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Casestudy of drainage line improvement at Kumar chowk, Solapur

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ABSTARCT

This study is carried out to review various research works carried out by researchers on the effects of poor drainage on road pavement. Poor drainage causes early pavement distresses leading to driving problems and structural failures of road as pointed our by researchers. To prevent or minimize premature pavement failures and to enhance the roads performance, it is imperative to provide adequate drainage, the review covered: importance of highway drainage system in road construction, requirements of highway drainage system, and effects of bad drainage system on roads. The research pointed out areas of concern for drainage designers and road engineers that are of great importance during road construction to ensure that, the constructed road is put to use without failure before the actual design life. The review concluded that effect of poor drainage condition on a road is very adverse. It causes the failure of road in different ways and as well economic hardship on inhabitants of affected communities with devastating effect of sicknesses as a result of breeding of mosquito especially on streets in towns with poor drainage capacity. Proper drainage system provided to the road at its early edge. Therefore effective engineering practices should be considered necessary during design, construction and management of roads and drainage channels.

Keywords: *Drainage, Roads*

1. INTRODUCTION

Solapur has been shortlisted by the ministry of urban development as one of the 100 cities to participate in the stage ll of the selection process i.e the “smart city challenge”. Solapur municipal corporation would be submitting a smart city proposal for Solapur for competing with the other cities in the smart city challenge and wants the citizen of Solapur to participate in preparation of the smart city proposal. The citizen may post their views on how the services being provided by the Solapur municipal corporation can be improved which will benefit all sections of the society i.e the rich and the poor should benefit from the solution being provided Solapur city does not have a planned storm water network. Most drains are kuccha. Drainage network is designed to carry wastewater like bidi gharkul nallah, upper landki nallah, lower landki nala, mill peth nala, sadar bazar nallah, revan siddheswar nallah and shelgi nallah with a total length of 16 km. Most nallahs meet sina river and pollute it. In some areas, these nallahs have been encroached upon. Alone some stretches, columns supporting buildings have been constructed on the nala bed. In this project we are going to do case study of drainage line improvement at kumar chowk, solapur. We will do survey of that area and find out the problems of that drainage line and why the drainage will over flow during the rainy season and after that will find the solution

2. LITERATURE REVIEW

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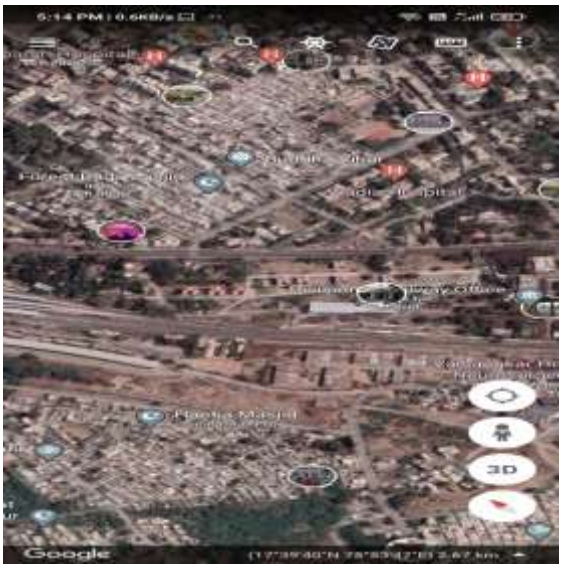
Highway drainage system:
Highway drainage is the process of removing and controlling excess surface and sub-surface water within the right way. This includes interception and diversion of water from the road surface and sub-grade. The installation of suitable surface and sub-surface drainage system is an essential part of highway design and construction. Highway drainage is used to clear surface water from the highway. Good highway drainage is important for road safety. Roads need to be well drained to stop flooding: even surface water can cause problems with ice in the winter. Water left standing on road surface break up and as well lead to an accident from the road users.

According to civil engineering dictionary (2014), highway drainage includes collecting, transporting, and disposing of surface/subsurface water originating on or near the highway right of way or flowing in streams crossing bordering that right of way. This is important because of water which are dangerous for highways are Rainwater. Cause erosion on surface or may seep downward and damage pavement (surface drains), Groundwater. May rise by capillary action and damage pavement (sub-surface damage) and water body: may cross a road and may damage road (cross drainage words).

In a research on drainage on roads by sigh, navpreet and nitin (2014) a designed and well- maintained road drainage is important in order to minimize the environmental designed impact of road runoff on the receiving water environmental impact of road runoff on the receiving water environment ensure the speedy removal of surface and associated infrastructures. Water in the pavement system can lead to moisture damage, modulus reduction and loss of strength. In order to prevent such damages to the pavement, it is essential to provide proper drainage of the road, and in doing so it also reduces the structures lifetime. Highway drainage is used to clear surface water from the highway. Roads need to be well drained to stop flooding: even surface water can cause problems with ice in the winter. Water left standing on roads can also cause maintenance problems, as it can soften the ground under a road making the road surface break up.

3. METHODOLOGY

For this case study we are selected kumar chowk place located in Solapur city. In this place we observed that every rainy season in this places storm water accumulates because of slope of the road is not given properly as per I.R.C. rules.



