Road Accident Analysis and Identify the Most Critical Stretch of Surat City

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ABSTRACT

Apace with the development of Urbanization and urban area, an uneven urban form urban pockets were formed, Parallelly motorization and traffic, road accidents have increased. This study will show the existing urban road accidents scenario on a stretch of a Surat city. Based on the accidental data acquired from the police stations, the recommendations will be given. Number of fatal injuries and fatalities saved if the countermeasures adopted by the policy makers and design institute quantitatively for improving the designs and planning strategy.

Keywords - Road Accidents, Road Safety, Black Spot, Urban Road, Road safety Assessment

1 Introduction

It is estimated that urban populations in developing countries are currently growing at around 4 % per annum and that by 2045, more than a half of the populations of the poorest nations will live in cities (UNDESA 2010). To meet this expansion, many developing world cities are increasing the capacity of their road networks, but often at the expense of the safety of the vulnerable road users. As a result, many people die and are injured unnecessarily in road crashes with the consequential social economic and health burdens imposing heavy constraints on sustainable development.In the developing country like India, majority of road crash victims are not motor vehicle occupants, but pedestrians, motorcyclists, bicyclists and non-motorised vehicle occupants. Poor driving, poor vehicle standards and overloading of unrestrained passengers also make buses and taxis very dangerous, frequently resulting in multiple fatalities or injuries in one crash.

"In developing countries, the situation (road safety) is made worse by rapid and unplanned urbanisation. The absence of adequate infrastructure in our cities, together with the lack of a legal regulatory framework, makes the exponential rise in the number of road accidents all the more worrying. The statistics show that in Brazil, 30000 people die every year in road accidents. Of these, 44% are between 20 and 39 years of age, and 82% are men. (Luis Inácio Lula da Silva, President, Federative Republic of Brazil, cited in WHO 2004)

The numbers of road accidents are increasing at an alarming rate in India. Thus, there is an urgent need for a systematic approach to improve road safety. The road accidents deaths and injuries are global phenomena but more sever situation in mixed traffic condition as prevailing on India multilane roads.Road accidents is a negative aspectassociatedwith expansion in road network, motorization and urbanization in the country. According to WHO, an estimated 632 people are killed on Indian roads every day.In case of India, road injuries are **one of the top four leading causes of death** and health loss among persons of age group 15-49 years.Thus, there is an urgent need to improve safety of the road way and its features. Considering this importance of the road safety, the statistical analysis of accident is carried out atcritical locations or road stretches which will help to arrive at suitable measures to effectively decrease accidents rates.

Table 1 Road accident profile of India from the year 2005-16

Year	Number of Accidents		Number of Persons		Accident Severity
	Total	Fatal	Killed	Injured	
2005	4,39,255	83,491	94,968	465282	21.6
2006	4,60,920	93,917	105,749	496,481	22.9
2007	4,79,216	1,01,161	114,444	513,340	23.9
2008	4,84,704	1,06,591	119,860	523,193	24.7
2009	4,86,384	1,10,993	125,660	515,458	25.8
2010	4,99,628	1,19,558	134,513	527,512	26.9
2011	4,97,686	1,21,618	1,42,485	5,11,394	28.6
2012	4,90,383	1,23,093	1,38,258	5,09,667	28.2
2013	4,86,476	1,22,589	1,37,572	4,94,893	28.3
2014	4,89,400	1,25,828	1,39,671	4,93,474	28.5
2015	**5,01,423**	**1,31,726**	**1,46,133**	**5,00,279**	**29.1**
2016	**4,80,652**	**1,36,071**	**1,50,785**	**4,94,624**	**31.4**

