RENOVATION OF CAUSEWAY AT POOLAMBADI IN PONNERI LAKE

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ABSTRACT

In this fast moving and developing world, people migrate from place to place for their work. In rural areas, not having any structure across a river for the purpose of migration from one place to another place. The bridge construction should not be adopted in every villages because of the low velocity flow and economy. From past studies in rural places cause way is enough . So, The design of cause way is adopted for our project. Here, The taken location is to renovate the damaged cause way due to the heavy flood level and over traffics.The project successfully completed by renovation of cause way design at Poolambadi in Ponneri lake.Thus to satisfy their basic ecnomical needs we have planned for our project to renovation of Causeway at Poolambadi in Ponneri lake . The Causeway consists of a 14 numbers of piped transmitters. This Causeway have a vents for flow of water through the pipe transmitter for normal usage. The length of Causeway is 30m and width of Causeway is 2.5`m. In our project, design and estimation is carried out. Design is done as per **IS: 458-1971** for wheel load, strength factor and earth fills. The project mainly deals with the renovation of piped Causeway in rural area. The plan of the project has been drawn by **AUTO CADD**.

INTRODUCTION

In our project, design of causeway at poolambadi in ponneri lake is designed. The causeway is located on "Resource city of Tamilnadu",Perambalur. The causeway is a type of small bridge like structures which is raised road or way across wet ground or water. It may or may not have opening or vents for low water to flow. A road causeway is paved dip which allows floods to pass over it. It is raised path or road crossing, water, marshland, sand etc.the main aim of investigation is effective of way of designing the causeway. The data related to causeway design is collected from PWD for the area poolambadi which is located on perambalur district.

TYPES OF CAUSEWAY

- Flush Causeway
- High Level Causeway
- Vented causeway

FLUSH CAUSEWAY

A flush causeway is a low level causeway.If a causeway has not vent to flow the water then it is called low level causeway. It is also known as "**Irish bridge**". The bed of small rivers or streams or lakes which remains dry for most of thes year or generally passable without a bridge. This involves heavy earth work in cutting for bridge approaches. For streams or rivers or lakes in plains having sandy beds, It is often sufficient to laybundles of grass over and across the sandy tracks.For crossing the important traffic it is essential to lay a metal on paved or concrete road.To prevent against possible scour and under mining a cutoff or drownoff wall usually 60Cm deep on upstream side and 120 to 150 Cm on downstream side is provided. For steep banks the roadway is carry across the stream at high level than the bed level. In this case masonry construction equal to the width of the route of desired height may be provided.The wearing surface is provided over the filling in this case an apron of concrete or masonry should be provided on the downstream side to guard against scouring action.

HIGH LEVEL CAUSEWAY

A High level causeway is submersible road bridge designed to be over toped in floods Its formation level is fixed in such a way as not to cause interruption to traffic during flood for more than three days at a time nor for more than six times in a year.They are provided with abutments and piers, floors and slabs or arches to form the required number of openings. The slopes of approaches is kept as 1 in 20. When velocity is high and stream bed is soft the apron could be of concrete or harder masonry upto a certain distance similarly the road can be formed of cement concrete slab or stone blocks set in cement mortar. A sufficient number of openings are provided to allow the flood discharge to pass through them with the required clearance. Temporary cause ways which are used for an emergency military operation are formed either by using timber stringer and planking over cribs used as piers by constructing a Culvert using pipes. Bed level causeway are provided where period of interruption to traffic at a time does not exceed 24 hours in cause of hill road.It should have the vents to flow the water. It will be provided on water flow below the 0-6 cumec/sec.

PARTS OF CAUSEWAY

- Deck slab
- Bedding
- Vents
- Base course
- Apron wall
- Upstream wall

FACTORS INFLUENCE OF CAUSEWAY

- Number of interruption
- Duration of interruption
- Type of flow
- Type and amount of traffic
- Importance of road

CULVERT

Culvert is defined as a small bridge which is totally enclosed and used to convey runoff from one side of the road to another and are usually covered with embankment and composed of structural material around the entire perimeter, although some are supported on spread footings with the stream surveying as bottom of the Culvert. For economy and hydraulic efficiency, Culvert should be designed to operate with the inlet submerged during the flood flows, if

conditions permit. Cross drain are those Culvert and pipes that are used to convey runoff from one side of highway to another.

4.2 TYPES OF CULVERTS

- Arch Culvert
- Slab Culvert
- Pipe Culvert
- Box Culvert
- Steel Girder Culvert

The above charecteristics culverts are explained briefly with the picture as follows.

ARCH CULVERT

Arch Culverts are constructed economically for short spans of 2 to 3m. the arch Culverts may be constructed in stone masonry brick masonry. This Culverts mainly consists of foundation, abutments, wingwalls, arch and the parapet. If the soil is poor and there is likelyhood of scouring, floor and curtain walls are provided. Spandrel filling is done with lime concrete.

