International Journal of Engineering &Technology, 7 (3.12) (2018) 1254 -1256

International Journal of Engineering & Technology

Website: www.sciencepubco.com/index.php/IJET

Research paper

Accident Study and Analysis of Selected Black Spots – A Case Study

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Abstract

In the present study, accident statistics of 2011 to 2014 has resolved Vidya path as a black spot. In addition, attempt has been made to investigate the prevailing conditions of two V3 road stretches i.e. (Stretch – 1: road dividing sec – 14 and 15 and Stretch – 2: road dividing sec – 11 and 12) of Chandigarh for accidental risk. The moral of investigation has cleared that all the prime associated parties i.e. traffic, speed and users/driver are favoring the accidental risk; as during peak hour the road stretches were found short of capacity, speed of vehicles was over the legal speed and the users were ignoring the rules and regulation of driving. Consequently, the injury and life risk for pedestrians and cyclists are at the most. The preventive measures for the same are also incorporated.

Keywords: *Road Accident, Vidya Path, Black Spot, Traffic, Speed and Road Side Interview*

1. Introduction

Intensification in populace, fiery progress in the count of private automobiles, has augmented the integer of personalized Lorries, partially due to the absenteeism of an effectual and unswerving civic transport structure. There are restrictions on the road cosmos that can be delivered within the prevailing fabricated environment. As spreading out of the city to the fringe of UT and indorsed land use fluctuations have occasioned in fresh travel lobbies. Fresh roads to deliver / improve connectivity of the advances in the fringe areas spawning criss - cross crusade across the city and greater than before inter sector shuttling. Ensuing in Large volumes of inter-city traffic and High volumes of through traffic across the city.

Huge growth has resulted in couple of traffic related concerns such as congestion, delay in traveling, high speed and level of service. However the prime factor of consideration is the rate of increase of accidents; many researchers throughout the world have studied the same with different approaches and many of them have come up with fruitful results. As, along with growth in traffic, speed of vehicle and driver behaviors are the three prime aspects associated with occurrence of an accident.

2. Objective of Study

1. Collection of past accident data at selected locations.
2. To analyze accident data and identify black spots.
3. To investigate volume to capacity ratio and LOS.
4. To conduct the speed test.
5. To study of road user aspects through road side interview approach

3. Methodology

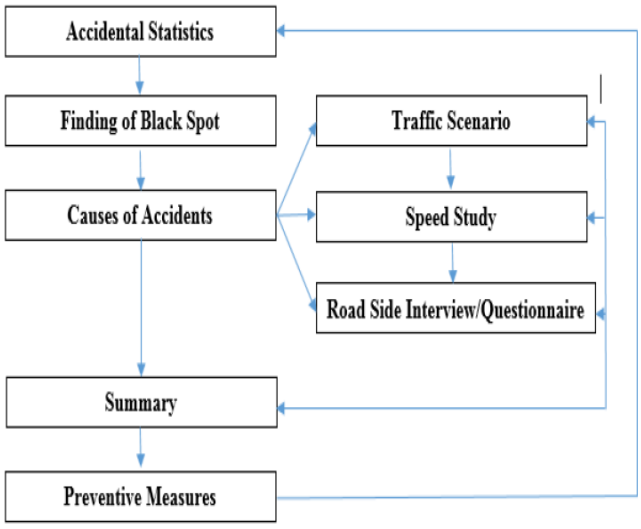

Fig. 1.1: Methodology Chart

3.1. Volume to Capacity Ratio

3.1.1. Capacity

The capacity for the different categories of urban roads is tabulated below. In the present study, both the considered roads are in urban area, have intersections at their ends, 4 – lane divided road or 2 lane single carriage. So Design Service Volume or capacity for the considered stretches is 1500 PCU per hour.

