

Feasibility Study of Flyover on Bopal Junction along Sardar Patel Ring Road, Ahmedabad

Raba Jayeshkumar V.¹, Prof. R. N. Shukla²

¹P.G. Student, L.D College of Engineering, Ahmedabad

²Associate Prof., L.D College of Engineering, Ahmedabad

Abstract— Ring roads are made for the continuous movement of goods vehicle and for eliminate the traffic problem in the city due to trucks and multi axle vehicles. But now cities are expanding very fast so that traffic problem also occurs at ring road intersection. So at bopal junction along S.P. Ring road traffic delay and numbers of accident occurs due to trucks. In order to solve this traffic problem, planning and constructing a Flyover at intersection may be a viable option.

Index Terms- Flyover, Economic Evaluation, Traffic Volume Count, Vehicle Delay

I. INTRODUCTION

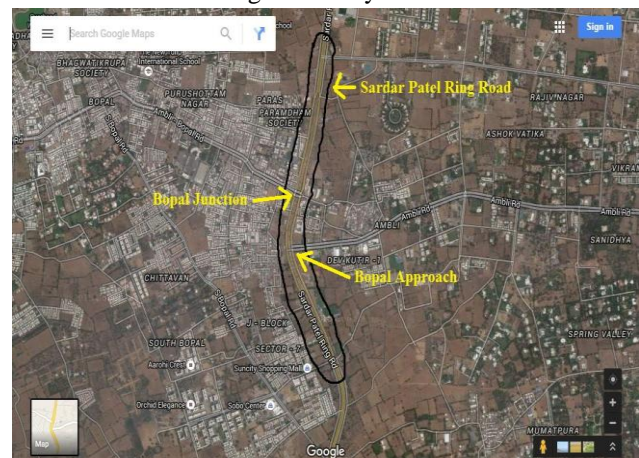
When the highway crosses another at grade capacity is reduced to that of Intersection. Furthermore, some or all of the vehicles must slow down or stop to permit the passage of crossing and turning traffic which will cause delay. Due to the many conflict points at intersections the rate of accident will increase. A grade separation structure eliminates these difficulties. Grade separation is a form of intersecting in which one or more conflicting movements of intersecting highways are segregated in space. The capacity of the intersection rise to that of the traffic lanes. Vehicles can travel at uniform speed, which reduce both travel time and operation costs. Accident opportunity is almost entirely eliminated. An interchange not only offer grade separation between two traffic arteries, but also provides easy route for vehicles transferring from one through facility to other. Hence, the advantages of such a form of separation is the freedom gained from cross interference which is time saving and increase safety for traffic movements. Therefore the intersection of two freeways or where a freeway intersects a major highway, an Interchange may be required. An Interchange is a grade separation with connecting roadways, which allow route transfer between the intersecting highways. The flyover construction need very huge amount of investment and it also effect the economy of the country so before construction we have to check feasibility of the

flyover so that we can come to know that from this project we can achieving our desire goal or not, and it will overcome the transportation problem and beneficial in future or not.

II. STUDY AREA

As per the censuses 2011 bopal and ghuma have population more then 70,000 so at bopal junction along sardar patel ring road more traffic problem occurs. With industrial growth in Sanand and real estate development in areas like Bopal and Ghuma along with other nearby locations, the volume of road users is increasing. Hence, there is need for better infrastructure that can reduce traffic congestion on Ring Road.

Figure 1 Study Area



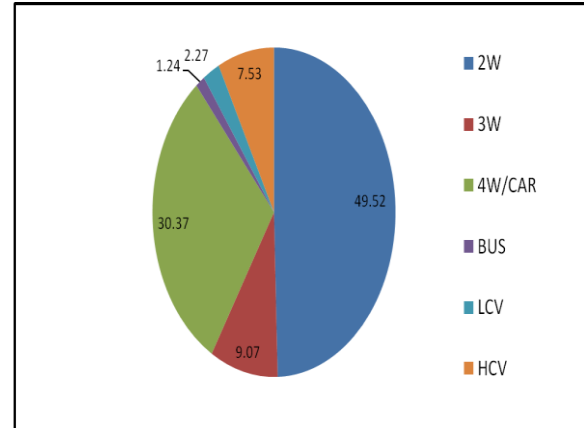
III. DATA COLLECTION AND ANALYSIS

1. Classified Volume Count Data

Survey conducted on 22/01/2016 Friday for 12 hour (9am to 9pm) (Bopal Circle)