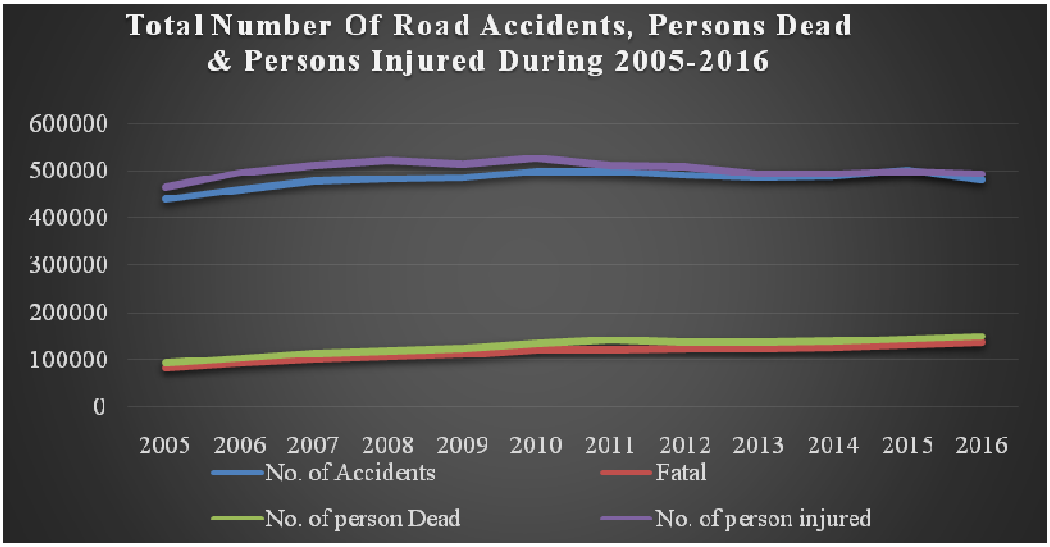

Figure 1 Accidents analysis of India from the year 2005 to 2016

From the analysis of accidents data from 2005 to 2016, it can be concluded that the number of accidents slightly in decreases manner and Number of Persons killed & number of persons injured are just vice-versa. It's in the increasing manner continuously. The continued steep increase in the number of road accidents indicates that these losses are undoubtedly inhibiting the economic and social development of the countries.

1.1 Cross country comparison

According to World Road Statistics 2016 published by International Road Federation, Geneva, there is lower incidence of deaths per 100,000 in the countries Australia, Canada, China, France, Germany, Japan, Republic of Korea, U.S.A, Poland, Portugal etc. except Russian Federation while comparing it with India. Incidence of road accident related deaths were higher in Russian Federation (19) in comparison to India (11) during the calendar year2014. A cross country comparison of incidence of road accident related deaths and injury. accidents of select countries are given in following fig-2.

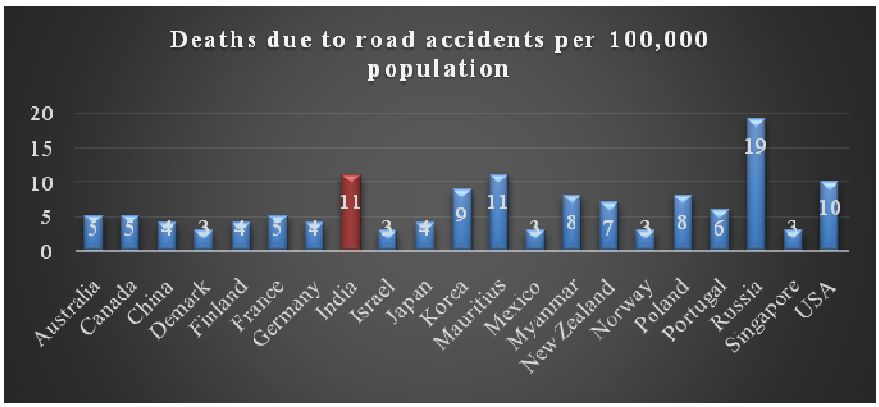

Figure 2 Cross Country Comparison of Incidence of Road related Deaths

According to the above graph, India stand on the second place in the deaths due to road accidents per 100,000 population. Russia stand on the 1st place with total 19 number of deaths due to road accidents per 100000. However, Mauritius has also same numbers as India.

1.2 Number of Road Accidents, Persons deaths & Injured in Surat City

Table 2 Number of Road Accidents, Persons deaths & Injured in Surat City

Year	Total accidents	Fatal	Person Death	Person Injured
2018	653 (Till 30/09/2018)	213	-	-
2017	910	246	254	812
2016	790	273	283	687
2015	903	251	257	800
2014	976	246	267	819

(Source: DCP Office Surat City, 2018)

1.3 Road wise Fatal Accident analysis of Surat City

Surat city has good network of ring road and radial type. The roads which are in old city have lesser width so they are more congested.

