International Journal of Technical Innovation in Modern Engineering & Science (IJTIMES)
Impact Factor: 5.22 (SJIF-2017), e-ISSN: 2455-2585
Volume 5, Issue 03, March-2019

ACCIDENT ANALYSIS FOR ROAD LINK JOINING TO IDAR TO KHEDBRAHMA IN SABARKANTHA DISTRICT

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Abstract: : In most regions of the world, the epidemic of road traffic fatalities is on the upsurge with over 1.2 million people die every year due to road crashes and about 50 million suffer nonfatal injuries. According to Ministry of Road Transport & Highways (MORT&H) India, the analysis of road accident data 2016 reveals that about 1,374 accidents and 400 deaths take place every day on Indian roads which further translates into 57 accidents and loss of 17 lives on an average every hour in our country. Generally major victims in the accidents are pedestrians, bicyclists and two wheelers, among which generally in the age group of 25 to 65 years. The present study focuses on to understand rural roadway accidents causes. In order to help and find cost-effective solutions for reducing the frequency and severity of crashes, various rural roadways of Sabarkantha district will be selected. In this study, accident data from the respective Police stations will be collected. After analyzing this data, black spots will be decided. Analysis of this information will be helpful to find the remedial measures for reducing the accident rate.

Keywords — Accident, Accident Rate, Black spot, pedestrian, Road accident, Road Crash,

I. INTRODUCTION

The accident analysis is the systematic checking of the safety aspects of new/existing highway and traffic management schemes, including modifications to existing layouts. The main aim of accident analysis is to ensure that all new road schemes operate as safely as practicable from the beginning and to reduce future problems. In recent years, rural road network developed rapidly, as of the end of 2016, rural road have 3,935,337 km of the Indian total highway mileage, and at the same time, the security problem has become more and more serious. Nearly three years, accidents in rural road accounted for about 40% of the total road accident, the ratio that number of accidents in rural road, deaths, injuries, property loss accounted for the corresponding data has increased year by year. In view of examination of vehicle composition, speed, road, innovation file of rural road, rustic expressway traffic condition, the traffic safety status and the reason for accident are broke down in this report, and the traffic safety counter estimates set forward so as to decrease country roadway accident and improve safety level. To limit the road accident in India, RSA is being pursued in a very big way on the current as well as on proposed new highways. For various projects of national highways development projects [NHDP] a part of this effort is been taken by national highway authority of India [NHAI] has commenced road safety audit. Various states of the country are also started RSA for their road projects.

Table 1: Number of Accidents and Number of Persons Involved in India

Years	No. of accidents		No. of persons	
	Total	Fatal	Killed	Injured
2001	405637	71219	80888	405216
2002	407497	73650	84674	408711
2003	406726	73589	85998	435122
2004	429910	79357	92618	465521
2005	439255	83481	94968	465282
2006	460920	93917	105749	496481
2007	479216	101161	114444	513340
2008	484704	106591	119860	523193
2009	486384	110993	125660	515458
2010	499628	119558	134513	527512
2011	497686	121618	142485	511394
2012	490383	123093	138258	509667
2013	486476	122589	137572	494893

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2014	489400	125828	139671	493474
2015	501423	131726	146133	500279
2016	480652	136071	150785	494624
2017	464910	134796	147913	470975