4. Vehicle Composition (%)

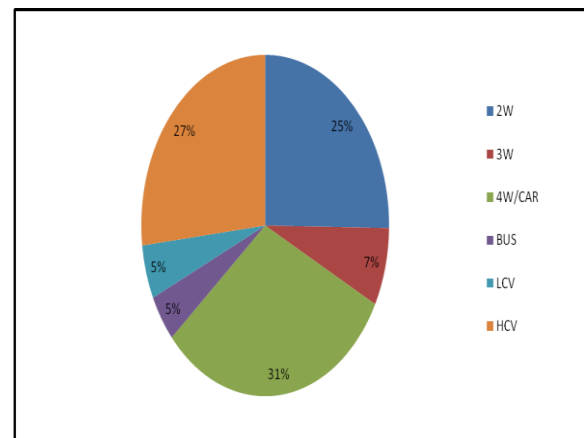
Type of vehicle	From: - bopal	From:- sanathal	From: - ambali	From: - silaj	Total
2W	15,717	9,991	2,197	10,062	37,967
3W	2,959	2,074	1,152	769	6,954
CAR	9,231	6,047	516	7,488	23,282
BUS	395	390	0	168	953
LCV	304	600	236	602	1,742
HCV	176	2,612	0	2,987	5,775
Total	28,782	21,714	4,101	22,076	76,673



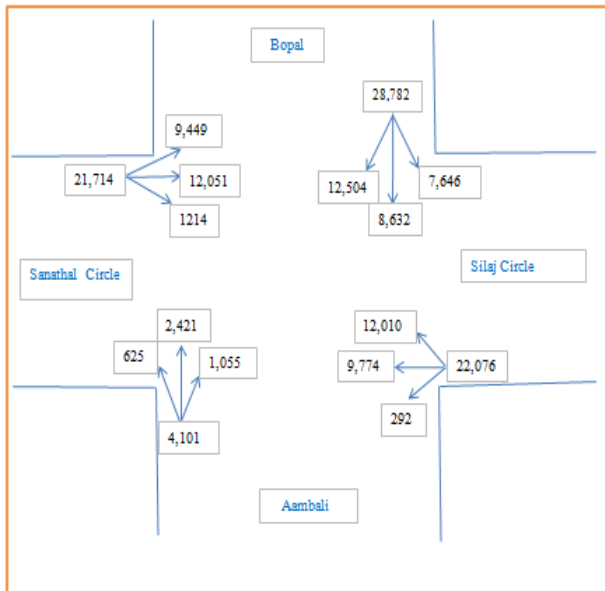
2. Accident data collection (bopal circle)

Year	Minor	Major	Fatal	TOTAL
2013	11	8	2	21
2014	14	11	3	28
2015	18	13	2	33

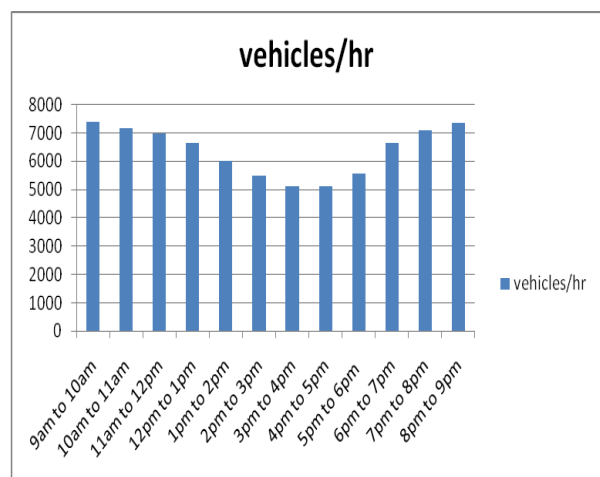
5. Vehicle Composition (in % Pcu)



