

INTERNATIONAL JOURNAL OF CIVIL ENGINEERING AND TECHNOLOGY (IJCET)

ISSN 0976 – 6308 (Print)

ISSN 0976 – 6316(Online)

Volume 5, Issue 5, May (2014), pp. 105-113

© IAEME: www.iaeme.com/ijciet.asp

Journal Impact Factor (2014): 7.9290 (Calculated by GSI)

www.jifactor.com

IJCET

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ROAD CRASHES AND LOSSES IN SURAT CITY AND UMRA

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ABSTRACT

It was reported in India, a total of 1, 39, 091 people died on roads during year 2012 in Gujarat State. Surat city was declared as fastest growing city in the most recent Census of India. This paper discusses over pattern and distribution of vehicular growth and road traffic accidents occurring in Surat city and Umra. On an average, it was observed that fatal cases share 19.63% of total crashes occurring on roads of Surat, in fatal cases Umra contribution is 1.13%. In Umra, Fatal cases share 18% of total crashes occurring on road and age group 18-44 years contribution of total crashes is 77%, in which male victims are 87%. Moreover, roads are well lacking public awareness in terms of their behaviour on roads. It was also observed the losses of road fatality crashes in Surat City and Umra. Accident which is occurred in Umra is different from other area because age of fatal is different in every case so all over fatality losses are decreased. Fatality losses are not only dependent on number of crashes but on the age-group involved also. The extent of losses due to crashes in Umra was found to be to the extent of INR 13.80 million in 2007 which subsequently reduced to INR 3.5 million by 2011 however, in the year 2012 it shown a rise again to the extent of INR 5.5 million. This shows that despite of reduction in total fatal accidents in 2012, the loss was observed high compared to other years. This specific observation show the effect of the age-group involvement in the road crashes. In general we can say that the loss of crash observes to be high with involvement of persons who still have major time left for the productive economic contribution.

Keywords: Fatality, Road crash, Road Crash Losses, Road Crash Victim, Severity, Vehicles Population.

I. INTRODUCTION

In India, the incidences of accidental deaths have shown a mixed trend during the decade 2002-2012 with an increase of over 51.85 percent in the year 2012. A total of 3, 94, 982 accidental deaths were reported in the country during 2012 (4,098 more than such deaths reported in 2011) with increment of 1.05 percent as compared to the previous year. A total of 1, 39, 091 persons were killed in road crashes sharing 37.4% of total un-natural deaths. Road crashes share 35.2% over various causes of accidental deaths during 2012. For the same year, Gujarat State was sharing 6.3% among accidental deaths in major states whereas road crashes in the state shared 9.20% for a total 1, 23, 402 Km length of surface roads.

Surat emerged as the fastest growing city of Gujarat state in India, with a decadal growth rate of 83.34% in the Census of India, 2011. Moreover, it is the second largest metropolitan of the state accommodating more than 4.46 million plus population and has emerged as the 8th largest urban centre of the nation.

The home ministry of Gujarat state has made division of Surat state through police department which is monitored by 26 police stations - Katargam, Amroli, Chowk bazaar, Salabatpura, Mahidharpura, D.C.B., Sarthana, Kapodra, Varacha, Puna, Udhna, Sachin, Sachin GIDC, Dindoli, Limbayat, Khatodara, Umra, Dumas, Athva, Pandesara, Rander, Adajan, Jahangirpura, Ishchapor, Hazira and Marin.

The paper focused on road crashes in the area under the Umra Police Station limits. This area lies in the south-west part of the Surat where Hazira industrial belt is situated on the western part, major roads connecting Surat-Hazira Industrial belt passing through outer Umra Police Station Boundary. A large number of vehicle work trips are generated towards Hazira. A constant movement of numerous vehicles on roads clubbed with traffic congestion has been reported earlier. In absence of mass transit facility, many residents use personal mode of transportation adding risk of road crashes in the present area of interest. The paper exploits the road crashes, anticipated losses, severity index, vehicle-accident proportionality index and other aspects with Umra area as pivotal area under focus with overall scenario in Surat.