Table 3Road wise Fatal Accident analysis of Surat City

Road Name	No. of Fatal Accidents by Year		
	2018	2017	2016
Hajira-Palsana N.H.-53	13	17	19
Surat-Navsari S.H.	17	26	23
Surat-kadodara	11	7	19
Surat-kamrej	18	11	10
Dindoli-Bhatiya	05	4	3
Dindoli-Parvat Patiya	07	6	5
Ringroad	05	4	6
Udhana-Magdalla	04	5	4
Surat-Dumas	02	3	2
Pandesara-VIP road	02	1	3
Adajan-Hajira road	02	4	3
Dabholi Road	03	3	4
Rajmarg(Station to Chok)	02	1	2
Sayan Road	02	3	2
Rander-Amroli	02	2	4
Kosad-Bharthana	02	3	2
New Bamroli	02	1	2
Other Road	114	145	160

(Source: DCP office-Traffic Department, Surat City)

Figure 3 Surat City Profile

There are two major National Highway are passes form the Surat, which is Hajira-Palsana NH-53 and second is the Surat-Kadodara-Bardoli Discarded NH-53. Than another important major road is Surat-Olpad Road, Surat-Kamrej Road, Lambe Hanuman Road, Aswanikumar Road, Ved Road, Katargam Road, Dindoli Road, Ghoddod Road, Adajan Hazira Road, Athwa Dumas Road,Udhna Navsari Road, Udhna Magdalla Road, Bardoli Road, Varachha Road, Katargam Amroli Road, Rander Road.

From the above **Table 3,** it is clearly concluded that the major number of fatal accidents are occurred on the NH-53, Surat-Kamrej Road, Surat-Kadodara Road, Surat-Navsari Road. This are the main entry or exits of the Surat city. So, from the above table, I can conclude that the major number of accidents are occurred on the all entry roads of Surat city. So, probably there is a major problem, fault in at there, and it should be solved to reduce the accidents. This above data not give a details information about the road accidents profile on this major entry of Surat city. So, to select my study area, I visited all police station, which is contiguous to this major entry and collect an accidents data from that relevant police station. all this major entry of Surat city is shown in the fig. 3.

2 Profile of Five major entries of Surat city

Table 4profile of Five major entries of Surat City

Road Name	Stretch Length (Up to SUDA Boundary)	Road Category
Surat-Kadodara-Bardoli Road	20 Km	Discarded Length of National Highway-53
Surat-Sachin-Navsari Road	19 Km	State Highway-6
Surat-Kamrej Road	16 Km	Arterial Road
Surat-Palsana Road	38 Km	National Highway-53
Surat-Olpad Road	14 Km	State Highway-6

(Source: R & B Department, Surat)

2.1 Fatal Accidents profile of Surat-Kadodara Road

Table 5 Fatal Accidents profile of Surat-Kadodara Road

Sr. No.	Contiguous Police Station	Fatal Road Accidents by Year					Avg. fatal per year
		2014	2015	2016	2017	2018(Till October)	
1	Puna Police Station	16	12	19	7	11	13
2	Kadodara Police Station	34	29	22	10	26	24.2
3	Palsana Police Station	7	3	3	5	2	4
Total Fatal Accidents on Surat-Kadodara Road (Avg. 41)		57	44	44	22	39	

- On the road stretch of Surat-Kadodara, there is a t… accidents were occurred. It is clearly seen that, there is … & 4 fatal accidents were accord per year on the road … belonging to the Puna Police Station & Palsana Police … respectively.
- On this road the most critical stretch is the road … belonging to the Kadodara police station boundary, wh… about to 24 accidents occurred per year.

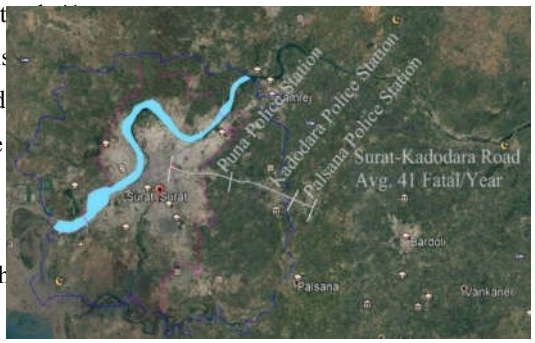

Figure 3 Surat-Kadodara Road

2.2 Fatal accidents profile of Surat-Navsari Road

Table 6 Fatal Accidents profile of Surat-Navsari Road

Sr. No.	Contiguous Police Station	Fatal Road Accidents by Year					Avg. fatal per year
		2014	2015	2016	2017	2018(Till October)	
1	Khatodara Police Station	1	1	1	0	0	0.6
2	Udhana Police Station	6	7	5	10	4	6.4
3	Pandesara GIDC Police Station	6	8	9	7	6	7.2
4	Sachin Police Station	4	13	8	9	7	**8.2**
Total Fatal Accidents on Surat-Sachin-Navsari Road (Avg. 22)		17	29	23	26	17	

- On the road stretch of Surat-Navsari, there is a total 22 accidents were occurred. It is clearly seen that, there is a total 6&7fatal accidents were accord per year on the road stretch belonging to the Udhana Police Station &Pandesara Police Station respectively.
- On this road the most critical stretch is the road stretch belonging to the Sachin police station boundary, which has about to 8 accidents occurred per year.

