distributed approximately in 3 meters intervals pattern at the upper Tunga project, the resistivity sounding curves were first interpreted by the curve matching technique (Bhattacharya ad patra 1968). We have used four electrodes at equal distance along a straight line and electric current is passed between the outer two electrodes and is precisely measured by a millimeter, the potential difference between the inner two electrodes is measured using null point type of circuit from the data obtained the electrical resistivity is calculated. The vertical electrical soundings (VES) were performed in a shallow and depth subsurface condition by means of wenner's and schlumberger methods.

Key Words: Resistivity Survey, Vertical Electrical Soundings, Shallow Depth, Cross Section, Subsurface & Investigations.

Introduction:

The application of soil and rock mechanics, engineering geology and other related field's to be face problems of civil Engineering construction, mineral extraction and improvement of environmental standards.

The Dam of Irrigation, Hydro electrical power generation, Roads, Bridges and Tunnels a means of transport of vehicles to passes from one end to the other end, these civil structure have to be founded on soils and rocks in this problematic areas. The Dam site areas in vestigated through VES have been carried out which brings out the thickness of weathered and fractured zones as well as depth to the hard bed rock, The VES in the present study schlumberger configuration of electrical separation has been adopted. The soundings were carried out to get depth zone information at three meters interval.

Location of Upper Tunga Project:

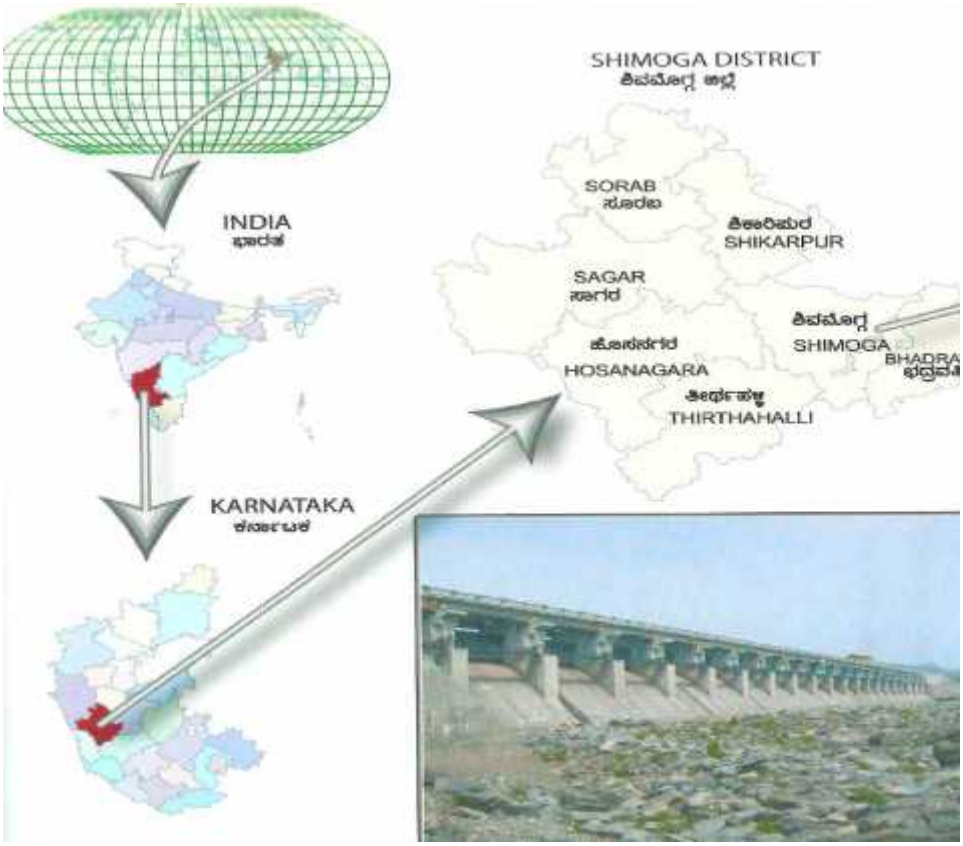

Figure 1: Location of Upper Tunga Project

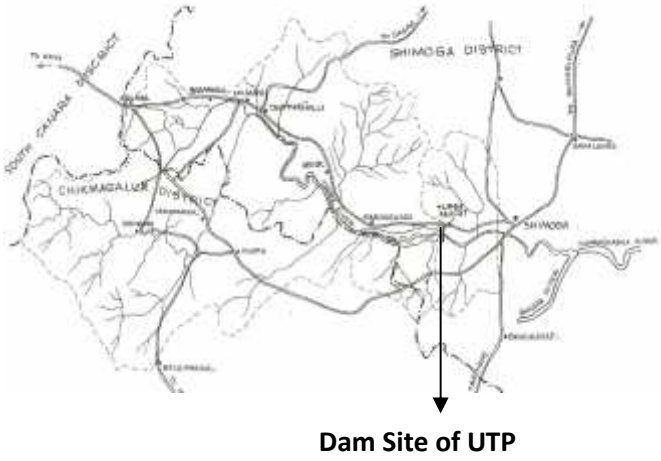

Figure 2: Dam site of UTP

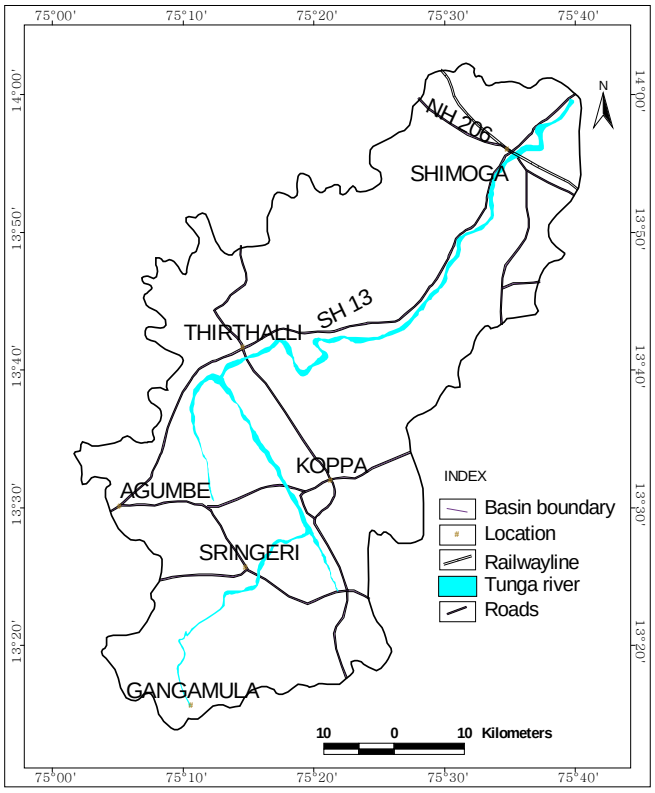

Figure 3: Location of Tunga River System

Resistivity Survey Results and Data at Study Area's:

Resistivity data obtained from these Vertical electrical Soundings are represented in the resistivity data sheets. The summary of these results are represented in the L-section.

Table 1: Resistivity Survey Data

VES No	Chainage (M)	Depth to Bed Rock	Remarks	Index
1	50.80	18.00	The rock is moderately fractured	RMF
2	60.00	12.00	The rock is moderately fractured	RMF
3	69.00	9.00	The rock is moderately fractured	RMF
4	79.00	15.00	The rock is moderately fractured	RMF
5	89.00	6.00	The rock is moderately fractured	RMF
6	99.00	6.00	The rock is hard	HR
7	108.00	6.00	The rock is hard	HR
8	118.00	9.00	The rock is hard	HR
9	168.00	6.00	The rock is hard	HR