II. ABOUT SURAT AND UMRA

Surat is situated in south Gujarat, on the bank of river Tapi. It is famous for food, diamond cutting, textile and large scale industries in and around Surat. With more employment opportunities made available different establishments, people are attracted to migrate to Surat resulting in higher population and vehicles accordingly. Surat emerged as the fastest growing city with a decadal growth rate of 83.34% (as reported in Census of India, 2011). Moreover, it is the second largest metropolitan of the state accommodating more than 44.62 Lacs population and 8th largest city of India. The city is having administrative boundaries to the extent of 325.26 Sq Km as of the year 2011 till date.

The map below shows the location of city and Umra police station administrative limits. The police station has a coverage of 4.60% of the city. The area is very well known for posh living, shopping, malls, education, entertainment, Gardens and so on. The area remains very busy during all the week days with specific attraction of citizen during the weekends towards leisure purposes.

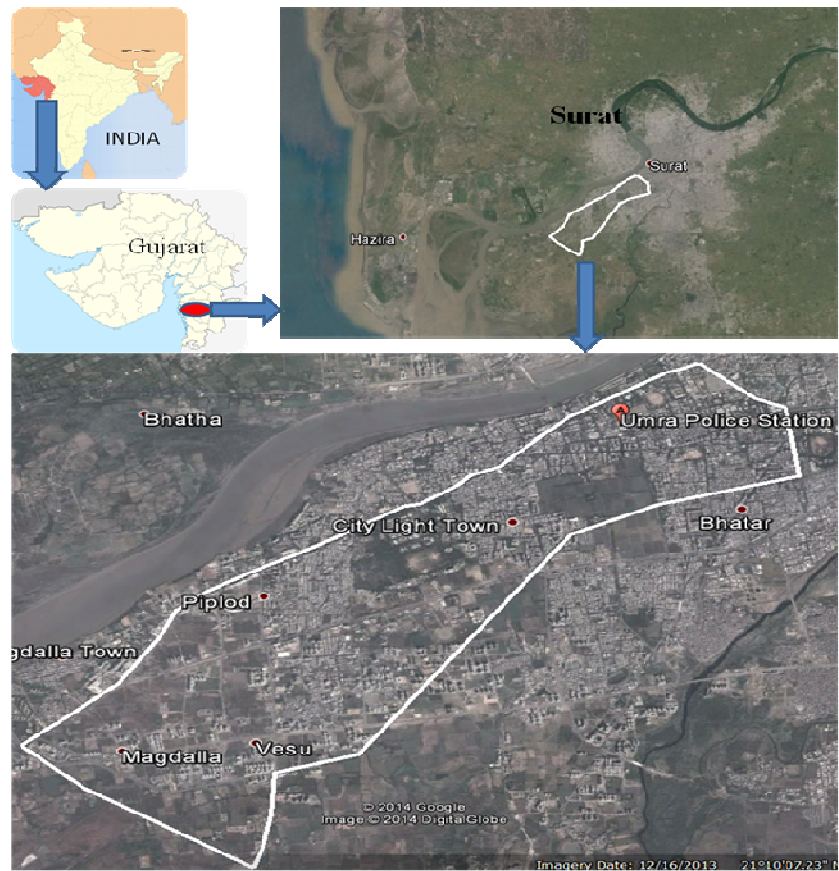


Figure 1: Location of study Area

Number of vehicles registered in Surat can be seen in figure 2. The data show that the total percentage of motorised two-wheelers (MTW) and cars which constituted for 88.1% in 2003 to 89.42 % in 2013 of the total number of vehicles registered in particular years. Data shows that the actual number of vehicles is increasing continuously, under which there is prominent increase and share of MTW and cars. Majorly, these vehicles are used for private mode only. This is resulting in increased traffic movement on the roads of the city arising a need for better and wider roads. The government has been doing the construction of new roads, widening works, bridges across rivers and grade separated roads but the same is not proving to be a solution to control or manage the traffic.