PIPE CULVERT

Minimum 5 numbers of pipe Culvert of each having section 2.3m width and 2.3m height are provided at central portion of the causeway.The section and reinforcement details given in the IRC:SP-20 are adopted. Approach slab for a length 3.5m behand the abutments for full formation width is proposed width M25 grade RCC as per IRC:SP 20.

SLAB CULVERT

The slab Culvert consists of stone slab or R.C. slab suitably supported on masonry walls on either side. The stone slab Culvert are suitable number of span upto 2.5m. R.C slab Culverts are suitable number for span upto 6m. R.C. slab Culverts are used for highway are railway bridge.

PIPE CULVERT

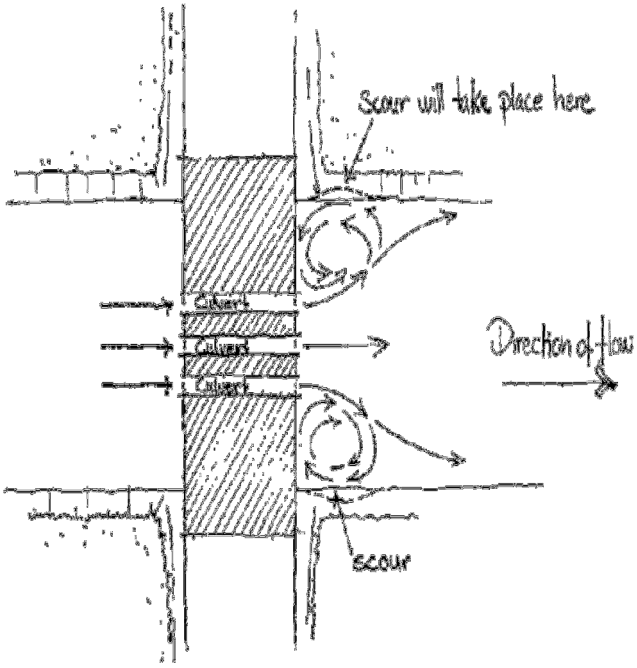
Pipe Culvert are used where depth of flow and discharge are small. These are easily constructed. The roads may be provided with pipe Culvert by simply laying the R.C.C. or hume pipe in the position and filling the soil, compacting it and constructing the road over it. The exact number and diameter pipes are determined by the maximum discharge which will pass through thus Culvert and height of the embankment of the road

BOX CULVERT

These Culverts mainly consists of one or more number of square or rectangular openings for passing the water from one side to other. These Culverts are constructed in masonry or reinforced cement concrete. But R.C.C. box Culverts are very common. They may be precast or cast-in-situ construction. These Culverts are used where the bed has soft soil and there is possibility of scour.

Water through the Causeway

High level Causeway



CAUSEWAY PARTICULARS

S.No	HYDRAULIC DETAILS	PARTICULARS
1.	Name of Tank	Poolambadi Ponneri
2.	Name of Taluk / District	Veppanthattai / perambalur
3.	Registered Ayacut	Joint ayacut with chitteri 137.52 Ac
4.	Capacity of Tank	6.78 mcft.
5.	Water spread Area	2.00 m.Sq. ft.
6.	Length of Bund	927m
7.	Width / Side Slopes of Bund	2.00m F:$1^{1/2}$:1 R:2:1
8.	No. of weir / Type	2No.
9.	Length of Weir	15.24m
10.	No. of Sluice / Type	1Nos.
11.	Sill level of Sluice	164.82
12.	FTL in m	167.920
13.	MWL in m	168.260
14.	TBL in m	169.760
15.	Free catchment Area in Sq. mile	1.26 Sq miles
19.	Total Yield	591 C/S
20.	Length Anicut	Keravadi Surplus
21.	Length of Supply channel	1950m
22.	Breadth of supply channel	3.00m
23.	Latitude – Longitude	11^{o} 24' 25" - 78^{o} 42' 30"
24.	No. of Fillings	1.5

CAUSE WAY DETAILS

Locatoin : Poolambadi

Type of road : Nabard/rural roads.

Improved year : 2005-2006.

Type of Culvert : Pipe Transmitter.

Type of soil : Clay soil.

Number of pipes : 14 Nos.

Diameter of pipe : 750mm.

Width of causeway : 28.50m.