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Table 1.1: Tentative Capacities of Urban Roads between Intersections (IRC 86:1983)

No. of traffic lanes and widths	Traffic Flow	'C' Capacity in PCU's per hour for various traffic conditions		
		Roads with no frontage access, no Standing vehicles, very little cross traffic	Roads with frontage access but no standing Vehicle and high Capacity inter-sections	Roads with free frontage access, parked vehi-cles and heavy cross Traffic
2 – lane (7 – 7.5m)	*One way*	2400	*1500*	1200
	Two way	1500	1200	750
3 – lane (10.5 m)	One way	3600	2500	2000
4 – lane (14 m)	One way	4800	3000	2400
	Two way	4000	2500	2000
6 – lane (21 m)	One way	3600	2500	2200
	Two way	6000	4200	3600

In the present study, the road stretch is a two lane road with one way traffic, so the capacity for the road is 1500 PCU's per hour.

3.1.2. Peak Hour Volume

As per the average of 7 days traffic survey, the details of peak hour volume from 24 hours survey for both the road stretches is tabulated below.

Table 1.2: Peak hourly volume

S. No.	Stretch	Direction	Time	Peak Hour	'V' Peak Volume (PCU's)
1	Stretch – 1	PGI to Na-yagaon	Morning	11:00 – 12:00	1104
			Evening	5:00 – 6:00	1012
		Nayagaon to PGI	Morning	9:00 – 10:00	1303
			Evening	5:00 – 6:00	1004
2	Stretch – 2	PU to PGI	Morning	11:00 – 12:00	1145
			Evening	5:00 – 6:00	1090
		PGI to PU	Morning	9:00 – 10:00	1598
			Evening	5:00 – 6:00	1165

3.1.3. V/C Ratio and Level of Service

From the details of Table – 1.1 and 1.2, the conclusion for volume to capacity ratio and Level of service are tabulated below.

Table 1.3: Peak hour volume to design service volume

Stretch	Direction	Peak Hour	'V' Peak Volume (PCU's)	'C' Design Service Volume (PCU/hr)	V/C	LOS
Stretch – 1	PGI to Nayagaon	11:00 – 12:00	1104	1500	0.74	D
	Nayagaon to PGI	9:00 – 10:00	1303	1500	0.87	E
Stretch – 2	PU to PGI	11:00 – 12:00	1145	1500	0.76	D
	PGI to PU	9:00 – 10:00	1598	1500	1.07	E

3.2. Speed Analysis

3.2.3. Permitted Versus Observed Speed

From the comparison of table – 1.4, it is crystal clear that in both the stretch the observed speed have exceeds the permitted speed limits by 10 to 56 percent except the speed of three-wheelers in stretch – 1, which are well in speed limit; the details are tabulated below:

Table 1.4: Rate of increase of observed speed by permitted speed

S. No.	Vehicle Category	Permitted Speed (kmph)	Observed Speed		Comparison in terms of (%age)	
			Stretch – 1	Stretch – 2	Stretch - 1	Stretch – 2
1.	Cars	50	56	78	**12**	**56**
2.	Two-wheeler	45	54	60	**20**	**33**
3.	Three-wheeler	45	38	55	-15	**22**
4.	Buses	50	55	55	**10**	**10**

3.3. Road Side Interview

From the questioner filled on the road side, the following observation are concluded:

Age: 41 percent of the drivers were below 25 years of age, where 59 percent of the drivers found above 25 years of age.

Gender: 69 percentage of the motorists were male and 31 percentage of the motorists were female from the total count. In addition, most of the female drivers were two – wheeler riders, below 25 and were students of PU and PEC, Chandigarh. The percentage of rest of the women's were less than 8 percent.

Drunk: it has been extracted that 29 percent of the users found drunk while driving. Most of them were countered in the evening shift, in addition percentage was high for the vehicle moving towards the Nayagaonn. Therefore, leading a risk for safety.

Traffic Signals: Form the traffic signal regulations point or view it has been found that only 48 percent of drivers were following the signal regulation, 32 percent of the user follow signal regulations by mood and rest 30 percent drivers were violating signal regulation. Most of them were two-wheeler rides.

Traffic signs: 43 percent of the users were following the signs and marking ssuch as zebra crossing, stop line, overtaking zone etc. 34 percent said they follow the rule as per the condition or mood, whereas 23 percent of the vehicle were not following the marking and sign rule laid by Chandigarh Administration.

