isrjournals

International Journal of Advanced Research in Civil,Structural,Environmental and Infrastructure Engineering and Developing

Volume: 2 Issue: 2 Apr,2016,ISSN_NO: 2320-723X

Analysis Of Road Accidents National Highway-5

Dr.A.S.kanagalakshmi*, M.dinesh, M.saikrishna raju**, Jishar jaffry**, Syed Ashish basha****
***professor, Dept of civil engineering, panimalar engineering college**
****Student, Dept of civil engineering , panimalar engineering college**

1. ABSTRACT

Accidents are not natural but they are caused is a common cliche in the area of traffic safety. Thus, if accidents are caused by some, surely the ones responsible are could be identified and appropriate remedial measures developed and implemented to the extent feasible. Analysis of previous data indicates that 66 of the accidents occur due to human error and 33 due to road parameters such as road and vehicle interaction, other road user and environmental factors. India has a road network of 3.3 million km consisting of National Highway NH, State Highway SH, Major District Roads MDR and Other District roads ODR. National Highways constitute 2 of the total road length and carries more than 40 of passenger traffic and 85 of goods traffic has registered more accidents accounting for 20, as compared to other roads. This paper lays emphasis on accident studies on the 40 km long National Highway 5 section between MOOLAKADAI, in state of tamil nadu and TADA, in the State of Andhra Pradesh, India. The Institute has undertaken a study on NH5 between Moolakadai to Tada during the year 2003 and it runs through urban, semi urban and rural areas. The accident data for the last five years was collected form the concerned police station and analyzed there after. The data revealed that 64 deaths and 373 injuries were recorded between January to December, 2002 and 20 deaths, 82 injuries were recorded between January to June, 2003. The analysis of the data from safety point of view indicated that the vehicle drivers are the single major factor responsible for the accidents as they fail to perceive the situation ahead because of poor reflexes, fatigue, inexperience or being under the influence of intoxicants. The accident data for the section indicated that two wheelers are the ones who mainly suffer the fatalities and major injuries, which is around 35 followed by trucks 23 involved in accidents. The reasons for the accidents can be attributed to the driver, improper design of pedestrian crossing, frequent median openings, and lack of enforcement to control wrong side movements. There are however, other factors, which contribute directly or indirectly to the accidents include road, vehicle, road user and environmental factors. From the results of the analysis, it can be concluded that this National Highway section needs improvement from safety point of view. A large number of accidents have been occurring over such a small section of 40 km length. Proper traffic guidance and control system to guide road users ensuring safe movement of vehicles has been recommended and some of the facilities such as pedestrian crossings and median openings, acceleration and deceleration lanes were redesigned in order to improve the safety of the road and minimize the accidents.

KeyWords: road Accident, Safety, National Highway.

Volume: 2 Issue: 2 Apr,2016,ISSN_NO: 2320-723X

2. INTRODUCTION

The National Highway 5 is one of the major highway connecting southern parts of India, mainly Tamil Nadu, Andhra Pradesh, Orissa and west Bengal. All commercial trucks and travelling vehicles travel by this route. There are huge number of colleges, hospitals, factories, hotels and restaurants. This highway also has a record of frequent accidents either fatal or non-fatal. If there is heavy traffic or more numbers of check-posts, then trucks travel by rural roads and cause accident on villages. The government has taken measures to reduce the accidents this may include widening of roads , construction of 4 lane or 6 lane roads, construction of bridges, construction of flyovers, etc. But these measures are not sufficient due to growing population and increase in volume of vehicles. The accident of highway causes more number of collateral damage of goods, money, men and vehicles. This has been of great concern of government regarding controlling accidents and death of people.

The government has launched national highway department to look after the problems but in vain it is not also effective, further the highways department contracted private organizations to maintain the roads.

These private organizations do lay pedestrian markings and crossings, help lines and do all necessary changes required accordingly. But, these steps are not sufficient enough to avoid road accidents. Encroachments' on road and unwanted presence of distraction cause sudden accidents. We have planned to rectify these problems by analyzing the current scenario and make necessary steps regarding it.