DESIGN OF CAUSEWAY

Datas

Maximum flood level = 168.26 m^3/sec

High flood level = 169.23m^3/sec

Discharge through the pipe Culvert
= 1.57m^3/sec

Velocity of flow through pipe
= 2m/s

Length of Causeway = 30 m

Width of Causeway = 2.5m

Top width of embankment
= 1.5:1

Diameter of pipe = 0.9m

Diameter of pipe Culvert

Adopt NP-3(R.C.C heavy duty non pressure pipe for carrying heavy road traffic. From IS 458 -1971)

Internal dia = 900mm

External dia = 1100mm

Load due to earth fill

Height of embankment over pipe = 2

From the IS 458-1971 for d=900mm, H=2m

load due to earth fill = 58.7 kN/m

Load due to IRC Class AA Wheel load

Wheel load = 62.5 Kn

Loading on pipe = 10.875 kN/m

Check for strength factor

Three edge bearing strength for NP-3 class 900 mm Dia pipe is 111 kN/m

S.F = 0.879

The strength factor for first class bending is 2.3 and for concrete cradle building is 3.7.

Reinforcement in pipe

According IS 458-1971

For Spiral reinforcement –Permissible stress = 140 N/mm^2 = 44 kg

For longitudinal reinforcement – Permissible Stress= 126.5 N/mm^2 = 5.80 kg

Using 10mm Dia bar at 60 mm c/c spacing

Number of spiral in 1m = 16 nos.

Estimate For Causeway

The Abstract Estimation has been done by the Long Wall Sort Wall Methods.

S. No	PARTICULARS	QUANTTY (Cu-m)	RATE in Rs.	COST in Rs.
1.	Earthwork in excavation	130.35	350 per Cu m	45622.5
2.	Cement concrete 1:4:8	89.74	300 per Cu m	26922
3.	First class brickwork 1:6 cement sand motar	60.9	340 per Cu m	20706
4.	Cement pointing 1:2 above ground level	165	5.6 per Sq m	924
5.	Hume pipe heavy type 900mm Dia	35	140 per m	4900
	Total			99074.5

Total

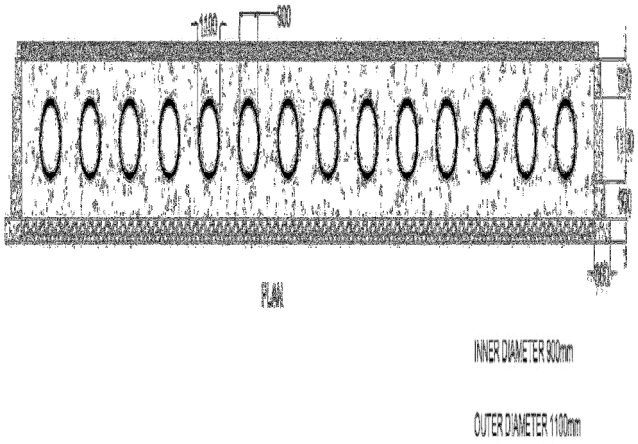
= Rs. 99074.5

Add 5% for contingencies and work charged

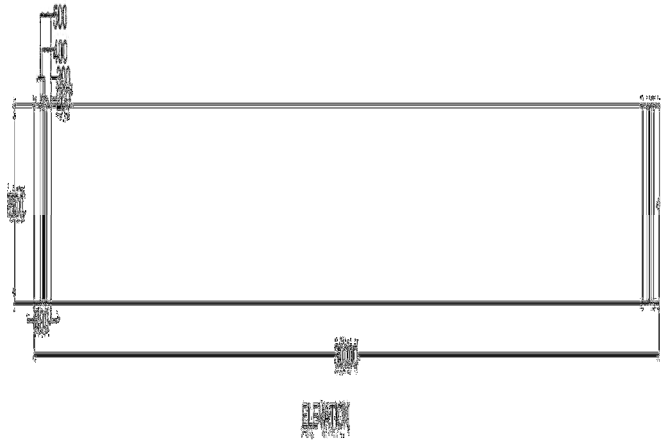
= Rs.4953.725

Grand total = Rs.104028.225

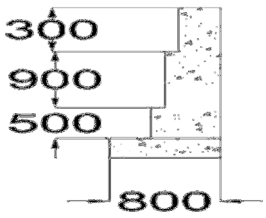
PLAN FOR CAUSE WAY



Plan For Causeway



ELEVATION OF CAUSEWAY



FFOOTING

CONCLUSION

- In this project we have successfully made an attempt for "RENOVATION OF CAUSEWAY AT POOLAMBADI IN PONNERI LAKE".
- The plan has been drawn using AUTO CADD.The causeway has been designed as per IS 458-1971.
- The design has been done manually using limit state method.Necessary drawings are also attached properly.
- The low level causeway is efficiently converted as high level causeway due to flood level.
- The design of causeway is economical in both cost and design wise.In rural areas the requirements of steel (or) concrete bridge is not necessary due to less population and industrialization.
- In future, the low level causeway can be completely eliminated due to adverse flood condition, rapid development of population and industrialization.

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