II. LITERATURE REVIEW

Maru et al (2016) in a time of nonstop development in portability and interest for transportation, safety is an issue of real social concern and a region of broad research and work. The rate of accident in developing nations like India expands step by step. The occurrence of accident not just aims prompt misfortune in term of property and life but may also cause a long term pain or grief. This study presents accident scenario and lack of road safety provisions. For that purpose various types of surveys related to work has been carried out. The results of this analysis give the scenario of accident and road safety provided. Black spot are identified and ranking of hazardous locations is done by Accident severity per kilometer. By the study of accident scenario this study gives the road safety measures to prevent the accidents on entire stretch. Oza et al (2014) have examined This paper is an attempt to investigate the traffic safety circumstance Kapurai - Dabhoi Section of SH-11, Gujarat, India and to distinguish countermeasures for stretches in which the absolute mischief brought about by accidents can be considerably and promptly decreased. In this examination they have distinguished the road accidents, its causes, variety as for yearly, month to month, hourly, user type vehicle, age, seasonal. They have additionally recognized black spots in the investigation zone and offered recommendation to improve safety of road users. They have also created linear regression model in which they have establish relationship between years with type of accidents. **Sharma** et al (2016) the present study focuses on Road Safety Audit at Rural area of Aravalli district Gujarat India. This research aims at developing an expert system that can serve as a diagnosis knowledge-based system of traffic-safety condition at rural roads due to the principles of RSA. The expert system deals with the database of safety auditing examination according to checklists extracted from the program of RSA for rural roads in Aravalli. in order to help and find cost-effective solutions for reducing the frequency and severity of crashes on rural two-lane roadways. To achieve such a goal, traffic accident data, roadway geometric data, traffic volume data, traffic control data, and related land use data from study routes are collected and analyzed A total of five-year data from 2010 to 2014 are collected from multiple sources, including the Police Department, roadway video image data (from electronic media), and geographical information systems (GIS) data retrieved from Road and Building Department(R&B). Basic on this study the conclusion have been drawn the Study represents that rise and fall of road, width of pavement, No. of junction and degree of curvature impacted accident rate and they are the main factor for causing road accident on selected route. From them no. of junction is most impacted factor for accident and the traffic volume impact for accident is negligible due to level of service of road is class A. If the improvement in rise fall of road, curvature and junction location then accident rate may automatically decrease, which is feasible for selected route of Aravalli district. Jain et al. (2011) have examined the study aims to evaluate road safety audit of a section of four-path national highway (NH)- 58 and will concentrate on evaluating the advantages of the proposed actions that have emanated from deficiencies distinguished through the audit process. After conducting RSA, it is discovered that trucks are parked on highway which reduces the effective width of carriageway and making traffic risks to high speed moving traffic. Unapproved middle openings were found which should be immediately closed. Missing road and median markings to be done and speed signs should match with speed. Access and service lanes are also deficient which requires quick improvement. The most helpless road user i.e. Pedestrians and cyclists facilities near habitation are lacking and needs to be facilitated on priority

III. METHODOLOGY

Accident data collection

The data collection of the accidents is primarily done by the police. Motorist accident reports are secondary data which are filed by motorists themselves. Table 2 shows the format of accident detail obtained from the Police department.

1. **General** - Date, time, and person involved in accident, classification of accident like fatal, serious, and minor.
2. **Location** - Description and detail of location of accident.
3. **Details of vehicle involved** - Registration number, description of vehicle, loading detail, Vehicle defects.
4. **Nature of accident** - Details of collision, damages, injury and casualty
5. **Road and traffic condition** - Details of road geometry, surface characteristics, type of traffic, traffic density etc.
6. **78**
7. **Primary causes of accident** - Details of various possible cases (already mentioned) which are the main causes of accident.
8. **Accident cost** - Financial losses incurred due to property damage, personal injury and Casualty.

Table 2: Accident Data collection Format

Sr. No.	Date	Time	Place	Collision	Type of Vehicle involved	No. of death	No. of injured person

IV. STUDY AREA

Sabarkantha district is a district in the state of Gujarat in India. The district is situated at 23.8477° N, 72.9933° E in western India. The "Tropic of Cancer" passes through Sabarkantha district. Sabarkantha District is surrounded by Rajasthan state to the northeast, Banaskantha and Mehsana districts to the west, Gandhinagar to the south and Aravalli District to the South - East. The district headquarters at himmatnagar. Figure 1 shows the location of sabarkantha district in the map of Gujarat.