Figure 4 Surat-Navsari Road

2.3 Fatal accidents profile of Surat-Kamrej Road

Table 6 Fatal Accidents profile of Surat-Kamrej Road

Sr. No.	Contiguous Police Station	Fatal Road Accidents by Year					Avg. fatal per year
		2014	2015	2016	2017	2018(Till October)	
1	Varachha Police Station	2	2	1	1	1	1.4
2	Kapodra Police Station	8	2	2	3	3	3.6
3	Sarthana Police Station	1	5	7	7	14	6.8
4	Kamrej Police Station	19	7	10	8	12	**11.6**
Total Fatal Accidents on Surat-Kamrej Road (Avg. 23)		30	16	20	19	30	

- On the road stretch of Surat-Kamrej, there is a total 23 accidents were occurred. It is clearly seen that, there is a total 03&06 fatal accidents were accord per year on the road stretch belonging to the Kapodra Police Station &Sarthana Police Station respectively
- On this road the most critical stretch is the road stretch belonging to the Kamrej police station boundary, which has about to 11 accidents occurred per year.

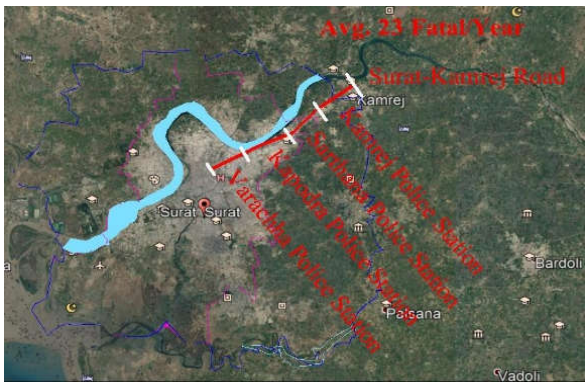

Figure 5 Surat-Kamrej Road

2.4 Fatal accidents profile of Hazira-Surat-Palsana Road

Table 6 Fatal Accidents profile of Surat-Kamrej Road

Sr. No.	Contiguous Police Station	Fatal Road Accidents					Avg. fatal per year
		2014	2015	2016	2017	2018(Till October)	
1	Hazira Police Station	2	1	0	0	1	0.8
2	Ichhapor Police Station	6	9	7	6	5	6.6
3	Dumas Police Station	1	2	0	3	0	1.2
4	Sachin GIDC Police Station	5	9	8	7	5	**6.8**
5	Sachin Police Station	3	3	4	1	2	2.6
6	Palsana Police Station	5	8	0	6	3	4.4
Total Fatal Accidents on Hazira-Surat-Palsana Road (Avg. 22)		**22**	**32**	**19**	**23**	**16**	

- On this road the most critical stretch is the road stretch belonging to the Sachin GIDC police station boundary, which has about to 06 accidents occurred per year.

Figure 6Hazira-Surat-Palsana Road

2.5 Fatal accidents profile of Surat-Olpad Road

Table 6 Fatal Accidents profile of Surat-Olpad Road

Sr. No.	Contiguous Police Station	Fatal Road Accidents					Avg. fatal per year
		2014	2015	2016	2017	2018(Till October)	
1	Jahangirpura Police Station	2	2	2	0	0	1.2
2	Olpad Police Station	5	7	4	5	4	**5**
Total Fatal Accidents on Surat-Olpad Road(Avg. 06)		**7**	**9**	**6**	**5**	**4**	

- On this road the most critical stretch is the road stretch belonging to the Olpad police station boundary, which has about to 05 accidents occurred per year.

Figure 7 Surat-Olpad Road

3 Conclusion

Based on the analysis of all fatal accidents data of five major entries of Surat, the maximum number of fatal accidents are occurred on the Surat-Kadodara road. On this road stretch, there were about to 41 accidents occurred per year, which is highest from above 5 selected stretch. There are total three contiguous police

station on this road, which is followed by Puna Police Station, Kadodara police station & Palsana police station. Puna police station has boundary from the Sahara Darwaja to Niyol Choki, from Niyol Chokdi to Bagumara Patiya is covered in the Kadodara police station and from Bagumara Patiya to Dastan railway crossing is covered by the Palsana police station. From these three police station, the maximum number of fatal accidents are reported within the Kadodara police station boundary, which is 24 fatal accidents per year. So, the Stretch from the Niyol Chokdi to Bagunara Paitya(Road stretch belonging to the Kadodara Police station) is most critical stretch on this road.

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