3.OBJECTIVE :

As per the NHAI number of road accidents in India is three times higher than that prevailing in developed countries. The number of accidents for 1000 vehicles in India is as high as 35 while the figure ranges from 4 to 10 in developed countries.

The objectives of the present study are listed below:

To study the monthly and annual variation in accident rate on selected stretch.

To study the effect of traffic volume on accident rate and innovative ways to reduce it.

4.SPAN OF HIGHWAYS:

- The span of NH5 is as follows
- NH 16 runs for 1,533 km (953 mi).
- Odisha - 488 km (303 mi)
- Andhra Pradesh - 1,000 km (620 mi)
- Tamil Nadu - 45 km (28 mi)

5.STATES COVERED BY NH5:

- TAMIL NADU.
- ANDHRA PRADESH.
- ORRISA.
- WEST BENGAL.

6.MAJOR CITIES COVERED BY NH5 :

Volume: 2 Issue: 2 Apr,2016 ISSN NO: 2320-723X

- CHENNAI. (TN)
- CHITTOR. (AP)
- GUNTUR. (AP)
- TADA. (AP)
- TADA. (AP)
- VISHAKAPATNAM. (AP)
- BERHAMPUR. (ORISSA)
- BHUVANESHWAR. (ORISSA)
- CUTTAK. (ORISSA)
- KOLKATA. (WB)

7.MAJOR HARBOURS :

- 1.KOLKATA
- 2.ORRISA
- 3.VISHAKAPATNAM
- 4.RAJAMUNDRY
- 5.TADA
- 6.CHENNAI

8.RURAL AREAS:

- 1.KOLAGHAT
- 2.BALASUR
- 3.GANJAM
- 4.PALASA
- 5.SRIKAKULAM
- 6.ANKAPALLI
- 7.TUNI
- 8.ELURU
- 9.CHILAKAURIPET
- 10.KAVALI
- 11.TADA
- 12.KAVARAPETTAI

9.METHODOLOGY

- 1.Data collection
- 2.Analysis of secondary data using WSI method.
- 3.Analysis of primary data
- 4.Analysis of identified black spots using GIS

The following detailed methodology has been adopted for obtaining the various aspects of the present study. The steps involved in the study are explained in the following sections.

A. Data Collection

Volume: 2 Issue: 2 Apr 2016 ISSN NO: 2320-723X

Primary and secondary data were collected for the study. Secondary data collection includes the collection of required accident data for the past three years from the concerned police department. Primary data collection includes road inventory data collection, traffic volume count, speed and delay study and spot speed survey from the identified accident prone stretches.

B. Analysis of secondary data using WSI method

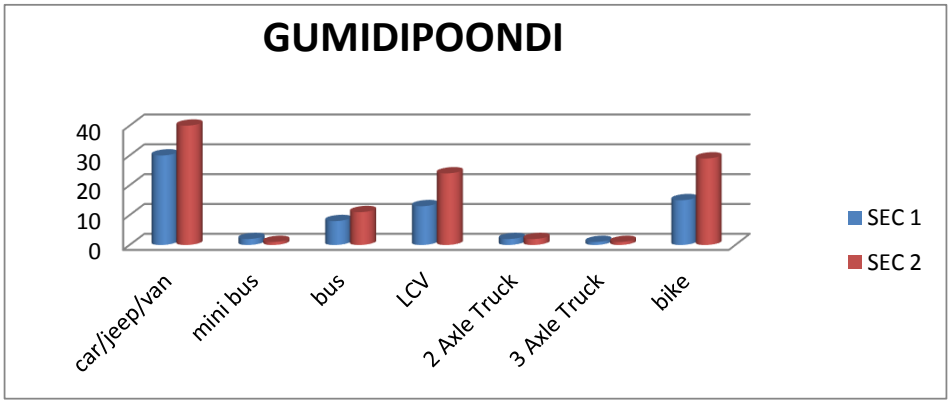
Three years accident data (secondary data) for the Gumidipoondi district was collected from State Crime Records Bureau (SCRB), Tada. The top ranked six accident black spots (Table I) were identified using Weighted Severity Index Method (WSI) by assigning scores based on the number and severity of accidents in that particular location in the last 3 years.

