Scheming and Estimation of High Level Bridge

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Abstract: Our project deals with high level bridge in Medak district which is going to be constructed at km 4/0-4 on Nizampet X road to Kalher road. While the existing bridge is not capable to offer highest flood level and gets submerged during floods, thus a high level bridge is designed. We require designing bridge, characteristics of preferred bridge, site details, and hydraulic particulars. The design of the bridge is determined by means of type of bridge which is being constructed. The high level bridge can carry the roadway above highest flood level of channel and it is moreover for free flow of traffic. It offers the transportation means among two villages which is constructed above an obstruction. The catchment area is 151sq. km as well as it completely deals with designing of abutments, piers, bed blocks as well as wing walls and moreover includes estimation as well as costing of high level bridge. Bridge estimation can be made following its completion of design and so on and the proposed high level bridge is designed to be cost-effective in all aspects.

Keywords: High level bridge, Traffic, Floods, Roadway, Cost-effective, Piers, Abutments, Bed blocks.

INTRODUCTION

Our project is located within medak district containing 151sqkm catchment area of high level bridge. The streams join nalla cheruvu within medak district connecting nijampet X road towards kahler road and includes 6 vents with 10.42m width as well as length of bridge is 63.14m. The bridge which is proposed connects nizampet X road in the direction of kalher road. The road crosses stream next to ramchander tanda village and start near nagalgidda villages of medak district. Our project deals with construction of bridge portion which is 6 vents of 10m efficient span without footpaths. As per design values as well as the estimated values of project, it is said to be constant enough to assure design period and moreover capable to endure future traffic flow effortlessly. Forming of methods as well as laying of crust and provision of longitudinal sections. During the investigation of soil, drilling four boreholes at projected location as said by direction and collecting soil samples as well as implementing applicable laboratory tests on soils and rocks. Perform standard penetration test within borehole at each of the 1.5m depth interval [1]. In the preparation of geotechnical investigation report, the field work includes drilling of boreholes within soil and rock. Rotary drilling was adopted for cleaning out borehole in overload soil among sample intervals. Standard penetration test is performed at each 1.5m interval. Bentonite slurry is employed for stabilization of borehole. The speed of drilling at various depths, color of return water, water loss were constantly recorded.

Observations were made for ground water in borehole during and after boring. Observed ground water table is also to be recorded. On the basis of field as well as laboratory test results sub soil profile is determined. On basis of sub soil profile in addition to type of construction at projected high level bridge shallow foundation can be implemented. In sandy soils angle of internal friction $\phi$ is determined by means of typical penetration test. The $\phi$ values are utilized for critical bearing capacity of soil.

DETAILS OF BRIDGE STRUCTURING

The bridge alignment projected is on upstream of existing bridge by normal crossing to the flow. The design of bridge is determined by type of bridge which is being constructed. The proposed high level bridge can carry the roadway above highest flood level of channel and it is moreover for free flow of traffic. There are two curves on any side of
bridge by deflection angles of 41 as well as 37 degrees. The bridge location is within chainage of km 4/0-4 on road from nizampet X road in the direction of kalher. ABUTMENTS: open foundation is considered in VCC M20 by skin reinforcement of #8 @200mm C/C. PEIRS:open foundation is considered in VCC M20 by skin reinforcement of #8 @200mm C/C [2][3]. WINGS : return walls are projected in VCC M20 by skin reinforcement of #8 @200 mm C/C. In substructures, ABUTMENTS : wall type abutments are projected in VCC M 20 by skin reinforcement of #8 @170mm C/C. PEIRS : wall type piers are projected in VCC M20 by skin reinforcement of #8 @170mm C/C. WING WALLS : return walls are projected in VCC M20 by skin reinforcement of #8 @170 mm C/C. In provisions of Sub structure provisions: Bearings are not required or else only craft paper has to be provided. Weep holes, filter, are proposed as stated by IRC 78-2000. Provide quadrilateral revetment of 3.0 mts thick above filter media of 0.15 mts for quadrants [4]. Grouted toe wall 0.6 mts width intended for supporting for revetment at bottom. In super structure: RCC deck slab superstructure of 10 mts efficient span devoid of foot paths in VRCC M30 grade are offered as per drawing no. SD/114. In the provision of super-structure, mastic pads expansion joints are used. Wearing coat: projected as per SD/103&101 by VRCC M30 of uniform thickness 75 mm from kerb to centre of C/W. Approach slabs: for devoid of footpaths, approach slabs for 3.50 mts length of constant varying thickness by 300mm thick @ edges as well as 435 mm thick @ C/C is projected as per SD/104 in VRCC M30 concrete. Crash barriers are offered by M40 grade concrete. Drainage spouts: proposed as stated by SD/103. The skin reinforcement is proposed as said by clauses in IRC: 78-2000 [5][6]. The skin reinforcement projected for VCC structures are #8 & 170 mm C/C- for sub structure and #8 & 200mm C/C for foundation in both top as well as bottom.