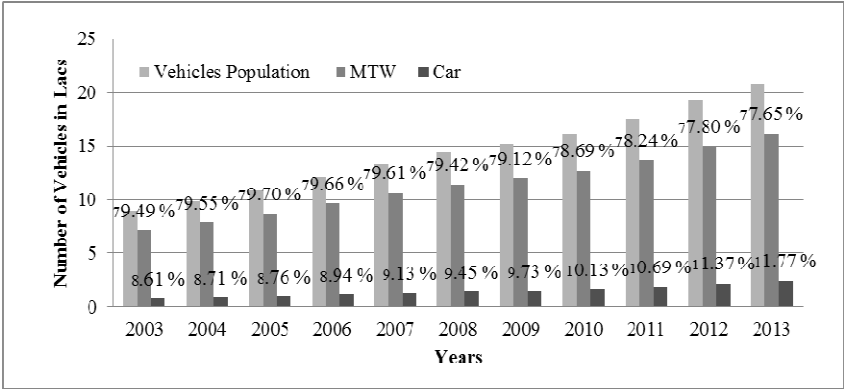


Figure 2: Vehicles Population in Surat City (Source: Road transport office Surat, 2013)

III. ADMINISTRATION WARD DISTRIBUTION AND DEMOGRAPHY OF UMRA

The Umra police station (referred as Umra now on) has its own area of administration related to crime prevention activities, however, this area differs from the Surat Municipal Corporation (SMC) administrative areas. Following figure 3 show the Umra police station area containing parts of SMC wards. The limits contain parts of 12 wards out of which maximum covered ward is of Vesu (42%) followed by Piplod (with 12%) in the South-west zone of the city.

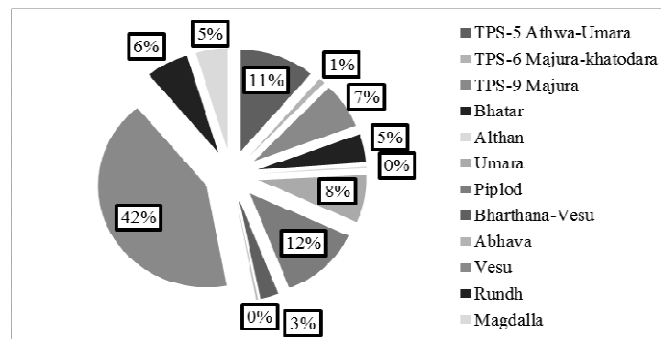


Figure 3: Administration ward distribution under Umra Police

In 2011, Surat and Umra are observed to have density of 137ppha and 83.27ppha respectively. Major part of the area was added in the city limits in the year 2006 where in local settlements were already established however dense development was not observed. Wider and planned roads through Town Planning Schemes having properly located open spaces and other amenities are attracting people to get settled in this area. In addition to this, the area is in vicinity to the industrial establishments which add in the effect of rapid settlement formations.

IV. ROAD CRASH SCENARIO IN SURAT AND UMRA

Rapid industrialization and urbanization in Surat city has resulted in mass movement or traffic on the roads. Major mode being private vehicle usage in absence of mass transit system results in road crashes and fatalities. Following figure 4 and 5 show the year-wise record of road accidents was observed in Umra with occurrence of Fatality (F), Grievous Injury (GI) and Minor Injury (MI) cases. There were some Non-injury (NI) crashes also resulting in sole losses of properties.