Before start of field survey, sufficient desk work should be carried out using the existing details and that should be corroborated by field visits and discussions with local community and municipal officials. This iterative process should be repeated to prepare a comprehensive workable plan. The data information to be collected and the elements to be surveyed for preparation of project plan are given below

LOCATION OF PROJECT

SITE VISIT PHOTOS

Table1: RL'S of road

RLS OF ROAD							
STATION POINT	STAFF (RL POINTS)	BS	IS	FS	HI	RL	REMARK
A	POLE	1.27			101.27		BM 100
	R1R		1.255			100.015	
	R1L		1.38			99.89	
	R2R		1.165			100.105	
	R2L		1.195			100.075	
	R3R		1.135			100.135	
	R3L		1.12			100.15	
	R4R		1.025			100.245	
	R4L		1.075			100.195	
	R5R		0.99			100.28	
	R5L		0.985			100.285	
	R6R		0.735			100.535	
	R6L		0.725			100.545	
	R7R		0.6			100.67	
	R7L		0.616			100.654	
	R8R		0.49			100.78	
	R8L		0.475			100.795	
	R9R		0.355			100.915	
	R9L		0.3			100.97	
	R10R		0.235			101.035	
	R10L		1.175			100.095	
	R11R		0.14			101.13	
	R11L		0.025			101.245	
	P1R		1.685			99.585	
	P1L		1.66			99.61	
	P2R		1.6			99.67	
	P2L		1.63			99.64	
	P3R		1.54			99.73	
	P3L		1.56			99.71	
	P4R		1.44			99.83	
	P4L		1.465			99.805	
	P5R		1.35			99.92	
	P5L		1.315			99.955	
	P6R		1.255			100.015	
	P6L		1.225			100.045	
	P7R		1.15			100.12	
	P7L		1.055			100.215	
	P8R		1.025			100.245	
	P8L		0.945			100.325	
	P9R		0.95			100.32	
	P9L		0.875			100.395	
	P10R		0.8			100.47	
	P10L		0.765			100.505	
	P11R		0.645			100.625	
	P11L		0.685			100.585	
	H1R		1.27			100	
	H1L		1.195			100.075	
	H2R		1			100.27	
	H2L		0.95			100.32	
	H3R		0.865			100.405	
	H3L		0.805			100.465	
	H4R		0.835			100.435	
	H4L		0.82			100.45	
	H5R		0.96			100.31	
	H5L		0.96			100.31	
	H6R		1.165			100.105	
	H6L		1.135			100.135	
	H7R		1.095			100.175	
	H7L		1.05			100.22	

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Table2: RL'S of drainage

Station Point	BS	IS	FS	HI	RL	Station Point
Pole	1.27			101.27		Pole
DR1		1.395			99.875	DR1
DR2		1.145			100.125	DR2
DR3		0.89			100.38	DR3
DR4		0.5			100.77	DR4
DR5		0.275			100.995	DR5
DR6		0.145			101.125	DR6
DR7		0.4			100.87	DR7
DL1		1.375			99.895	DL1
DL2		1.085			100.185	DL2
DL3		0.25			101.02	DL3
DL4		0.145			101.125	DL4
DL5		0.555			100.715	DL5
DL6		0.45			100.82	DL6
DP1		1.66			99.61	DP1
DP2		1.62			99.65	DP2
DP3		1.52			99.75	DP3
DP4		1.375			99.895	DP4
DP5		1.25			100.02	DP5
DP6		1.14			100.13	DP6
DP7		1.15			100.12	DP7
DP8		0.96			100.31	DP8
DP9		0.77			100.5	DP9
DP10		0.75			100.52	DP10
DP11		0.68			100.59	DP11
DH1		1.18			100.09	DH1
DH2		0.955			100.315	DH2
DH3		0.98			100.29	DH3
DH4		1.085			100.185	DH4
DH5			1.22		100.05	DH5

4. RESULT AND CALCULATIONS

Result

Assumed Data

Average Rainfall Intensity Of Solapur City = 545mm/Year

Catchment Area = 1km^2

Velocity = 1 To 10 M/Sec (Assumed)

Coefficient Of Runoff = 0.85 For Asphalt & Concrete

By Using Rational Method

Q = C I A

C=Runoff Coefficient, I=Intensity Of Rainfall, A= Catchment Area

= 0.85 X (1.728x10^-8) X (1x10^6)

Q= 0.0146 M^3/S

For 1m/S Velocity

Q = A X V

0.0146 = 3.14/4 X D^2 X (1)

D = 0.136 M For 2m/S Velocity

0.0146 = 3.14/4 X D^2 X (2)

D = 0.096 M

For 3m/Sec Velocity

0146 = 3.14/4 X D^2 X (3)

D = 0.0787 M

For 4m/S Velocity

0.0146 = 3.14/4 X D^2 X (4)

D = 0.0681 M

For 5m/Sec Velocity

0.0146 = 3.14/4 X D^2 X (5)

D = 0.0609 M

For 6m/Sec Velocity

0.0146 = 3.14/4 X D^2 X (6)

D = 0.0556 M

For 7m/Sec Velocity

0.0146 = 3.14/4 X D^2 X (7)

D = 0.0515 M

For 8m/Sec Velocity

0.014 = 3.14/4 X D^2 X (8)

D = 0.0482 M

For 9m/Sec Velocity

0.0146 = 3.14/4 X D^2 X (9)

D = 0.0454 M

10 For 10m/Sec Velocity

0.0146 = 3.14/4 X D^2 X (10)

D = 0.0431 M

5. CONCULSION

Here, we have come to the end of the project on the improvement of drainage line. We would like to share our experience while

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doing this project, we learnt many new things about the improvement of drainage line and it was a wonderful learning experience for us.

This aim of this study was to identify the parameters which are important in designing & improving the drainage system of kumar chowk. From this study we recommend to construct the drainage line of 900 mm diameter across the national highway as per our survey.

A very special thanks to our guide Mr. Bugade sir for their guidance for us. We do hope that our project will be interesting & may be ever knowledgeable.

6. ACKNOWLEDGEMENT

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APPENDIX

Photos During Work Process

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