Weighted Severity Index, **(WSI) = (41 x *K)* + *(4 x GI)* + *(1 x MI)* …… *(1)***

Where, **K is the number of persons killed; GI is the number of grievous injuries; and MI is the number of minor injuries.**

PANAMANGADU = (41*14) + (4*142) + (1*553) =1695

GUMIDIPOONDI = (41*9) + (4*93) + (1*364) = 1105



KAVARAPETTAI = (41*8) + (4*77) + (1*308) = 944

ARAMBAKKAM = (41*7) + (4*79) + (1*335) = 938

RED HILLS = (41*8) + (4*78) + (1*283) = 923

RAMAPURAM = (41*7) + (4*75) + (1*303) = 890

TABLE I: TOP RANKED ACCIDENT SPOTS

Place	WSI Value	Place	WSI Value
Pannamangadu	1695	gumidipoondi	1105
Kavarapettai	944	Arambakkam	938
Red hills	923	Ramapurm	890

C. Analysis of the Primary data

Road Inventory study, traffic volume count, speed and delay study etc.(primary data collection) were conducted at the above identified accident black spots.

1) Road Inventory Survey: A detailed road inventory survey was carried out on the entire identified spots to measure the roadway geometric parameters like the roadway width, footpath width, median, shoulders, surface type, surface condition, edge obstruction, road markings, road signs, drainage facilities and adjoining land use.

All the study stretches of Tada district are National Highways. From the road inventory survey it is observed that, the carriage way width of all stretches varies from 8 m to 10 m. It is not sufficient for accommodating huge traffic and the width is not satisfying the standards of national highways. In Ramapuram, Kavarapettai and Panamangadu there is no median for differentiating the direction of traffic. It may cause head on collision and night time road accidents due to glare problem. Bituminous surfacing is provided in all the spots and it is in fair condition. Presence of a number of T- Junctions is the primary causes of road accidents in these six stretches.

The alignment of the road is straight in all places and it encourages drivers to take over speed while travelling through these spots. Drainage facilities are given in most places and it is not good condition. Uncovered drainages compel pedestrians to use roads for walking and lead pedestrian accidents. Presence of advertising hoardings and illegal boards divert the attention of drivers while driving. The road signs and markings provided are visible and capable for necessary enforcement of traffic. Adequate shoulder width is provided in all stretches and helps drivers especially for two wheeler riders to keep the left side of the road. Regular maintenance is required for removing all the above ill effects of national highways and for providing safety for all road users.

2) Traffic Volume Count: The traffic volume count gives the measure of how many vehicles pass through a particular location during a period of time. According to the traffic volume, the time can be classified to peak hour and off peak hour.

For any traffic infrastructure design and accident study peak hour traffic volume is necessary. So, in the present study, four hour traffic volume count was taken for all the spots and peak hour traffic in terms of Passenger Car Units (PCU) was found.

From the survey it was observed that the road stretch under consideration carries highly mixed traffic of both fast moving vehicles and slow moving vehicles. The fast moving two wheelers and passenger cars are predominant in all the six stretches. The peak hour traffic volume ranges from 1000 PCU to 3600 PCU. The highest peak hour traffic observed at Red hills jn and lowest peak hour traffic observed at Pannamangadu. Fast moving light commercial vehicles (LCV) are predominant in all the six study spots. Traffic volumes for the identified spots are given in table below.