10	178.00	6.00	The rock is hard	HR
11	188.00	6.00	The rock is hard	HR
12	194.50	9.00	The rock is hard	HR
13	200.00	6.00	The rock is moderately fractured	RMF
14	210.00	6.00	The rock is hard	HR
15	261.00	9.00	The rock is hard	HR
16	271.50	12.00	The rock is moderately fractured	RMF
17	281.50	9.00	The rock is moderately fractured	RMF
18	291.00	6.00	The rock is moderately fractured	RMF
19	301.00	6.00	The rock is hard	HR
20	311.00	9.00	The rock is hard	HR
21	321.00	7.00	The rock is moderately fractured	RMF
22	330.00	3.00	The rock is moderately fractured	RMF
23	340.00	3.00	The rock is moderately fractured	RMF
24	350.00	6.00	The rock is moderately fractured	RMF
25	360.00	6.00	The rock is moderately fractured	RMF
26	370.00	3.00	The rock is hard	HR
27	380.00	3.00	The rock is hard	HR
28	390.00	3.00	The rock is moderately fractured	RMF
29	400.00	3.00	The rock is hard	HR
30	410.00	3.00	The rock is hard	HR
31	420.00	3.00	The rock is hard	HR
32	430.00	6.00	The rock is hard	HR
33.	442.00	3.00	The rock is hard	HR
34	449.00	3.00	The rock is hard	HR
35	460.00	3.00	The rock is hard	HR
36	470.0	3.00	The rock is hard	HR
37	480.00	3.00	The rock is hard	HR
38	490.00	3.00	The rock is hard	HR
39	500.00	3.00	The rock is hard	HR
40	589.00	3.00	The rock is weathered below 12 m	WR-12
41	589.00	3.00	The rock is hard & weathered/fractured below 12 m	WR-13
42	609.00	3.00	The rock is weathered below 12 m	WR-12
43	619.00	3.00	The rock is weathered/fractured below 9m	WR-9
44	629.00	3.00	The rock is weathered/fractured below 9m	WR-9
45	639.00	3.00	The rock is moderately fractured	RMF
46	649.00	6.00	The rock is moderately fractured	RMF
47	659.00	9.00	The rock is moderately fractured	RMF
48	670.00	9.00	The rock is moderately fractured	RMF
49	680.00	15.00	The rock is hard	HR
50	690.00	18.00	The rock is moderately fractured	RMF
51	700.00	18.00	The rock is weathered & moderately fractured	RMF
52	710.00	15.00	The rock is weathered & moderately fractured	RMF
53	720.00	6.00	The rock is hard	HR
54	730.00	9.00	The rock is hard	HR
55	740.00	6.00	The rock is hard	HR.

Results:

- ✓ The rock types in the dam site area is chlorite schist. The schist is a part of Shimoga Schist belt and it is the northern extension of Bababudan Schist belt. Further downstream at some places gneisses and granitoids were exposed.
- ✓ The schist rock is represented by greenish-gery quartz chlorite schist /quartz chlorite biotite schist. The schist rock is fresh and hard with veins of quartz. The rock is the predominant type in dam site with granite and gneisses in few places.
- ✓ All along the centre line of the dam site, 63 boreholes were drilled and ciore logging was carried out by the Geologist of Department of Mines and Geology, Government of Karnataka
- ✓ The core recovery were good, mostly above 80 %.
- ✓ The Chlorite schist follows the trend of N 30 W – S 30 E.
- ✓ The schist exhibits minor folds.
- ✓ Near the Ch. 525 m ob n the centre line, the rock shows shear joint trending NW-SE and N20 W – S 20 E with a dip of 70 SSW.

Geological Cross Sections of Upper Tunga Project:

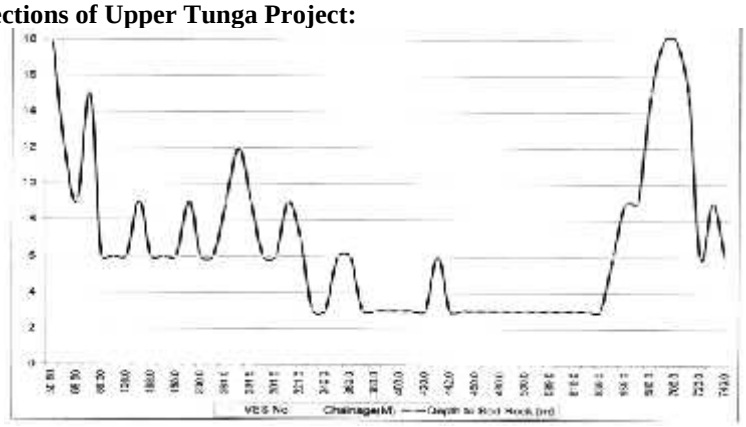

Figure 4: Geological – L Section Based on Geophysical Survey Result (Resistivity)