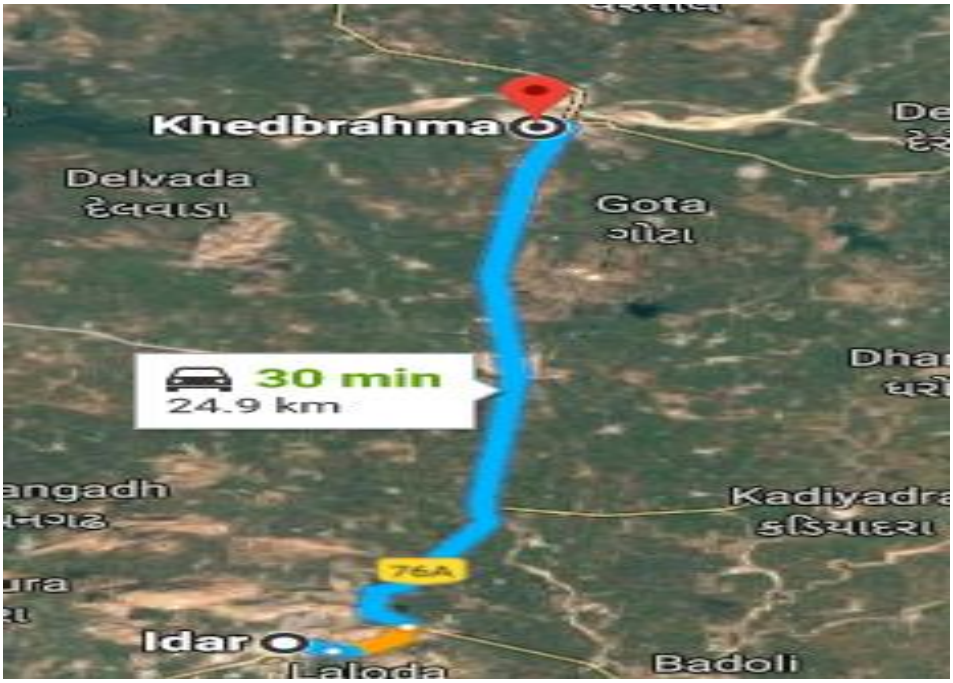

Figure 1: Google earth image of study area

V. DATA COLLECTION AND ANALYSIS

Following table shows the accident summary of Idar to Khedbrahma Road. Study present number of fatal and non-fatal accident, non-fatal accident with respect to type of vehicle, fatal accident with respect to type of vehicle and also pedestrian fatal and non fatal accidents with respect to type of vehicles.

Table 3: Accidents detail of Idar to Khedbrahma

Number of Accidents detail of Idar to Khedbrahma			
Year	Fatal	Non-Fatal	Total no. Of accidents
2013	12	21	33
2014	8	28	36
2015	11	32	43
2016	31	39	70

