



## Road Safety Audit for Kapurai - Dabhoi Section of State Highway-11

**Oza Daksheshkumar B.**

P.G. Student. Civil Transportation Engineering, Parul Institute of Engineering & Technology, P.O.: Limda, Ta: Waghodia, Dist. : Vadodara.

**Prof. S. M. Damodariya**

Reader in Civil Engineering Department, Parul Institute of Engineering & Technology

### ABSTRACT

Road network of any country has a notable role to play for countries economy and growth. Transportation through road networks satisfies the basic needs of people. Many lives are lost and huge amount of property damage occurs due to accidents. This paper is an attempt to analyze the traffic safety situation Kapurai - Dabhoi Section of SH-11, Gujarat, India and to identify countermeasures for stretches in which the total harm caused by crashes can be substantially and readily reduced. In this study I have identified the road accidents, its causes, variation with respect to yearly, monthly, hourly, user type vehicle, age, seasonal. I have also identified black spots in the study area and given suggestion to improve safety of road users. I have also created linear regression model in which I have establish relationship between years with type of accidents.

**KEYWORDS : Road Accident; Fatalities; Road Safety Aspects; Severity Index.**

### INTRODUCTION

Roads are integral part of the transport system and Roads are indispensable for commuting in daily life. A country's road network should be efficient in order to maximize economic and social benefits. They play a significant role in achieving development and contributing to the overall performance and social functioning of the community. Now a day, due to fast life vehicles and constant road width are increasing rapidly, they changing environment scenario, the accidents are increasing rapidly day by day. Road safety is a main concern to reduce road accidents. A Road safety measure prevents the accidents to a minimum. Road safety can be increased by providing safety measures such as traffic calming devices; traffic signs, signals, and markings; street lighting; bridges, culverts, over bridges and underpasses; ditches along the roadway; proper geometric designs of a location; parking regulations; removing sight obstructions in the roadways; etc. Providing a safe driving environment is indeed not only a responsibility, but also the highest priority for all road projects.

A Road Traffic Accident (RTA) can be defined as, 'An event that occurs on a way or street open to public traffic; resulting in one or more persons being injured or killed, where at least one moving vehicle is involved. Thus RTA is a collision between vehicles; between vehicles and pedestrians; between vehicles and animals; or between vehicles and geographical or architectural obstacles.' Road traffic accidents are a human tragedy. They involve high human suffering and socio-economic costs in terms of premature deaths, injuries, loss of productivity, and so on.

### ROAD ACCIDENT

An accident (collision, overturning or slipping ) which occurred or originated on a road open to public traffic resulting in either injury or loss of life, or damage of property, in which at least one moving vehicle was involved.

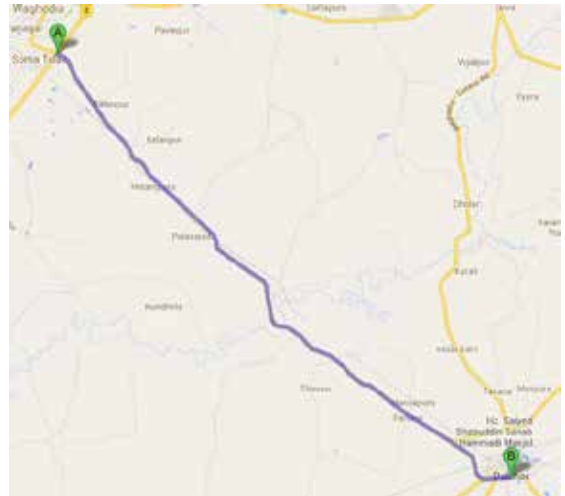
### NEED OF STUDY

Every road needs proper and accurate designing of various elements consisting the road surface otherwise chances of accidents increases because of the improper design. Government has tried many things to reduce the accident on road surface but the desired results are not achieved. Some data are not recorded on the police station. So there is need to do road safety audit on the highway. Whether design of road is according to specifications or not can be known? Whether intersection design is correct or not can be known? By analyzing the accident data from past and from various traffic parameters, we can provide safety measures for the particular road, intersection or black spots. Road Safety Planners and Traffic Engineer play an important role for evaluating the traffic problems and providing safe journey to people. Accidents have direct impact to any type of locality residing near by the accident prone locations. A safety planner has a role to

provide the safe journey to user on road.

### STUDY AREA

State Highway SH-11 (from Kapurai junction to Dabhoi 25.8 km) is major state highway of Gujarat where there is heavy traffic which connects to national highway NH-8 needs frequent safe. Keeping this in mind the study location of SH-11 has been selected in order to provide easy and safe access to people travelling through this stretch.