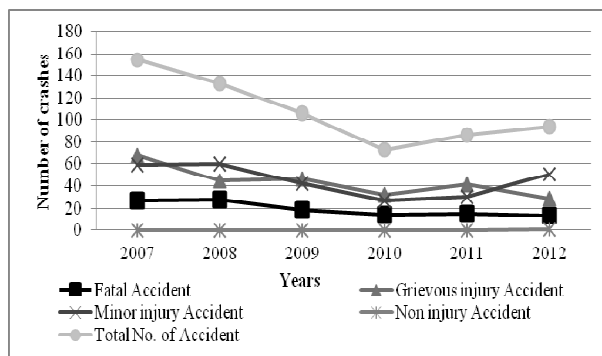


Figure 3: Road Traffic Accident Pattern

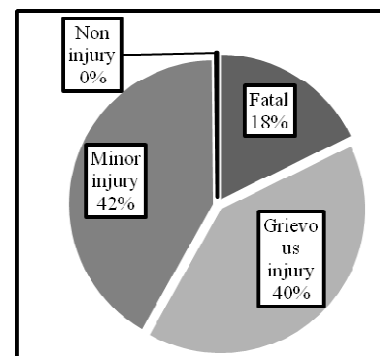


Figure 4: Share of Accident Type

Records show trend for the road traffic accidents observed on roads of Umra since year 2007 to 2012. It was found that each year approximately 115 crashes occur on roads of Umra. Out of this,

18% crashes are fatal which led people to death and in 40% crashes victims have to accept Grievous injuries or disabilities where as 42% accidents with comparatively less injuries. Minor accidents however, disturbs the social and economic performance of victims.

A comparative analysis on share of fatal crashes in the total accidents can be seen in figure 6. In year 2008, fatal crashes were more compared to others years but in 2010, over all crashes are less but fatal crashes with 19.18% predominated resulting in increased risk of fatality. The number of road crashes related fatalities among childhood and elderly people are directly linked to population density and GDP losses.

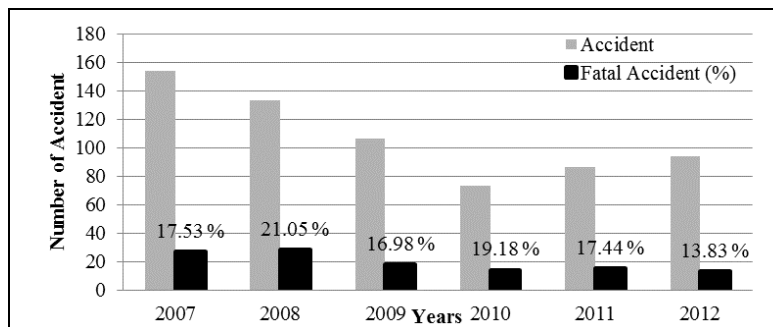


Figure 5: Accident and Fatal Accident(Source: Umra police station, 2013)

If the crash time is considered for the year 2012, the general scenario can be observed as the crashes are majorly observed in the duration of 9:00 to 23:00 hours. In the late night traffic volume is reduced resulting in less crashes due to residential locality in Umra. Evening hours show more likeliness for fatal crashes than the morning hours.

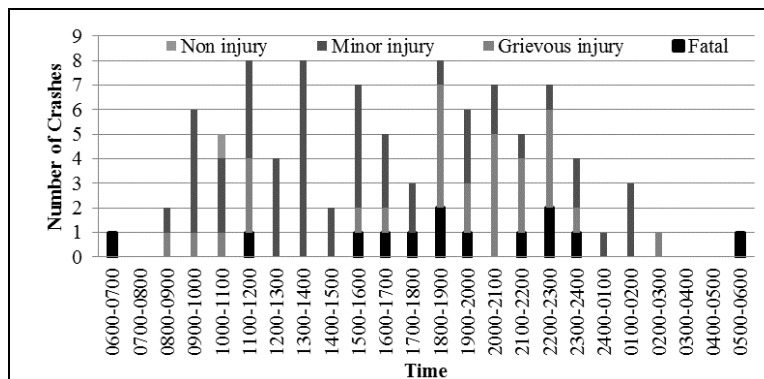


Figure 6: Road crashes distribution by time in 2012(Source: Umra police station, 2013)

Hazira industrial belt is situated the western part of Surat. Major road which connect Surat to Hazira Industrial belt is passing in vicinity of Umra. A lot of trips are generate from Surat to Hazira and Hazira to Surat daily catering workers resulting in increased traffic movement (volume as well as speed) may be a considerable reason for road crashes. If the age groups are considered for the road crash victims, it was observed in year 2012 that major contribution is from the age groups of 18-24 years and 24-44 years with 31% and 46%. These victim belong to the groups which are contributors to the economic wealth of the city as well as nation. Involvement of this age group result in potential future losses. Figure 8 below show the crash involved victims distributed by their age-groups.