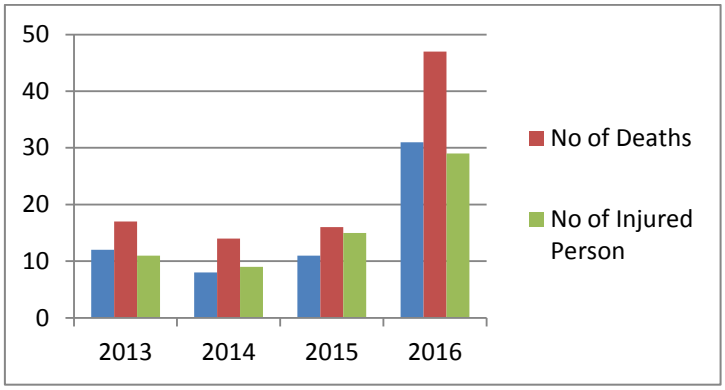

Figure 2: Summary of Accidents Detail of Idar to Khedbrahma

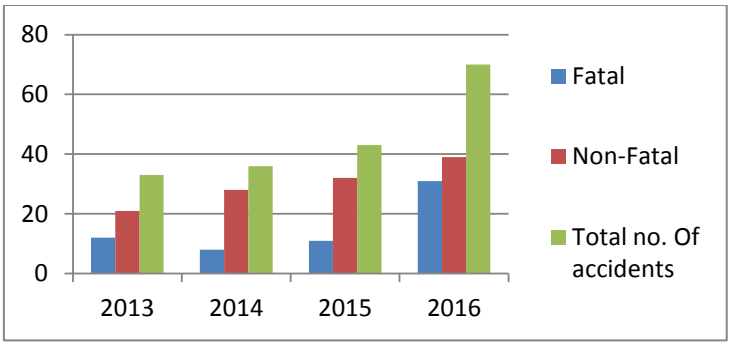

Figure 3: Summary of Fatal Accidents Detail of Idar to Khedbrahma

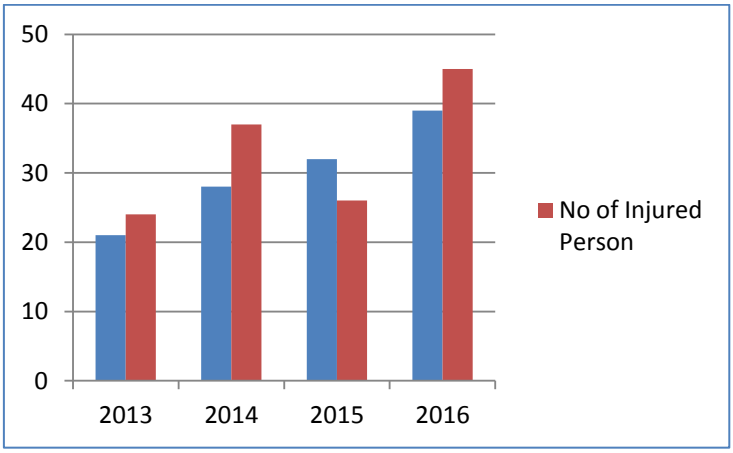

Figure 4: Summary of Non-Fatal Accidents Detail of Idar to Khedbrahma

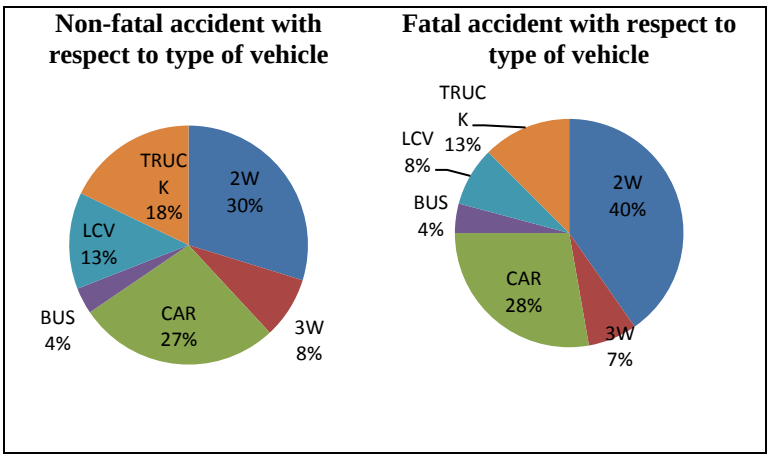

Figure 5: Accident with respect to type of vehicle Idar to Khedbrahma

Table 4: all black spot belong to Idar to Khedbrahma

Black Spot	Dead	injured	Fatal
Dhanal Road 3 rasta	1	14	5
AIT Vadali	1	13	8
Nadori-Vadoth 3 Rasta	2	15	0
Magasar 3 rasta	4	19	10
Kothikampa Road	2	11	7
Kalimata mandir	2	8	4
Undava 3 Rasta	3	14	6
Near Jyoti High school	2	17	7