**Figure 1: study area**

Sources: [www.googlemap.com](http://www.googlemap.com)

### ACCIDENT DATA FROM POLICE STATION

Accident data should be collected from First Information Report (FIR) from the concerned police stations of the selected stretch. After getting the FIR information, database is to be created day-wise, month-wise, year-wise, km-wise distribution of accidents. This would help in identifying the black spots.

### YEARLY VARIATION OF ACCIDENTS

**Table 1 Yearly Variation of Accidents data from 2009-2013**

Year	Minor	Serious	Fatal	Total
2009	36	31	21	88
2010	66	81	27	174

2011	26	47	18	91
2012	29	20	18	67
2013	34	29	22	85
Total	191	208	106	505

Table 1 show that there is 505 People injured in accidents in 2009-2013 in which 191 minor, 208 serious and 106 fatal respectively. There is maximum accidents occur in year 2010-2011 in last 5 year.

### MONTHLY VARIATION OF ACCIDENTS

**Table 2 Monthly Variation of Accidents data from 2009-2013**

Month	Minor	Serious	Fatal	Total
January	8	13	9	30
February	8	11	11	30
March	15	16	7	38
April	9	13	8	30
May	12	17	16	45
June	24	21	10	55
July	24	41	15	80
August	8	18	5	31
September	14	11	7	32
October	10	20	6	36
November	20	21	6	47
December	20	18	13	51
Total	172	220	113	505

Table 2 shows that more number of accidents has been occurred during the month of July which is the summer season and driver's do move at excessive speeds and are also inattentive.

### HOURLY VARIATION OF ACCIDENTS

**Table 3 Hourly Variation of Accidents data from 2009-2013**

Time	Minor	Serious	Fatal	Total
0:00 to 1:00	6	5	6	17
1:00 to 2:00	0	4	1	5
2:00 to 3:00	5	1	1	7
3:00 to 4:00	1	1	3	5
4:00 to 5:00	2	2	2	6
5:00 to 6:00	5	7	3	15
6:00 to 7:00	1	0	1	2
7:00 to 8:00	7	6	3	16
8:00 to 9:00	6	9	6	21
9:00 to 10:00	8	15	5	28
10:00 to 11:00	10	15	6	31
11:00 to 12:00	1	3	3	7
12:00 to 13:00	9	11	3	23
13:00 to 14:00	14	23	4	41
14:00 to 15:00	11	11	6	28
15:00 to 16:00	23	30	11	64
16:00 to 17:00	15	8	2	25

17:00 to 18:00	13	19	4	36
18:00 to 19:00	8	6	4	18
19:00 to 20:00	8	6	11	25
20:00 to 21:00	7	13	12	32
21:00 to 22:00	2	10	6	18
22:00 to 23:00	8	5	6	19
23:00 to 24:00	6	8	2	16
Total	176	218	111	505

Table 3 shows that maximum accidents occurred during day time between 15:00 to 16:00. Accidents are occurred more during day time compared to night time. During day time visibility is more and numbers of trips are also more. Driver's have a tendency to take more risk during visibility hours. Also, it is seen that persons going for working place (morning 8:00 to 11:00) and leaving working (17:00 to 20:00 hours) place shows the rise in accidents.

### ACCIDENT IDENTIFY AS PER VEHICLE TYPE

**Table 4 Accident as per Vehicle type**

User type	Minor	Serious	Fatal	Total
Pedestrian	5	13	9	27
Cycle	4	3	3	10
Two-wheeler	37	53	36	126
Three-wheeler	16	19	9	44
Four-wheeler	50	54	23	127
Bus	22	40	9	71
Truck	38	39	23	100
Total	172	221	112	505

Table 4 shows that maximum number of accidents occurred in two wheelers, four wheelers and trucks. One big reason is there is Orsang River near Dabhoi therefore more number of truck transport sand to near big city Vadodara.

### ACCIDENT IDENTIFY AS PER AGE

**Table 5 Accident identify as per Age**

Age	Minor	Serious	Fatal	Total
Less than 20	17	24	14	55
20-30	60	58	43	161
30-40	50	64	33	147
40-50	35	43	15	93
50-60	11	20	6	37
60-70	4	5	3	12
Total	177	214	114	505

Table 5 shows that involvement people of affect of accident having age limit between 20-30 and 30-40 are maximum. Persons having age limit less than 20 and greater than 50 are less involved in accident.

**ACCIDENT CLASSIFIED AS PER SEASONAL**

**Table 6 Accident classified as per Season**

Season	Minor	Serious	Fatal	Total
Winter	56	63	39	158
Summer	60	67	41	168
Monsoon	56	90	33	179
Total	172	220	113	505

Table 6 shows that maximum accident occurred in monsoon season due to weather not clear. Also show that in winter and summer accident frequency also more.