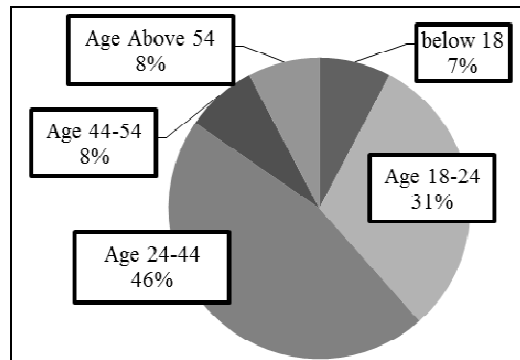


Figure 7: Crash distributions by victim age for year 2012

Further if the involvement of male and female is analysed, it was found that female fatality is less may be because of the low involvement of women as the work force. Over a period of time since 2007 to 2012, it was found that involvement of female victim is reduced over a period of time. Figure 9 show the gender based involvement percentage of victims for different years.

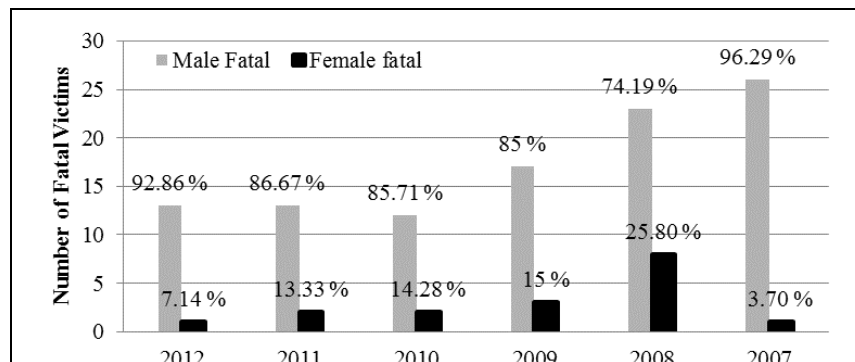


Figure 8: Road Crashes in Umra - distribution by Gender (Source: Umra police station, 2013)

The accident severity index measures the seriousness of the accident and the availability of medical facilities in the city. In this figure, comparison on Surat city and Umra police station boundary as accident severity index and which shows that the number of deaths per 100 accident.

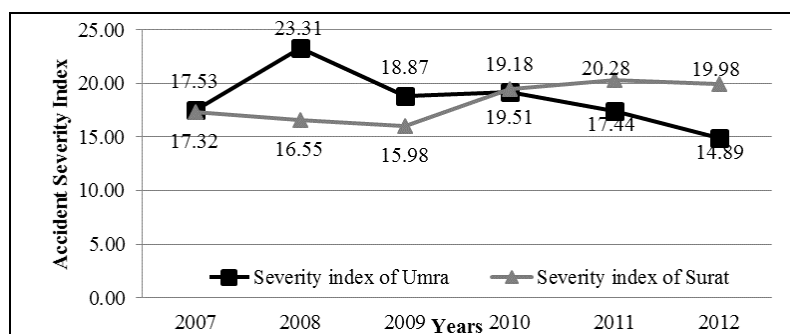


Figure 9: Accident Severity Index

The accident severity index is continuously decreasing in Umra compared to Surat city. After 2010, it was noted that there is easy and prompt availability of post-crash services and good medical facilities in Umra however in Surat, due to some areas are very congested or high traffic volume,

medical facilities are not available on vital time. Presently the emergency medical facility are provided by the State Government initiative (108 services) as well as private hospitals keeping the severity index to lower.

