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A Framework to Analyse Road Accident in Kanyakumari District

D. Allwin[1], D. Sabin Deva Jerald[2]

[1] *Department of Civil Engineering, Noorul Islam University, Kumaracoil, India*
[2] *Department of Civil Engineering, Wollega University, Nekemte, Ethiopia*

ABSTRACT

Road accident has become hidden epidemic across the world and has posed a substantial health and economic burden to many developing nations. An estimated average of 3,242 people killed daily due to road accidents worldwide. In India as many as 1, 39,091 persons lost their life's in 4, 40,042 road accidents in 2013 alone. The study was carried in Kanyakumari district which is the southernmost district of the peninsular India. It covers an area of 1,672 sq km. An average of 300 peoples was killed in the district each year. The accident acquired in the district from 2009 to 2013 is analysed. The Accident details were obtained from District Crime Records Bureau (DCRB), where they collected the details from the 41 police stations in the district. The problem in the district was due to very acute in highway transportation due to complex flow pattern of intense vehicular traffic, presence of mixed traffic along with pedestrians. An average of 3 persons was killed each year within 1.2 km zone due to defective geometrical design. The ultimate aim of this study is to develop certain improvement measures to mitigate the circumstances leading to road accidents in Kanyakumari district.

Keywords: Road Accident, Flow Pattern, Geometrical Design, Traffic

INTRODUCTION

The study has done in Kanyakumari district, which is the southernmost district of the peninsular India, the seventh largest country in the world. In Kanyakumari, the Indian Ocean, the Arabian Sea and the Bay of Bengal embrace one another. The total population of the district is 16, 69, 763. The density of population was 999 per sq.km. The literacy rate of the district was 91.75%. The economy of this district is agriculture-based. 68 percent of the district's land was utilized for agricultural purposes. The annual rainfall ranges between 90 and 160 cm and the average rainfall is 140 cm. The District having the road network of 3495.8 Km surfaced roads. Averages of 300 people were killed in the district each year in an approximate of 1300 road accidents every year. The traffic circulation pattern of the district is of liner type. The problem in the district was due to very acute in highway transportation due to complex flow pattern of intense vehicular traffic, presence of mixed traffic along with pedestrians.

DATA SOURCE

Data on the accident details from the year 2009 to 2013 were obtained under special request for the project purpose from the District Crime Records Bureau (DCRB) of Kanyakumari district which comes under the control of Superintendent of police, Kanyakumari district. The DCRB receives the accident data's from the 41 police stations in the district.

TYPES OF ACCCIDENTS

Table.1 presents the scenario of accidents in the Kanyakumari district from the year 2009 to 2013, the reduction in the total number of accidents from 1291 to 1223 was mainly due to reduction in minor, non-injury and grievous accidents. The non injury accidents reduced from 18% in 2010 to 14% in 2013. On the other hand the fatal accidents which leads to death consequently increasing year by year from 20% of fatal accidents in 2009 to 24% in 2013. This increase in the fatal accidents was the same story even from the last two decades.

Address for correspondence:

winniu@ymail.com

Table1. *Types of accidents in Kanyakumari district*

YEAR	FATAL	GRIEVIOUS	MINOR	NON-INJURY	TOTAL
2009	249	219	758	65	1291
2010	263	220	696	42	1221
2011	282	182	709	41	1214
2012	282	166	759	49	1256
2013	290	173	704	56	1223

ACCIDENT SEVERITY INDEX

The accident severity index measures the severity of the accidents and the availability of medical facilities in that area. Accident severity index is defined as the number of people killed in 100 accidents. Figure 1 show the accident severity index of for Kanyakumari district which is relatively very high. In 2009 the accident severity index was 20.6 where the accident severity index in 2013 was increased to 24.5. This shows that the persons killed per 100 accidents was increasing every year. Also the accident severity index of 24.5 is comparatively very higher rate. Moreover, the high level of accident severity index may also be a result of poor data collection and its reporting process. Because number of non injury and minor accidents where not entered in the police records.