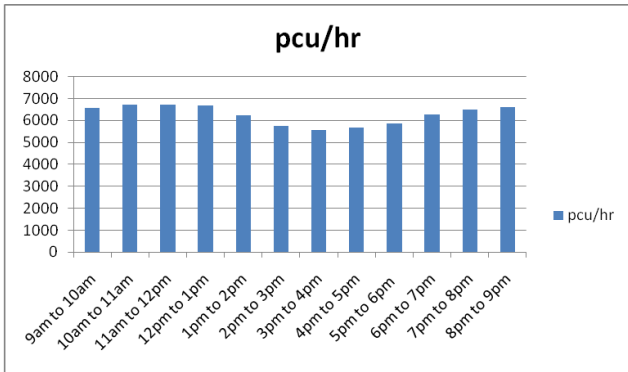
3. Turning Movement Count



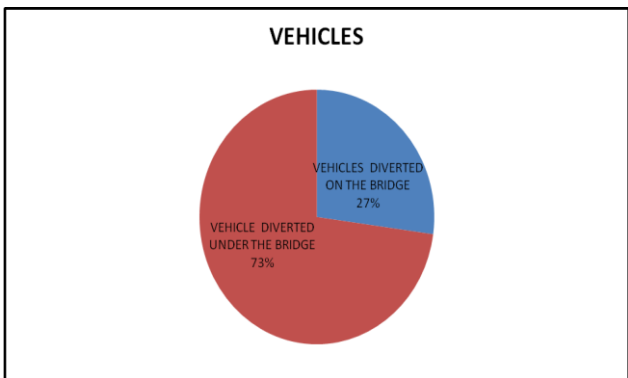
6. Vehicles/hr at bopal intersection



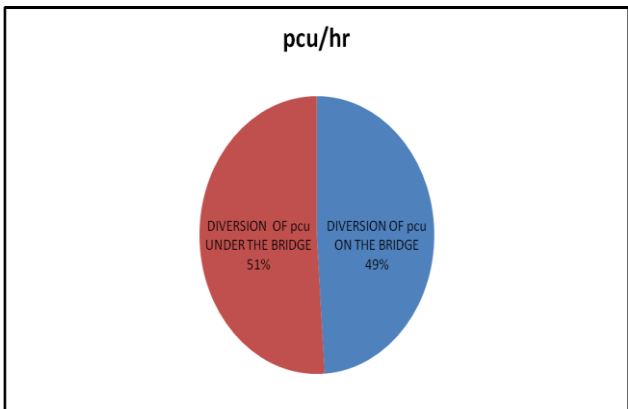
7. Pcu/hr at bopal intersection



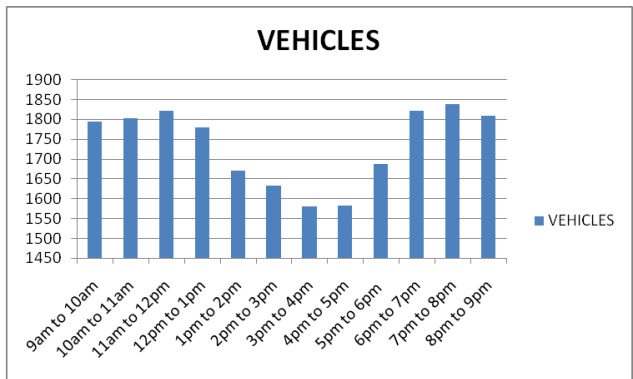
8. Diversion of vehicles on proposed flyover