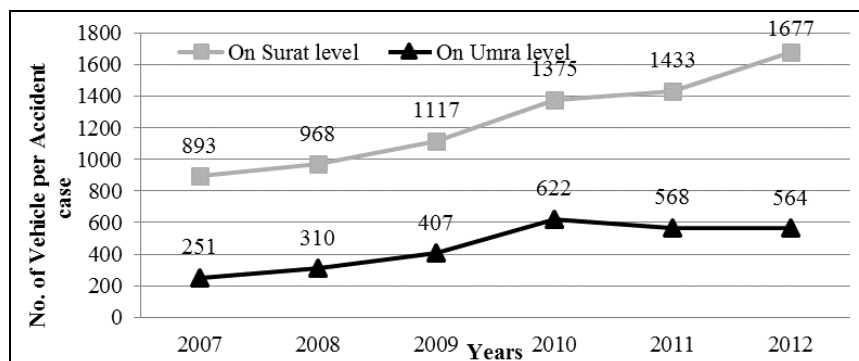


Figure 10: Vehicle-Accident Proportionality Index

Figure above show a comparative scenario for Surat and Umra level vehicle-accident Proportionality Index relating the vehicles in area and total number of crashes. At city level, the index is showing constant increment however at Umra level, after year 2010 there seems to have some control on the road crashes. Further, following table show the involvement of road user groups or vehicles in the crashes in Umra during the year 2012.

Table 1: Road crashes by road user group

Type of road user group	Number of crashes (2012)				
	F (%)	GI (%)	MI (%)	NI (%)	Total in %
MTW	11.11	40	48.89	0	25.14
Moped	0	27.27	72.72	0	6.15
Auto rickshaw	7.14	28.57	57.14	7.14	7.82
Motor car	5.45	32.73	60	1.81	30.73
Jeep	0	0	0	0	0.00
Taxi/cab	0	0	0	0	0.00
Bus	0	0	100	0	0.56
Truck	37.5	12.5	50	0	4.47
Tempo	0	0	100	0	0.56
Articulated vehicles	50	0	50	0	1.12
Tractor	0	0	100	0	1.12
Bicycle	16.66	33.33	50	0	3.35
Pedestrian	25	32.14	42.86	0	15.64
Tree	0	0	100	0	0.56
Other Vehicles	80	0	20	0	2.79

(Source: Umrapolice station, 2013)

The involvement of cars in road crashes is observed to be the highest with 30.73% followed by MTW with 25.14% and pedestrian victims having 15.64%. As far as fatal cases are concerned, involvement of pedestrian and trucks are prominent.

V. LOSSES DUE TO ROAD CRASHES

Loss of production is a disruption of normal operation in routine life and victim of fatal crashes may have been employed, can be a student, or a retired person or a child; when they become

victim of fatality the routine life is disturbed and results in production loss which has direct or indirect effect on GDP.

It was reported that Surat have per capita GDP of 8000 USD i.e. INR 4.96 lacs. Generally, production is through 20% of the population belonging to a particular age-group however, in case available data of crashes it is difficult to obtain information on whether the victim was actually involved in any productivity operations or not. However, in general cases, persons among age-group from 25 to 60 years may be considered for productivity. The figure below show the comparison of losses due to road crashes at Surat and Umra level anticipated with consideration of GDP. Crashes have effects like two sides of one coin. One effect on victim's family, relations, and the society whereas the other side has effect on property, income, medical treatment cost, vehicles loss, time loss, insurance etc. Figures below show the fatal victim losses considering income loss, Productivity loss, medical treatment loss, and vehicles loss. These losses have direct or indirect effect on GDP.