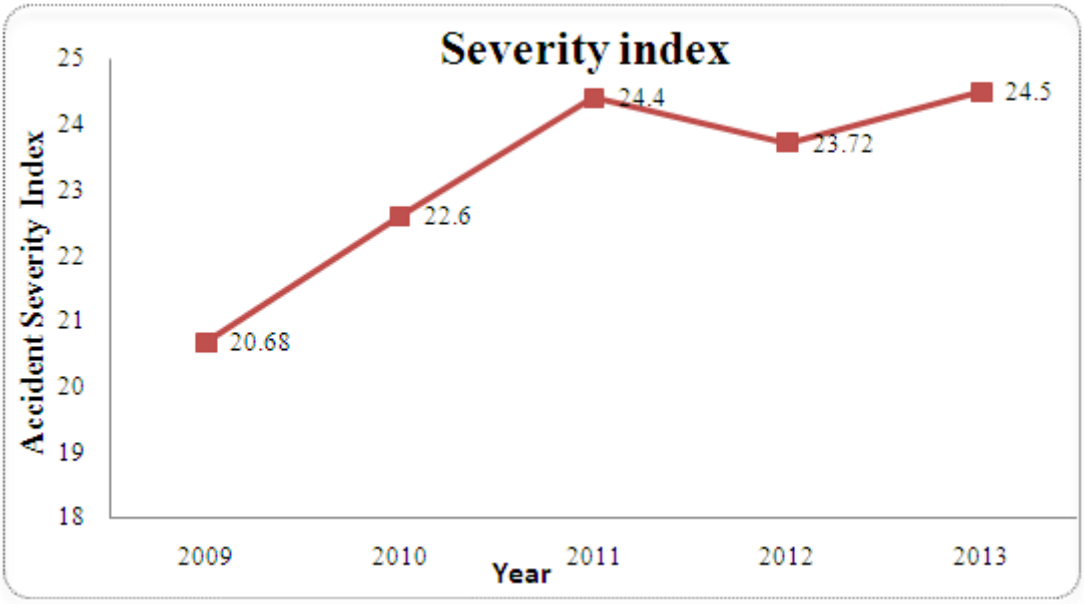

Figure1. *Accident Severity Index Graph (Persons Killed Per 100 Accidents)*

ACCIDENTS BY VARIOUS VEHICLES

Death percentage of motorcyclists in all road accident fatalities is very high in Kanyakumari district. Figure 2 shows during recent years, motorcyclists constitute more than 40% of all road accident fatalities. More than 100 motor cycle users killed due to road accidents every year. Motor cycle fatalities contribute more than 35% of the road accidental death of Kanyakumari district and in the highest risks. Besides motorcyclists bus passengers, car occupants and truck or tempo occupants accounts higher percentage of accidents. Consequently the fatality rate for bus accidents is 18.6% and the fatality by car is 11.6% and the fatality by Trucks and tempo is 10.5% respectively, determined by the mean of all the summation of the accidents in the individual years from 2009 to 2013.

The number of accidents occurred by different types of vehicles from 2009-2013 was shown in Figure 2. The accident caused by motor cycle is very high as compared to other vehicles. Motor cycle plays a vital role in road accidents. On seeing about other vehicles bus is also other main sources of accidents. The next source of accident is by motor cars. Nowadays there are more number of motor cars are registering year by year. This is the main source of motor car accidents. Comparing to tempo and truck, Tempo has faced large number of accidents. Tempos carry heavy loads so it has more chances to cause accidents. Following the tempo truck is also a source of accident maker. Comparing the accidents caused by tempo the accident caused by truck is less. Small size vehicles like auto also faced facing these types of problems like accidents. But the accident rate is less as compared to large vehicles. The tourist vehicle like taxi also faces these kinds of problems. Comparing to all other vehicles like motor cycle, bus, motor car, truck, tempo, auto the accident caused by taxi is less.