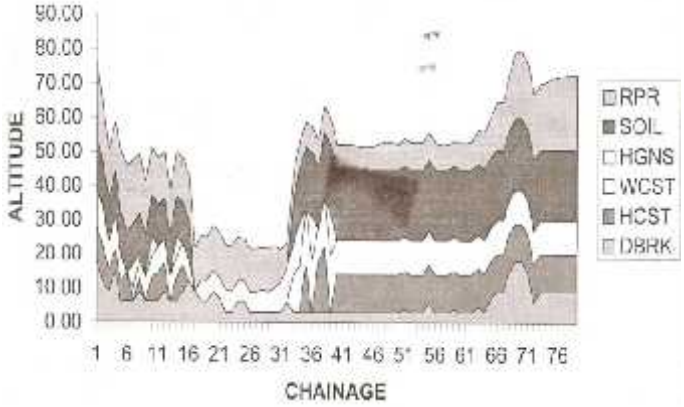

Figure 5: Geological Cross Section of Upper Tunga Project

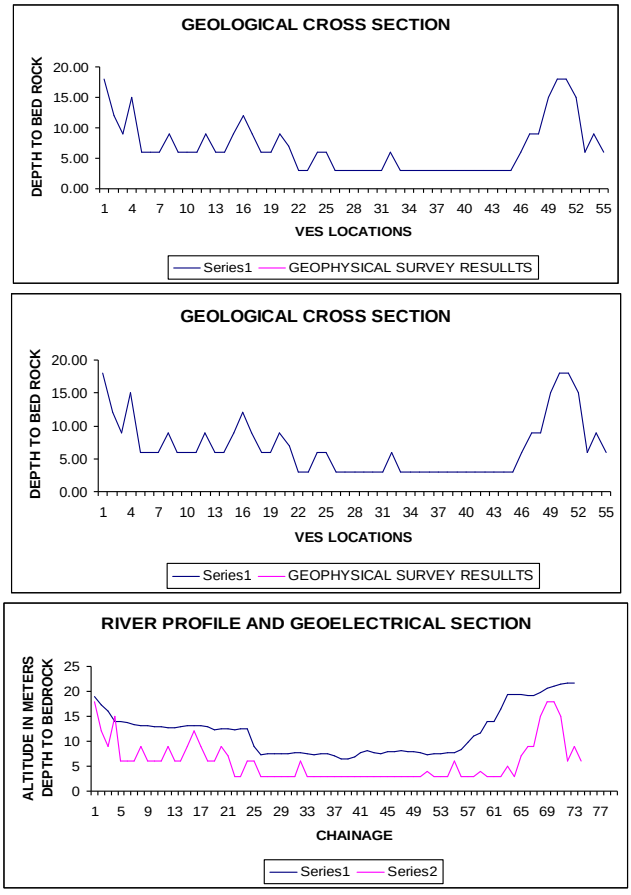

Figure 6: Geological Cross Sections of Upper Tunga Project

Conclusion & Recommendation:

According to geophysical (Resistivity) survey results, the depth to bedrock is varies between 3.00 m and 18.00 m and the rock type in the dam site area is chlorite schist and further downstream at some places gneisses and granitoids were exposed. The schist rock is fresh and hard with veins of quartz. The chlorist schist trend of N 30°W-S 30°E, the schist exhibits minor folds. According to geophysical (Resistivity) surveys are interpretation by the Vertical Electrical Sounding and structures, rock formations are not affected to the foundation basement construction of Upper Tunga Project. Therefore stability of basement of rock formation is strong, load bearing capacity is holds good and in this study area is no difference between horizontal and vertical displacement at dam site.

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