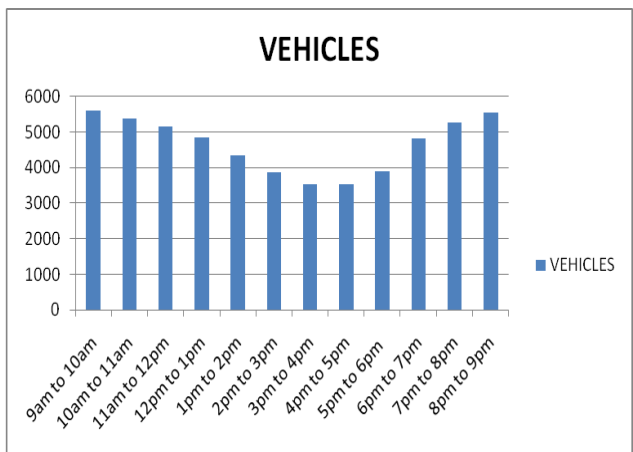
9. Diversion of Pcu on proposed flyover



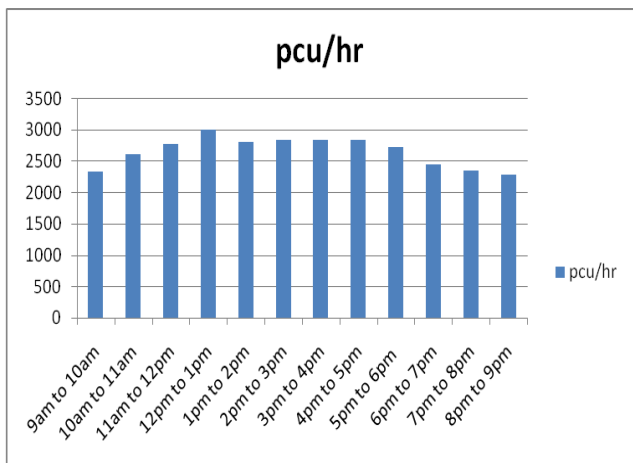
10. Vehicles/hr on the proposed flyover



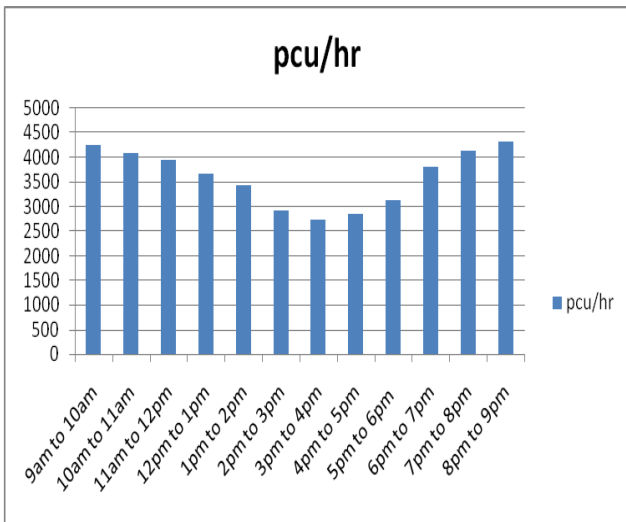
11. Vehicles/hr under the proposed flyover



12. Hour wise Pcu on the proposed flyover



13. Hour wise Pcu under the proposed flyover



14. Delay survey

DIRECTION	morning	evening
from:- sanathal	75.87	77.27
from:- silaj	67.61	68.23
average	71.74	72.75
average delay per vehicle		72.25

15. Speed

Speed in kmph			
vehicle	From: sanathal	From: bopal	From: silaj
2w	41	41	49.5
3w	38	39.5	40
car	53.5	44	53.5
bus	36	35.5	42
LCV	43	34	42
HCV	37	34	39.5
Average	39	37.5	44.5

III. ECONOMIC EVALUATION

1. No of vehicles gets benefitted by flyover construction

vehicle type	sanathal	silaj	total
car	2876	3145	6021

2w	4416	3080	7496
bus	146	85	231
3w	685	262	947
LCV	316	347	663
HCV	2612	2855	5467
total	11051	9774	20825

2. Saving in vehicle time in hours/day

vehicle	no. Of vehicle	saving in vehicle time in seconds	saving in vehicle time in hr/day
car	6021	435004	121
2w	7496	541569	150
bus	231	16689	5
3w	947	68419	19
LCV	663	47900	13
HCV	5467	394979	110

3. Saving in vehicle time in passenger hours/day

vehicle	saving in vehicle time in hr/day	passenger occupancy	saving in vehicle time in passenger hour/day
car	121	2.4	290
2w	150	1.6	241
bus	5	52	241
3w	19	2.4	46

4. Travel time saving in Rs./year

Type of Vehicle	Savings in veh. time in Passe. hrs/day	Travel Time Saving in Rs./Passe.-hr	Travel Time Saving in Rs. / day	Travel Time Saving in Rs. / year
2w	241	67.48	16242	5928427
3W	46	10.23	467	170315
Car	290	34.81	10095	3684671
Bus	241	10.23	2466	900131
total				10683544

type of vehicle	Savings in vehicle time	Travel Time Saving in Rs./hour	Travel Time Saving in Rs. / day	Travel Time Saving in Rs. / year	8. Total cost		
					sr. No.	saving	amount in Rs.
LCV	13	34.81	463	169057	1	travel time saving	15818359
HCV	110	124	13605	4965759	2	fuel saving	5361848
					3	Accident saving	4521250
					4	Vehicle damage	1106500
total				5134815	total		26807957

5. Money saving in Rs. In 1 year

vehicle type	total vehicle	money saving in 1 day as per respective fuel price	money saving in Rs. In 1 year
2w	7496	1662	606514.5
3w	947	602	219550.8
car	6021	5110	1865203
bus	231	262	95767.98
LCV	663	588	214666.6
HCV	5467	6466	2360145
total			5361848

6. Accident cost

sr no	type of accident	economic cost during accident (Rs)	no of accident	monetary loss (Rs.)
1	Fatal	864350	2	1728700
2	Major	172650	13	2244450
3	Minor	30450	18	548100
total				4521250

7. Quantum of vehicle damage due to accidents

1	car	26,150	15	392250
2	2w	6650	20	133000
3	3w	7600	14	106400
4	bus	76050	5	380250
5	HCV	8600	11	94600
total				1106500

IV. CONCLUSION

In order to solve the traffic problems at bopal intersection construction of a fly-over bridge was thought appropriate. So that delay and accident will reduce and continuous movement along S.P.Ring road will be achieved. And 49% of total traffic Pcu will be diverted on the flyover. Still we require signal system below the bridge at grade level.

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