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"Soil Testing and Design of Embankment for Vrishabhavathi River Bank"

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ABSTRACT

River bank erosion is one of the major natural disasters in all parts of India. In order to ascertain the erodibility of the bank soil characterisation of geotechnical properties of the bank soil is carried out. In this project the designing work of the embankment is completed. This includes the designing work for compound wall, stone soling and toe concrete. The final designing work is carried out after detailed laboratory test results and analysis. The soil characteristic, designing of compound wall and toe concrete for the river embankment is studied in this work. In order to predict the land terrain and surveying work is done and the contour is prepared. With all the information in hand, the final estimation of the project is completed.

I.INTRODUCTION

River training is an age old practice resulting in incessant development and application of human ingenuity to correct vagaries of the rivers. It requires deep and precise study of river mechanism and behavior discussed heretofore. River training has assumed considerable significance in India due to huge annual recurring damage caused by the floods. River training, in its broad aspects, covers all engineering works constructed on a river to guide and confine the flow to the river channel, and to control and regulate the river bed configuration for effective and safe movement of floods and river sediments. In essence, river training envisages training and stabilizing a river within a suitable waterway and along a certain alignment for a variety of purposes.

OBJECTIVES OF THE PRESENT STUDY

• To guide the axis of flow at ordinary and low stages and safe passage of floods without overtopping the banks.

• To protect the banks from erosion and generally improve their alignment by stabilizing the river channel.

• To train the river flow along a safe course, thereby avoiding damage by flooding or erosion of valuable lands, habitation, crops, factories, etc..

• To prevent outflanking of a bridge, barrage or weir by directing the flow in a defined stretch of the river.

• To prevent river from changing its course.

• To confine a river channel this has become too wide by swinging from side to side and to reclaim the land from river bed.

• To check certain devastations like that of flash torrents.

• To trap bed load in areas of superfluous width.

II.METHODOLOGY

2.1. SOIL TESTING

Compaction test: This laboratory test is performed to determine the relationship between the moisture content and the dry density of a soil for a specified compactive effort

TABLE1 COMPACTION TEST RESULTS

Sl no.	particular	1	2	3	4	5
1	Water Content w %	7.76	8.33	8.8	11.87	12.5
2	Dry density (g/cm3)	1.875	1.951	1.995	1.944	1.932

2.2Atterberg limits- The Atterberg limits are a basic measure of the critical water contents of a fine-grained soil: its shrinkage limit, plastic limit, and liquid limit.

2.3Results:

1) Plastic limit- The soil could not be rolled into 3mm thread because it was an filled up soil and it is not fit for the construction work.

2) Liquid limit- The Liquid Limit for the soil could not be determined because of the soil being a filled up soil.

For the stabilisation of the VRISHABHAVATHI RIVER bank for stretch of 392.5m, following steps were adopted

1) Surveying.
2) Soil testing by compaction and Atterbeg's limit.
3) Designing of the compound wall with the stone soling
4) Finally, the designing of toe concrete.
5) Estimate of the structure with the final design work.

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III. DESIGN WORK

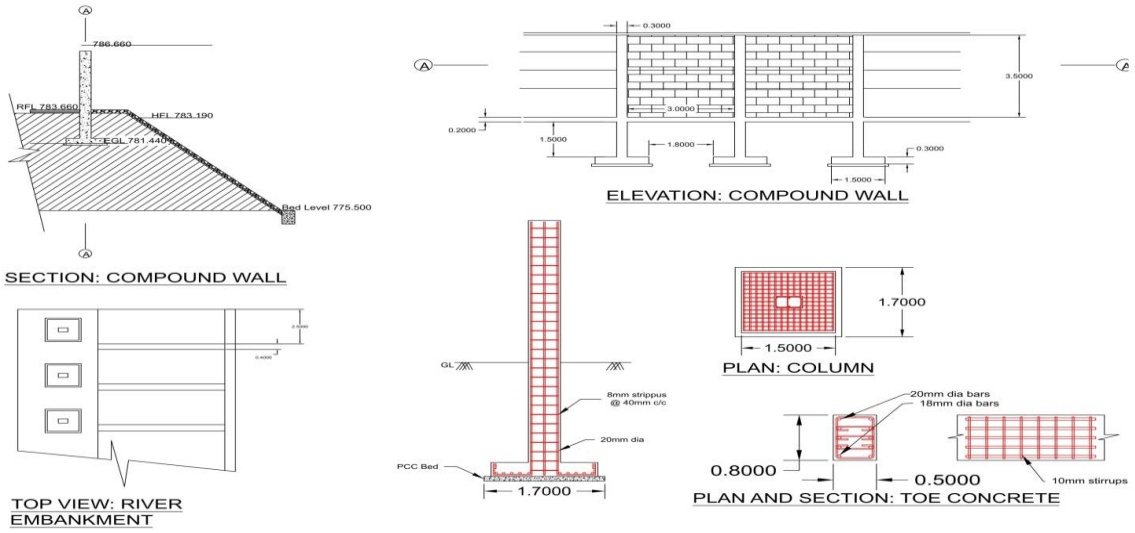

Fig 1: Embankment Design Details

IV.ESTIMATION

Before undertaking any project it is necessary to calculate the probable cost, because the customer one who approaches for any project will ask for probable cost so that they can check whether the total cost lies in their budget.

4.1For Compound Wall:

SL no.	item	No.	L	B	D	Qty (m^3)
1	Excavation	1	392.5	1.7	1.9	1267.77
2	PCC	119	1.7	1.7	0.1	34.391
3	SSM	119	1.5	1.5	0.3	80.325
4	Pre slab	119	0.3	0.45	5.2	83.538

4.2For Embankment

SL no.	item	No.	L	B	D	Qty (m^3)
1	Excavation	1	392.5	1.7	1.9	1267.77
2	PCC	119	1.7	1.7	0.1	34.391
3	SSM	119	1.5	1.5	0.3	80.325
4	Pre slab	119	0.3	0.45	5.2	83.538

V.CONCLUSIONS

•Soil testing was performed in which the bore details provided by the external agency shows that the first 4m of the soil below the GL was completely a filled up soil. So there was a need for soil replacement.

•Also the Atterberg test results were unacceptable since the soil was a filled up soil. Thus, there was need for the soil replacement.

•The designing work for the toe concrete, column and the compound wall were drawn according to the BWSSB standards.

•Finally, the estimation work for the compound wall and the embankment was conducted.

•This project work taught us to tackle with several problems related to River Training Work and how to design various elements in a cost effective manner.

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