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Road Blockage Due To Flood Condition

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Abstract - *The purpose of this document is to provide guidance for road authorities and other relevant bodies in respect of road drainage. One of the problem comes in flood condition that is road get blocked due to presence of flood water on the road especially near the river and canals. Most of the brides have provided distinct height more than maximum flood level but approach road connected to bridge are not provided desired height mostly. Hence road comes under water though the bridge is as it is.*

Key Words: Flood condition, Bridge height, Road blockage.

1. INTRODUCTION

The flood condition faced by south Maharashtra in India at July 2019 realizes us that most of the roads are blocked and transportation get stopped which leads traffic problems. One thing comes in observation that roads are blocked near the river side area because the flood water comes on the roads from the approach sides of road. The roads on the bridge was remains at higher level than flood because desired height was provided to the bridge more than maximum flood level but it was not provided to the road attaches the bridge . So water spread in nearby area and comes on the approach road and resulted in the blockage of road. Such condition found in Kolhapur, karad, and also on other sub roads.

2. OBJECTIVE

- To prevent flooding of the road and surface.

- To prevent traffic problem during flood condition.

- To avoid the erosion of side slope.

3. METHODOLOGY

1. Surveying
2. Collection of past history
3. Traffic effect during flood blockage
4. Comparison of pavement height with the consulting bridge.
5. Suggestion for design of Pavement height
6. Problem statement
7. Scope of work

4. TYPES OF SYSTEM

For such study we consider the following more specific factors to design storm and flood water

- Highway type
- Traffic volume
- Design speed
- Local standard

The another geometric and design feature of the highway also affect the spreading of water which are given bellow

- Longitudinal slope
- Number of lanes
- Parking lanes
- Width of shoulder
- Height of embankment
- Height of curb and dike

5. LITRATURE REVIWE

The floods in six districts of Western Maharashtra affected over 4.24 hundred thousand people. About 4, 00,000 people were evacuated and 30 people died in the rain-related incidents. The government announced the flood relief compensation of Rs 15,000 to each affected family in cities and Rs 10,000 in villages. The flood gates of Almatti dam were opened and the NH 4 (Mumbai-Bangalore National Highway) was closed after landslide stranding about 18,000 vehicles on highway.

70 teams comprising NDRF, Navy, Coast Guard, and State Disaster Response Force (SDRF) personnel were deployed.

It was the second-heaviest rainfall in Mumbai in the last 25 years, according to a tweet by Maharashtra's chief minister, Devendra Fadnavis.

Maharashtra has a huge & heavy rainfall in 2019, Affected district Kolhapur, Sangali (which was the worst), Satara, Thane, Palghar and Pune.

Ref. "Monsoon mayhem: Over 50 killed as 9 states face flood fury, red alert in Kerala". *India Today. 10 August 2019*. Retrieved 10 August 2019.

6. DESIGEN CONSIDERATION

The diagram fig 1.1 shows the normal condition of the river and bridge. At the time of construction of the bridge care should be taken in designing of height of bridge by considering the all necessary point regarding it such as maximum flood level, traffic volume, and rain fall intensity.

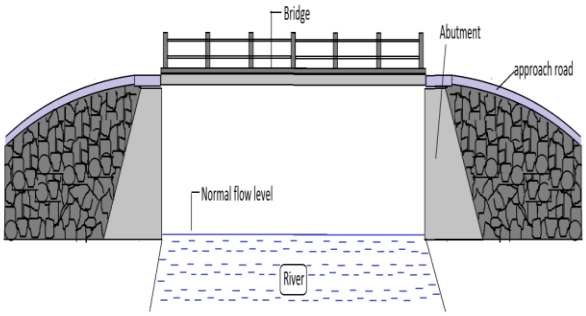

Fig 1.1 Normal condition of River

There for we observe that bridge deck remains safe during flood condition .Its due to its desired height but the approach road connect to bridge is mostly not made in such precautions .Hence it is seen that approach road comes under water before bridge and ultimately road get blocked. The diagram fig 1.2 shoes such condition

To solve this problem I suggest two ways first is to elevate the approach road at list to height of bridge for distance 1km from the bank of river and second is to construct embankment at the both end of bridge. Here I discus first point which is to elevate the approach road.

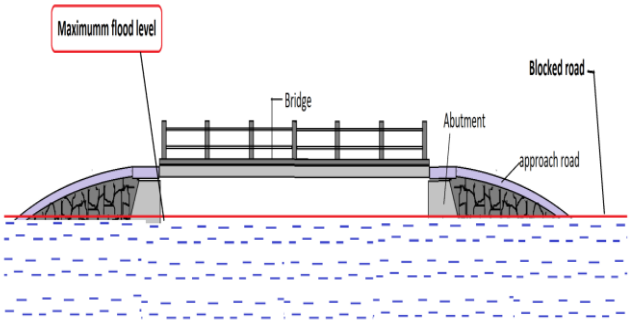

Fig 1.2 Flood Condition of river

7. METHODOLOGY

7.1 Surveying

Fig 1.3 Krushnna Bridge Rethare BK

This image is of the bridge belong to village Rethare BK, Tel.Karad, Dist. Satara, Maharashtra ,India Bridge name is Krushnna Bridge fig no 1.3 which shows the normal condition of krushnna river.Bridge height is 10 mtr. Width is 6 mtr and length is 100 mtr. Approach road at village side is at low level then the bridge about 2 mtr.