**ESTIMATION**

There are two types of estimates which are performed to get hold of accurate values for the project. It is essential to perform process exactly to get an estimate regarding materials necessary in terms of quantity as well as cost incurred for necessary quantity of the materials. An estimate provides an idea of quantity as well as price. The two types of estimates are abstract estimate and detailed estimate. As per design values as well as the estimated values of project, it is said to be constant enough to assure design period and moreover capable to endure future traffic flow effortlessly. On the basis of L.S submitted along the SE/MEDAK projected alignment, the approaches straight away after 15.00 mts straight portion are listed such as: Nizampet X road side-182.00 with levelled ground, Kalher side-252.00 mts with levelled ground. The items specifications projected within this sub-estimate are Embankment formation. Provision of granular sub base grading - VI 200 mm thick, Wet mix macadam 250 mm thick. Providing single coat prime coat using slow setting bitumen emulsion and providing BC of 40 mm thick. The L.S provisions that are offered for approach are Provision of VAT@5%, provision for caution boards, Name boards etc. as well as unexpected items & rounding off. While the approved bridge is on the U/S side of existing bridge, it is utilized for diversion of traffic during implementation of proposed HLB work. An L.S. amount is projected in the direction of dismantling of existing slab culvert within general abstract. The estimate quantities are considered on the basis of accepted designs and drawings as well as specifications for bridge work are framed on the basis of specifications for road and ridge works Fifth revision of MORT&H. The rates that are adapted in the estimate are on the basis of following such as: labour and material rates and conveyance charges are implemented on the basis of general schedule of rates for the entire engineering departments for year 2015-2016 accepted by board of chief engineers. Data is based on standard data book in support of analysis of rates published by MORT&H; with fifth revision MORT&H specifications are implemented. The costs of material, labor as well as hire charges for plant and machinery are implemented. The following leads intended for transportation of materials from quarry to site as implemented in original telangana estimate are regarded for metal aggregate, gravel, bitumen and sand lead is implemented.

**METAL HBG**

<table>
<thead>
<tr>
<th>16.50 KMS</th>
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<tbody>
<tr>
<td>MANUFACTURED SAND</td>
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<tr>
<td>16.50 KMS</td>
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<tr>
<td>SAND FOR MORTAR &amp; CONCRETE</td>
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<tr>
<td>34.0 KMS</td>
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<tr>
<td>SAND FOR FILLING</td>
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<td>1.0 KMS</td>
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<td>GRAVEL</td>
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<td>9 KMS</td>
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<td>SELECTED EARTH</td>
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<td>5 KMS</td>
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<tr>
<td>BITumen (one way)</td>
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<td>683 KMS</td>
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</tbody>
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The lead and conveyance charges of metals are implemented for manufactured sand. For filling, sand lead is accepted as 1.00 km for rate analysis of sand filling used for foundations. Costs of cement, steel were accepted as per G.O Rt. No. 540. Rates of bitumen as well as medium setting bitumen emulsion are accepted. Over head charges of 20% in favor of bridge items and 5% road items as well as contractors profit 10% are offered within the estimate. The work was carried out as per approval, designs as well as drawings, MORT & H specifications, IRC and IS codes.
CONCLUSION

A high level bridge is constructed as a replacement for existing bridge. The proposed high level bridge includes 6 vents having efficient span of 10mts, a width of 10.42mts as well as length of high level bridge is 63.14 mts, which assures traffic flow as well as design period of 100 years. This bridge is communication link among two villages that begin from Nizampet “x” road and ends at kalher road. The high level bridge is designed to be cost-effective in all aspects. By this bridge construction flood flow will be free devoid of any obstruction because of improved vent spacing that offers enough waterways and decrease scour depth by means of smooth flow of water thus, increasing lifetime of the bridge.

REFERENCES

[1]. IRC 5- STANDARD SPECIFICATIONS FOR GENERAL FEATURES OF DESIGN FOR ROAD BRIDGES.
[2]. IRC6-STANDARD SPECIFICATIONS FOR LOADS AND STRESS FOR ROAD BRIDGES.
[3]. IRC 21- STANDARD SPECIFICATIONS FOR CEMENT CONCRETE FOR ROAD BRIDGES (PLAIN AND REINFORCED).
[4]. IRC 78- STANDARD SPECIFICATIONS FOR FOUNDATIONS AND SUB STRUCTURE FOR ROAD BRIDGES.
[5]. MINISTRY OF ROAD TRANSPORT AND HIGHWAYS (MoRT&H) SPECIFICATIONS 304, 1500, 1700, 2100, 2200 (FIFTH REVISION)
[6]. STANDARD DRAWINGS FOR ROAD BRIDGES.

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