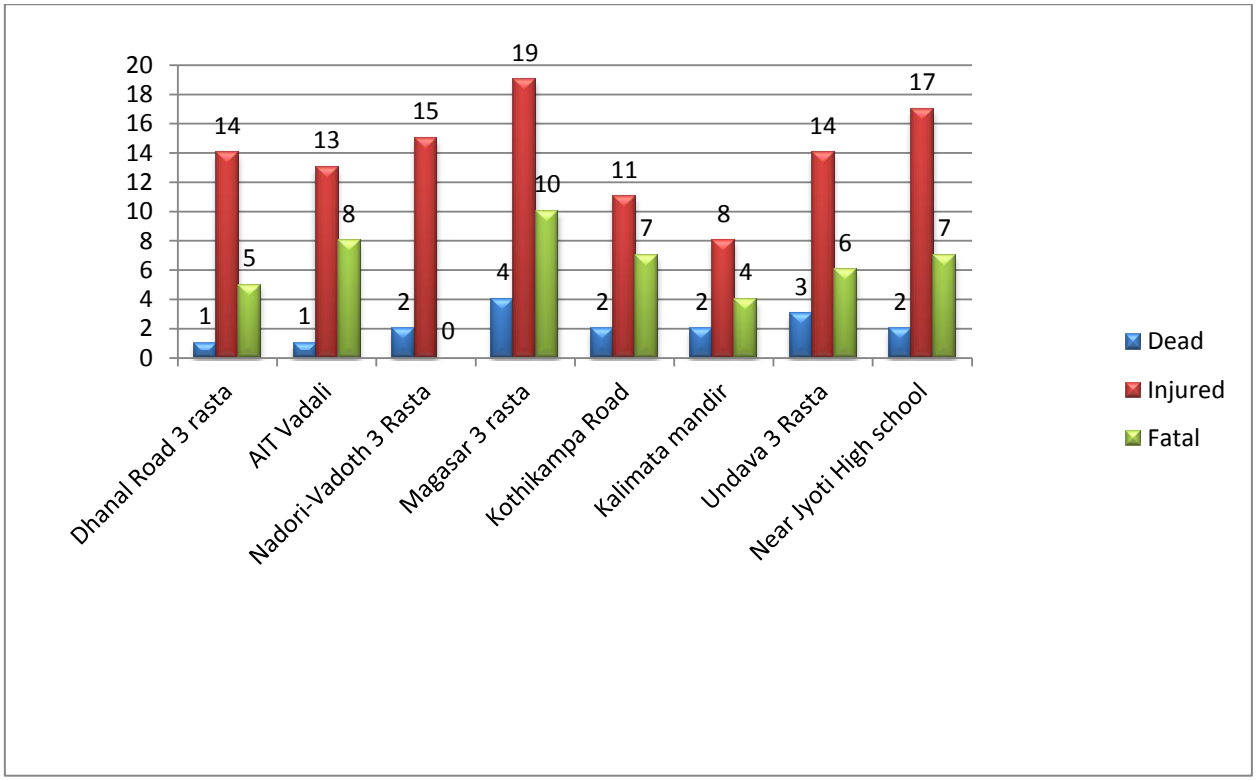

Figure 6: black Spot in Study Area

VI. PREVENTIVE MEASURES

1. Change in geometric design of road is required as the required super elevation is not there.
2. Provide divider on specific location for reducing Accidents.
3. To provide proper surface of road for safe and smooth riding.
4. Provide Road widening from single lane to double lane.
5. Required Speed breakers.
6. Repairs of cracked surface and filling up of pot holes to reduce the accidents.
7. Installation of cat eyes and road reflectors in the junctions and also near the road humps.

VII. CONCLUSION

1. Based on the police record & Accident severity per km the black spots are identified.
2. Accident Analysis & Prevention provides wide coverage of the general areas relating to accidental injury and harm, including the pre-injury and quick post-injury stages.
3. Magasar Chowkdi there is no facility for pedestrian to Crossing the road, so it's creating the black spot.
4. Based on the accident data majority of accident occurred is between chainage 7, 14 & 20.

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ACKNOWLEDGMENT

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