Fig 1.4 Krushnna Bridge during Flood

Fig 1.4 shows the bridge situation during flood as the approach road towards the village is at low level than the bridge therefore the approach road comes under water before the bridge and accommodation get stopped. The emergency services cannot be possible which create sever condition.

7.2 Traffic effect during flood blockage

This bridge is main link between other small villages viz. Rethare khurd, Atake, Vathar, Jadhav mali, Belawade BK, Kalavde ,Kale etc. to the Krushnna Sugar Factory, Shenoli Railway station during rare flood condition this road get blocked and communication among this villages get stopped. Cannot even provide emergency medical services.

7.3 Calculation for approach road

DESIGN STANDARDS FOR ROADS

7.3.1 Horizontal Alignment

The essential elements of the horizontal alignment are as under:
a) Radius of the Horizontal Curve
b) Super elevation
c) Transition Length
d) Sight Distance
The basic considerations for the horizontal alignment will be as under:

1) The curves will be designed to have the largest possible radius and in no case less than the minimum value corresponding to the design speed.
2) Sharp curves will not be introduced at the end of the long tangent.
3) Long Curves with Suitable Transitions will generally be provided.
4) Reverse Curves will be avoided as far as possible.
5) Horizontal Alignment will be coordinated well the vertical alignment.

7.3.2 Transition Curves

The minimum length of transition curve will be determined from the following two considerations and the larger of the two values will be adopted for design:

i) Rate of Change of Centrifugal Acceleration
Ls =0.0215 V3 /CR
Where:
Ls = Length of Transition Curve in meters
V = Speed in Km/hr
R = Radius of Circular Curve in meters
C=80/ (75+V) (Subject to a maximum of 0.80 and minimum of 0.50)

Our observation results gives the value V= 60 km/hr max , R = 55 m
Now C= 80/ (75+V)
= 80/(75+ 60)
=0.59
Ls = 0.0215 x 603/(0.59x55) =143.11 m

ii) Rate of Change of Super elevation should not be such as not to cause discomfort of travelers.
Further Rate of Change of Super elevation should not be steeper than 1 in 150 for roads in Plain/Rolling Terrain, and 1 in 60 in Mountainous/Steep Terrain.
The formula for minimum length of Transition Curve on the basis is:
Ls=2.7 V2 /R.
Ls=2.7 x 602/55 = 176.72m
The large of two is 176.72m which have to provide. Actual provided length for transition cure is more than 176.72m which is 180m then it's ok.

7.3.3 Vertical alignment

a) The vertical alignment will be designed so as to provide a smooth longitudinal profile.
b) Gradients corresponding to the ruling gradients will be followed in the vertical alignment design.
c) Long Vertical Curves will be provided at all grade changes.

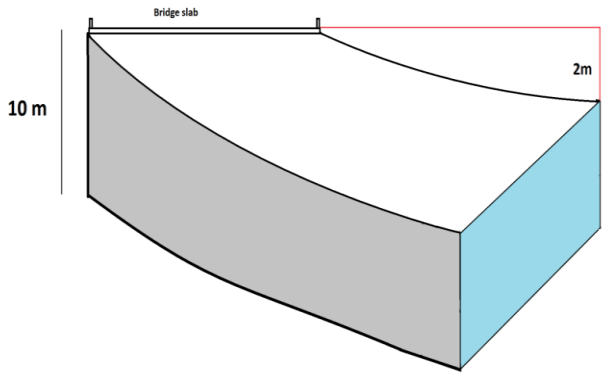

Fig 1.5 Block diagram of vertical alignment

For this typical area the measured values of bridge top slab to the normal water level is 10m but it is not found the same for extended area of road form the bridge. Which measure 2meter less than the bridge level. Also it is seen that no drainage system is not provided and curb along road are also not included in designing of road at the time of construction.

8. SUGGESTION FOR DESIGN OF PAVEMENT HEIGHT

As per the above statement I come to conclusion that if we have to prevent troubles in the flood condition which faced every year. The height of approach road which connect the main road to the bridge should be elevated at least to the height of bridge. The suggested design of road should include desired drainage system along the road with distinct curb.

9. PROBLEM STATMENT

1 Main problem for the development is the cost of construction.

To overcome this problem we can use waste and recyclable material for land filing purposes which reduces the cost of substructure construction. The fund for the village development and other government faculties are collected which include PWD,

2 The period of construction is long which requires alternate road to control the traffic.

This is problem comes at the time of excavation of the work till the completion of the project. For this purpose the alternate kachcha road WBM road have to made along the planned project. Otherwise we can make stapes by stapes construction of the road by dividing the road longitudinally in two sections and height is elevated alternately. Allowing other part of road for transportation. It also may create some problem of traffic but it is acceptable by thinking future facilities.

10. SCOPE OF WORK

1. The way of communication will improve
2. The traffic problems should be controlled
3. Communication belong the villages will be continued during flood condition also
4. There should be no problem in providing emergency services during flood.

11. CONCLUSION

Every year facing problem of blockage of roads will be solved .continue flow of traffic is maintained in every condition. Our suggestions are somewhat costly but it is very convenient for the use and health of the people. Providing curbs at the side of road also reduces the accident problems.

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