Speed Limit: only 19 percent of the road user were bowed to the speed limits, 21 percent said as per mood or time available to reach their destination, whereas 60 percent of vehicles were running on over-speed.

License: the legal permission to drive a vehicle; out of total 84 percent of the drivers were having license, whereas 16 percent of the drivers were not having the license most of them were below 18.

4. Summary

The tenacity is to catch the potential reasons of mishap linked to motorist, automobile, and thoroughfare. Calamity evaluations are thru to cultivate info such as traffic conditions, speed limits and road user aspects such as age, gender etc.

Table – 1.3 clarifies that; volume to capacity ratio or Level of Service has just managed to fulfill the demand; however both the stretches (direction - Nayagaon to PGI and PGI to PU) during morning peak hour found short of capacity. Consequently, resulting in LOS by E level.

Table – 1.4 presented that; at both the stretches the speed of all categories of vehicles was found higher than the legal speed limits, except the speed of three-wheelers on stretch – 1.Similarly in section – 4.3 i.e. from road side interview and observation, it has been concluded that users/drivers were drunk while driving, drivers were jumping signals, drivers were neglecting road signs and marking and even there were some users, who were driving in absentia of license. In addition, drivers were following rules as per their mood.

Above inferences has open the picture of the prevailing condition of both the stretches, where all the three prime aspects i.e. traffic, speed and driver were found culprit. Consequently resulting in high increase of accidental risk and damage.

5. Preventive Measures

It is well known that speed is a chief aspect in numerous calamities. Though, not wholly calamities are triggered by speed and not wholly calamities are avertable. However, there are footsteps that can be considered to respite calamities. Many calamities can be prohibited and in those which are not escapable, the mutilation could be diminished. Certain information in support to avert traffic calamities are:

1. Slow down: Road users should follow the speed frontier even if all other automobiles are exceeding. Summon up that police constables habitually stay concealed from sight while observing for speeders. If anyone trapped driving too fast, they won't vacillate to give a tag to culprit. In the cards, Chandigarh traffic police is doing this practice but need is to practices it more often.

2. Allow Overtaking: Cautious driving means letting others go ahead-not defending one's position in traffic. Avoid the urge to be a vigilante, accept the fact that someone is always going to think they're in more of a hurry than you.

3. Consider the upshot of atmospheric conditions: Defensive dealings such as, always keep windshield wipers going in the rain, one should defrost windshield to keep it from fogging up and Turn on headlights to help others to see you; could help in minimizing the accident.

4. Forbid drink and driving: It is always best to have a "designated driver". Never drive after one have had alcoholic beverages. Even one beer can alter one's ability to drive safely.

5. Use signals properly: Always use own signal, even if no one is there. When changing lanes on the freeway, don't signal as an afterthought or during the lane change. Signal at least a couple of seconds in advance so others know what you're going to do before you do it.

6. Don't tailgate: No matter how slowly traffic is moving, driver should keep at least two seconds of following distance between his/her car and the car ahead. Otherwise one won't be able to stop in time if the driver ahead slams on the brakes.

7. Keep your eyes moving: Driver should not get in the habit of staring at the back of the car ahead of him/her. Periodically shift of eyes to the side-view mirrors, the rear-view mirror, and ahead to where he/she will be in 10-15 seconds.

6. Conclusion

In the present study, accident statistics of 2011 to 2014 has resolved Vidya path as a black spot. In addition, attempt has been made to investigate the prevailing conditions of two V3 road stretches of Chandigarh for accidental risk. The moral of investigation has cleared that all the prime associated parties i.e. traffic, speed and users/driver are favoring the accidental risk; as during peak hour the road stretches were found short of capacity, speed of vehicles was over the legal speed and the users were ignoring the rules and regulation of driving. Consequently, the injury and life risk for pedestrians and cyclists are at the most.

Thoroughfare traffic thumps are liable and so avertible. In order to contest the delinquent, prerequisites to be close management and association, consuming a holistic and united tactic, across many sectors and many disciplines counting us as a road user (part of the system).

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