TABLE II: TRAFFIC VOLUME IN TERMS OF PASSENGER CAR UNITS (PCU)

Accident Black Spot	Peak Hour Traffic Volume (PCU)	Average Daily Traffic (PCU)
Pannamangadu	3549	41753
Kavarapettai	2058	24212
Red hills	1342	15788

gumidipoondi	2785	32765
Arambakkam	2408	28329
Ramapurm	1334	15706

3) Speed and Delay Study: The speed and delay study was carried out by using moving observer method on entire identified black spots in Tada district to find out the average journey speed and delay of the traffic stream.The average journey speed on the entire study stretch varied from a minimum of 34.48 km/hr to a maximum of 47.44 km/hr without delay. The minimum journey speed observed at Ramapuram and the maximum journey speed observed at Arambakkam, both are national highway stretches. The maximum stopped delay of 50 sec observed at Arambakkam and it is due to electronic signal and pedestrian crossing. The main reasons for delay at selected stretches are parked vehicles, slow vehicles, vehicle crossings, bridge cutting, bus stops, traffic signals, and pedestrian crossing. The Table III gives the average journey speed of vehicles on the selected stretches.

PLACE	AVERAGE JOURNEY SPEED(KM/hr)	
	Without delay	with delay
Ramapurm	38.65	38.48
Gumidipoondi	34.86	34.48
Pannamangadu	35.68	34.89
Red hills	37.91	36.82
Kavarapettai	36.86	36.07
Arambakkam	52.09	47.44

D. Analysis of identified black spots using GIS:

The map required for the desired road network for the study has to be digitized in a suitable form and certain specified road attributes to carry out prioritization are to be input to GIS. Then the identified black spots further prioritized using GIS.

1) Prioritization: The following prioritization scheme was used for the GIS analysis and which involves assigning suitable weights to different factors which tend to influence the occurrence of accidents on identified study stretches in the district in such a manner that the factors which tend to increase the probability of the accidents have lower weights (Table IV)

2). The final weight (Eq. 2), assigned to each road link was obtained by adding all the individual weights and normalizing the value using maximum weight. The maximum weight assigned in this case is 110.

Total weight = (Σ Individual Weights) x 100 / 110 … (2)

The classification of roads for occurrence of accidents is based on the final weights obtained by using Eq. 2. The road links with low final weight were considered as highly accident prone stretch (Table V).

FINAL WEIGHT:

TOTAL WEIGHT = (Σ Individual Weights) x 100 / 110

TOTAL WEIGHT = (75+80+68+70+90+88) X 100/110
= 428.18

Fig1-A severe accident on NH5

Fig 2: Potholes on highways

TABLE IV: FACTORS USED IN PRIORITIZATION WITH POSSIBLE WEIGHTS

SI.NO	FACTORS	POSSIBLE VARIATION	WEIGHTS ASSIGNED
1	No .of lanes in each direction	1 2 4	2 6 10
2	Width of the road	<6m 6-8m 8-10m 10-12m >12m	1 3 5 7 10
3	Type of road	NH SH PWD OTHER Roads	1 4 8 10
4	Surface type	Bituminous concrete	4 10
5	Surface condition	Good Fair Poor	10 6 1
6	Drainage facility	Good Satisfactory Poor No drainage	10 6 2 1
7	Vehicle type	Heavy vehicles Bus/truck Car Two wheelers	10 8 4 1
8	No .of vehicles per day	<100000 1000-30000 30000-50000 >50000	10 7 4 1
9	Shoulders	Paved Unpaved No	10 6 1
10	Edge obstruction	Yes No	4 10
11	Median	Yes No	10 4

10.CONCLUSION:

From the above procedures and measures as planned we could avoid occurance of road accidents on NH5 by advanced marking and signaling systems and make the people to follow the road rules, giving speed limit to vehicles, giving a high road grip, giving correct elevations and curves, designing proper super elevation. Thus, by following these principles we will decrease the death rate due to road accidents in NH5.

REFERENCES

1.NATIONAL HIGHWAY AUTHORITY OF INDIA ,NHAI
2.TRANSPORT DEPARTMENT OF INDIA
3.TRAFFIC DEPARTMENT OF INDIA
4.DEPARTMENT OF INDIAN POLICE
5.MUNICIPAL CRPORATION OF TAMIL NADU
6.THE HINDU
7. IDENTIFICATION AND ANALYSIS OF BLACK SPOTS ON NH5 - VISAKHAPATNAM (INDIA)
8. INTERNATIONAL JORNAL OF INNOVATIVE RESEARCH IN SCIENCE, ENGINEERING AND TECHNOLOGY