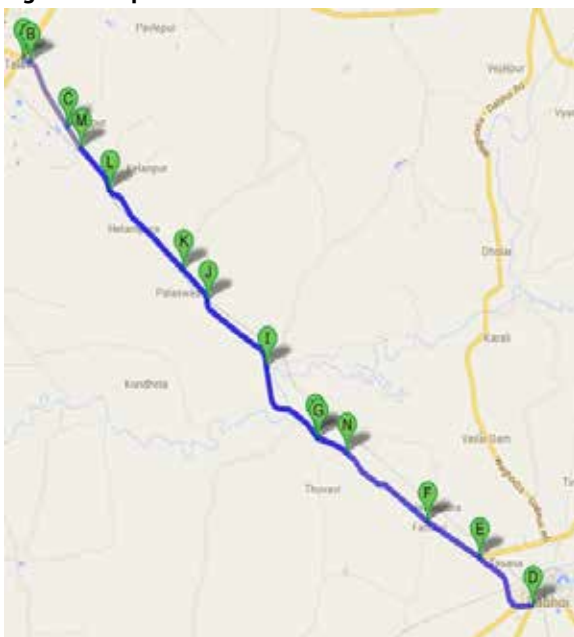
**BLACK SPOTS IDENTIFY**

**Table 7 Black Spots Detail**

No.	Chainage in KM	LOCATION (Google location)	No of Accidents
1	0.20	Kapurai Bus stand (B)	12
2	2.60	Ratanpur crossing (C)	12
3	3.30	Dada Bhagvan (M)	9
4	5.00	Kelanpur (L)	18
5	8.70	Kuvarvada - Kundhela crossing (K)	20
6	10.00	Palasvada Railway Crossing (J)	27
7	12.60	Bhilapur crossing (I)	30
8	15.50	Rajali-Thuvavi crossing (G)	13
9	16.30	Thuvavi (N)	15
10	17.40	Ambav- Boravar crossing (M)	25
11	21.00	Hansapura - Fartikui crossing (F)	32
12	23.00	Vega crossing (E)	21
		TOTAL	234

Table 7 shows the high frequency accident prone area (black spots) from Kapurai - Dabhoi section of State Highway-11.

**Fig 2 Black Spots Location**



(Source: Google Maps)

From the accident analysis, it can be concluded that during day time the accidents are occurring more in number compared to night hours. This may be attributed due to heavy road traffic, poor road geometry and environment, lack of traffic sense and enforcement measures. Policies during rush hours need to be there. This will reduce the accidents on black spots considerably.

Based on accident analysis we can conclude that:

- (I) Maximum numbers of accidents especially fatal accidents are found to occur for the vehicles, which are moving straight.
- (II) Majority of accidents occur at village junction on highway.
- (III) Maximum Accidents are caused due to heavy traffic.
- (IV) Maximum accidents occur during day time. Maximum Accidents are recorded during peak hours between 08:00 to 11:00 and 17:00 to 20:00 pm.
- (V) Maximum Number of Casualities occurs to two - Wheelers, four-Wheelers and Truck.
- (VI) Driver's with age limit between 20-30 and 30-40 are involved in maximum number of accidents on study area.
- (VII) Most of accidents are caused during monsoon season indicating lack of driver's alertness during the bad weather.

**Remedial measures**

1. There is no shoulder provided near Kapurai bus stand Chainage 0.20 km. So in emergency vehicle cannot park or drive on side, which causes accident.
2. There is less sight distance due to hoardings at Ratanpur village bus stand Chainage 2.60 km. also required zebra crossing for crossing road for pedestrian
3. There is zebra crossing required for crossing road for pedestrian at Dada Bhagvan near Navapura village Chainage 3.30 km. and also necessary to provide Bus Bays for passanger safety and facility.
4. Major Accident location at Outpost of Kelanpur village Chainage 5.00 km. There is Railway station and bus stand on SH-11 at Kelanpur village. So Enforcement or speed breaker required to force vehicle to reduce their speed.
5. At Kuvarvada - Kundhela crossing Chainage 8.70km required to provide Proper sign signals marking.
6. At Palasvada Railway Crossing Chainage 10.00 km efficient lighting system is to be provided for night visibility point of view and also for reducing glare at the night time.
7. Bhilapur crossing at Chainage 12.60 km there is needed to provide speed breaker to force vehicle to reduce their speed.
8. Major Accident location at Rajali-Thuvavi crossing Chainage 15.50 km. Road side area covered by village sales people causes accident. Prividng area for sales people for business.
9. Thuvavi (Y-junction) at 16.30km necessary to provide sign board and proper road markings.
10. Ambav- Boravar crossing at 17.40 km and Hansapura - Fartikui crossing at 21.00 km need to provide bus bays for local village people for them safety and convenience.
11. Major Accident location at Vega crossing at Chainage 22.00 km. Proper road marking required for guide lining vehicle. Also providing High type channelized Y-intersection.

**CONCLUSIONS**

## REFERENCES

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