Scouring of Water at Sardar Bridge (Surat) & It's Preventive Measures

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Abstract **- The erosion of earth material at bridge foundation establishment by streaming water, velocity of stream surpasses the constraining speed, the scour occurs. Scouring is leading cause for bridge failure. Generally, abutment are scour basic and around 60% bridge failure worldwide have been directly or by implication brought about by scouring. Scour at bridge abutment can caused harm or disappointment of bridge and result in unreasonable fixes, loss of openness, and so forth. Any under estimation of scour may bring about disappointment of bridge while over estimation will prompt acceleration of expense. The review recognizes and assesses driving scour recipes and propose a system for building up a unified projection driving scour equations and recommend a structure for building up an assembled projection scour recipe that relies upon fulfilling a few focused on future research needs. This project will estimate the risk of scour bridge failures by integrating experiments, numerical and theoretical research.**

Index Terms **- Scouring, Bridge Water Scouring, Soil erosion**

I.INTRODUCTION

As an imperative segment of the transportation arrange, bridge plays a pivotal job in present day society. An extension is a structure worked to traverse a valley, street, waterway, or other physical obstructions, to give section over the impediment. Around 84% of the bridge are over bodies, similar to a waterway, spring, lake and ocean. Scour, characterized as "the disintegration or expulsion of streambed or bank material from bridge foundation establishment because of streaming water" is the most widely recognized reason for the interstate scaffold disappointment in U. S. As indicated by measurement, 60% of all extension disappointment result from scour and other water powered related causes.

II. STAGES

A. Review Stage

The aim of the present study is to present a general view of the scouring process at bridge piers on the ground.

B. Final Stage

In U.S. scaffold scour is one of the serious issues for the extension disappointment. It has been evaluated that 60% of all extension disappointment result from scour and other water driven related reason. Issue of scouring is that, whenever belittled it can cause an inconceivable disaster in a gigantic manner. So, to decrease that, study identified with it is significant.

C. Figures

Experiment was performed at a constant flow discharge so as to provide a uniformity of results between different shapes of pier and with/without compaction piles. Various Calculation based on local scour and contraction scour outcome are obtained and with the outcome of the experiment we conclude that changing the shape of piers to nose shape reduce the scouring effect of the piers

III. MATH

Scour Depth Calculation for Sardar Patel Bridge, on River Tapi in Surat We know that, dsm = 1.34 (Db2 / Ksf)1/3 Where Db = the design discharge for foundation per meter at effective linear water ways Ksf = Silt factor of the bed material Now for Db, From the project technical detail [SARDAR BRIDGE] we have, Maximum Probable Flood = 34000 cum. Linear Water ways = 700 meters (from c/s of river tapi) Design Discharge per meter = 48.57 cum. = (34000/700) Now for finding hsf or silt factor, we have For Clayey Soil – [Appendix no.1 of IRC 78:2014]

Ksf = f (1 + c) where f = 2 from < 5 And c =1 for Ksf = 2(1 +) = 4 Now, from the formula = 1.34 (48.572 / 4)1/3 = 11.24 meter 11.25 meter = 22.50 meter (from HFL for Normal Condition)

IV. HELPFUL HINTS

A. Figures and Tables

Table 1

K1	Type of bed material
0.59	mostly contact bed material discharge
0.64	some suspended bed material discharge
0.69	mostly suspended bed material discharge

B. REFERENCES

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C. Abbreviations and Acronyms

"SCOURING OF WATER AT SARDAR BRIDGE (SURAT) & IT'S PREVENTIVE MEASURES"

D. Equations

dsm = 1.34 (Db2 / Ksf)1/3

Where Db = the design discharge for foundation per meter at effective linear water ways

Ksf = Silt factor of the bed material

ys/a = 2.0 K1 K2 K3 (y1/a)0.35 Fr10.43

Where, ys = scour depth, ft

y1 = flow depth directly upstream of the pier, ft

K1 = correction factor for pier nose shape from given Table1

K2 = correction factor for angle of attack of flow from Table 2

K3 = correction factor for bed condition from Table3

a = pier width, ft

L = length of pier ft

V1/(gy1)1/2

V1 = Mean velocity of flow directly upstream of the pier, ft/s

V. CONCLUSION

In this project work, we have obtained the necessary information related to scouring of water under bridge piers. Various methods are studied, and observation related to scouring are done. We have work on scour depth formula for the given study area. For further research, work on prevention of scouring with various methods and equipment under bridge piers will study. Various method like Laursen equation for scour depth and CSU method for scouring depth will be calculated and test will be performed in the next phase and analysis of the result will take place. In 8th Semester, we have obtained the outcome by obtaining various types of shapes and sizes of piers and by calculation scouring depth is calculated at various depth in the experiment. Experiment was performed at a constant flow discharge so as to provide a uniformity of results between different shapes of pier and with/without compaction piles. Various Calculation based on local scour and contraction scour outcome are obtained and with the outcome of the experiment we conclude that changing the shape of piers to nose shape reduce the scouring effect of the piers.

VI.APPENDIX

Scour at bridge abutment can caused harm or disappointment of bridge and result in unreasonable fixes, loss of openness, and so forth. Any under estimation of scour may bring about disappointment of bridge while over estimation will prompt acceleration of expense.

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