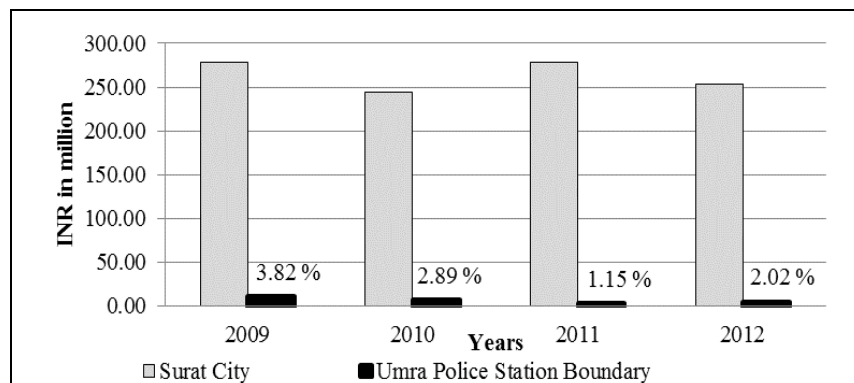


Figure 11: Share of Umra losses due to road crashes at Surat level

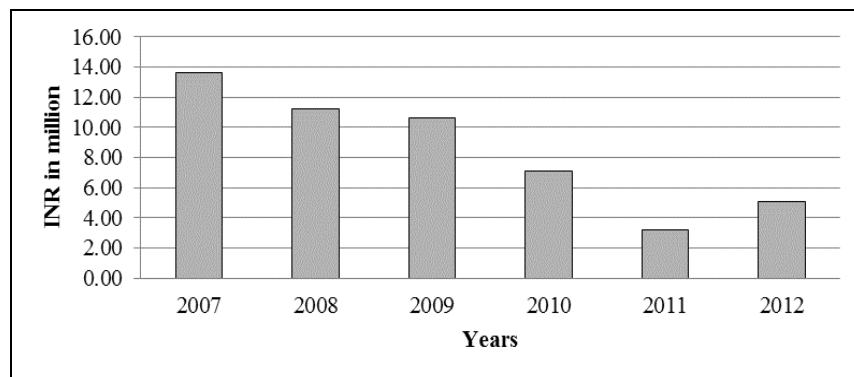


Figure 12: Losses due to road crashes in Umra

VI. CONCLUSION

Surat is emerging as a mega city showing high growth and spatial expansion. It has become a hub for variety of industries and commercial activities. Vehicular population is increasing largely with major proportion of two-wheelers (almost 80%) which are part of vulnerable road users. Average share of loss at city level for each of the police station works out to be 3.84% which for Umra is 2.02%. Accident which is occurred in Umra is different from other area because age of fatal is different in every case so all over fatality losses are decreased. Fatality losses are not only dependent on number of crashes but on the age-group involved also. The extent of losses due to crashes in Umra was found to be to the extent of INR 13.80 million in 2007 which subsequently

reduced to INR 3.5 million by 2011 however, in the year 2012 it shown a rise again to the extent of INR 5.5 million. This shows that despite of reduction in total fatal accidents in 2012, the loss was observed high compared to other years. This specific observation show the effect of the age-group involvement in the road crashes. In general we can say that the loss of crash observes to be high with involvement of persons who still have major time left for the productive economic contribution. Child victim has the maximum effect on the increase of losses however, involvement of such age-group was found to be of lower share. Also, the severity of road crashes have also reduced over year 2012 compared to previous years.

ACKNOWLEDGEMENT

Authors are thankful to Sh. B.M. Prajapati (G.A.S.) for them extreme categorized vehicles data from R.T.O in Surat City, Sh.V.M.Pargi, Indian Police Service, department of traffic and crime, for the permission of traffic crashes data for Surat City, and Sh. C.K.Patel, Police Inspector of Umra Police Station, for the permission of traffic crashes data for Umra. Also, the authors are thankful to Prof.Dr.VaishaliMungarwadi, Principal, SCET and Prof.Himanshu J. Padhya, Head, Civil Engineering Department, SCET, Surat for all the support that had been extended as and when needed during the accomplishing the research work.

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