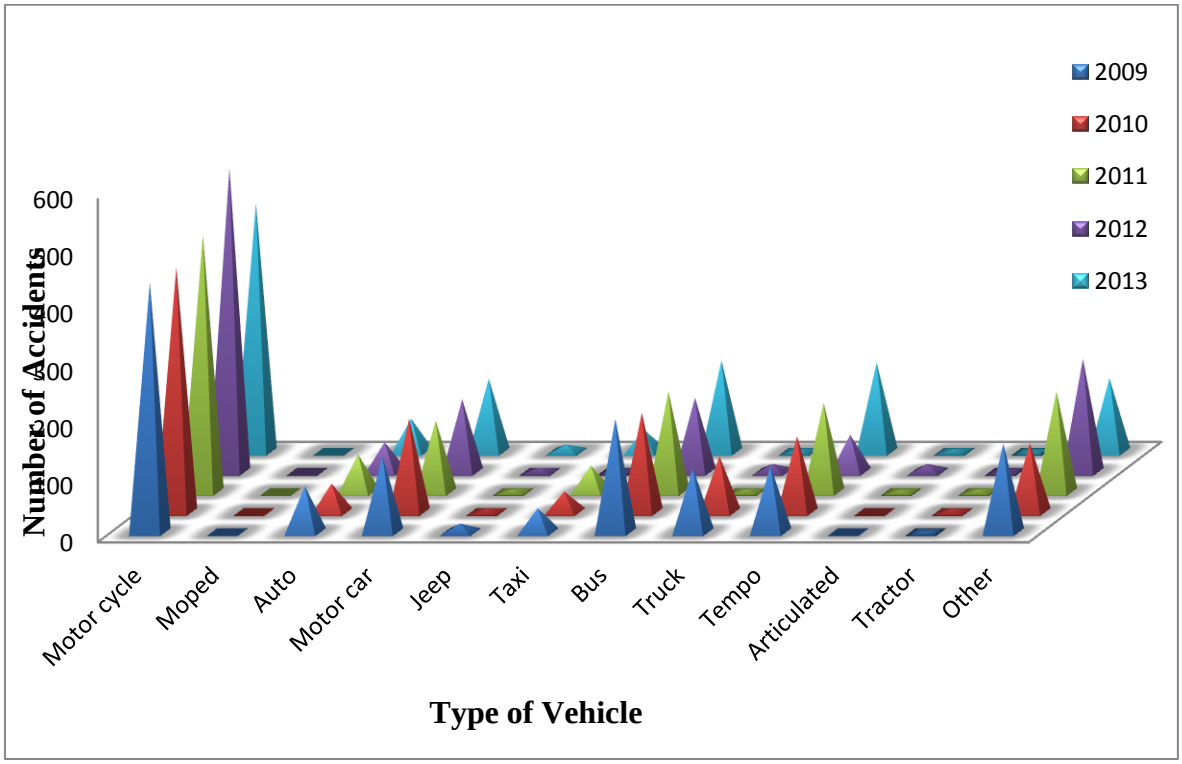

Figure2. *No of Accidents by Various Vehicles*

ACCIDENT CLASSIFIED ACCORDING TO TIME

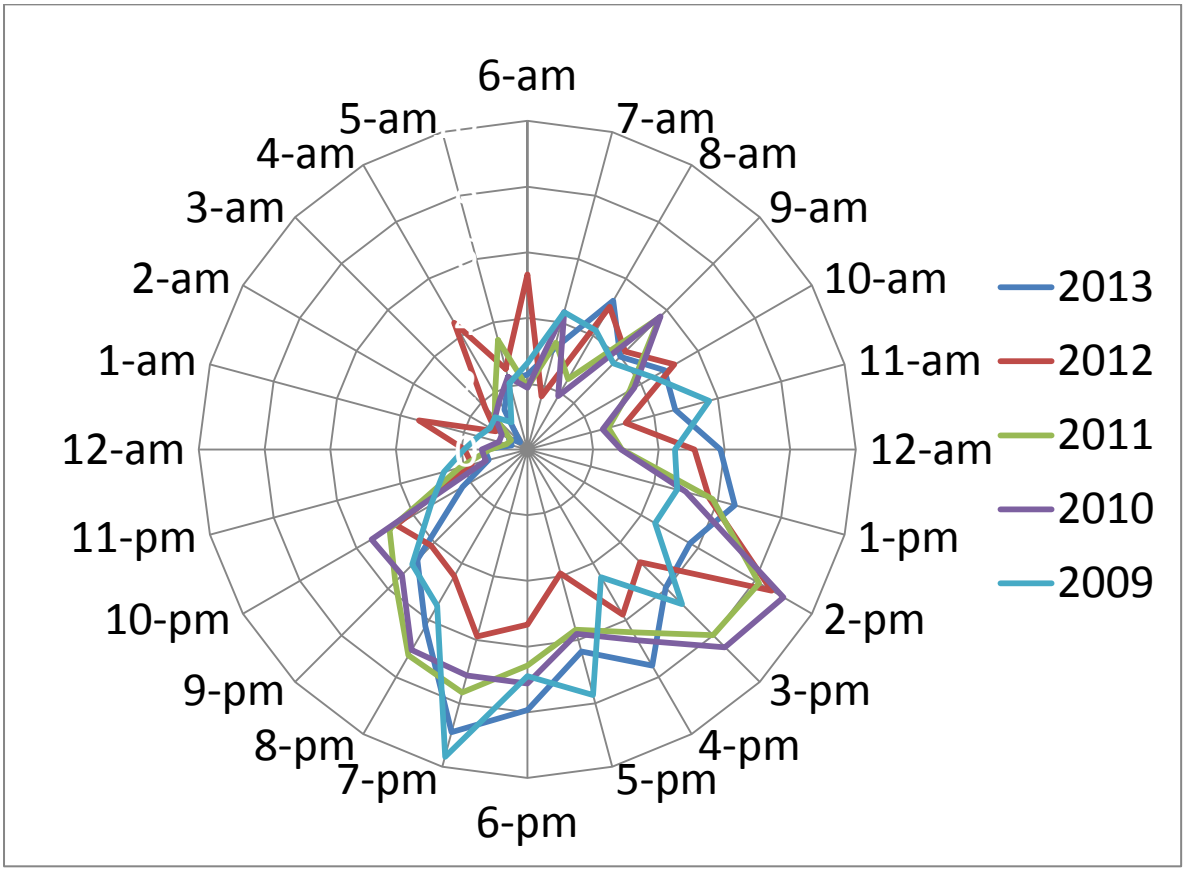

Figure3. *Accident Intensity by Time*

Figure 3 shows the percentage of accident by time. The rate of accident is very less in early morning around 12:00 am to 6:00 am .After that the accident is slightly increased at the time of 7:00 am to 1:00 pm. The increase in accident is due to the transportation crowd of people from one place to another because of going to college, job, school etc. From 2:00 pm to 7:00 pm the accident is very much higher which is due to the leaving from college, job and school etc. Particularly at the time of 2:00 pm

and 7:00pm because of high crowd of people returning home from where they have gone at morning job, school etc. So, it clearly shows more number of accidents were happened at afternoon and evening. And less number of accidents is happened at morning. This may because in mornings the drivers may feel very enthusiastic and active.

ACCIDENT DISTRIBUTION BY MONTH

Figure 4 shows in the year 2009 month of May have faced more number of accidents. March and April has same number of accidents. Then August and January has less number of accidents. June, July, February has almost equal accidents at the end of the year September, October, November has very less amount of accidents and the last month December has again increased. This clearly shows that the month of May and March has large number of accidents. In 2010, May and March months have faced more number of accidents. And next to May and March the months of January, June, August, October and November has less accident rates as compared to May and March. Finally the months like February, April, July, September and December has very less number of accident rates of the year. In 2011, May and December have faced more number of accidents. And the months of January, March, June, July, August and November has almost equal number of accidents. And at the end of the year, months like February, April, September and October has faced very less number of accidents rates of the year. In 2012 and 2013, the highest no of accidents occur in months like December, May and June. The accidents are slightly less in the months like July, August, September and October. In this year less number of accidents are occur in January, February, March, April, and November.

In general the accidents are higher in the months of May. A percentage of about 10.68% accidents acquired where in November about only 5.18% accidents were acquired. This may due to the number of school and college students who uses the road was high because of the vacation. Some medical studies show this may because of the intense heat in the summer time.

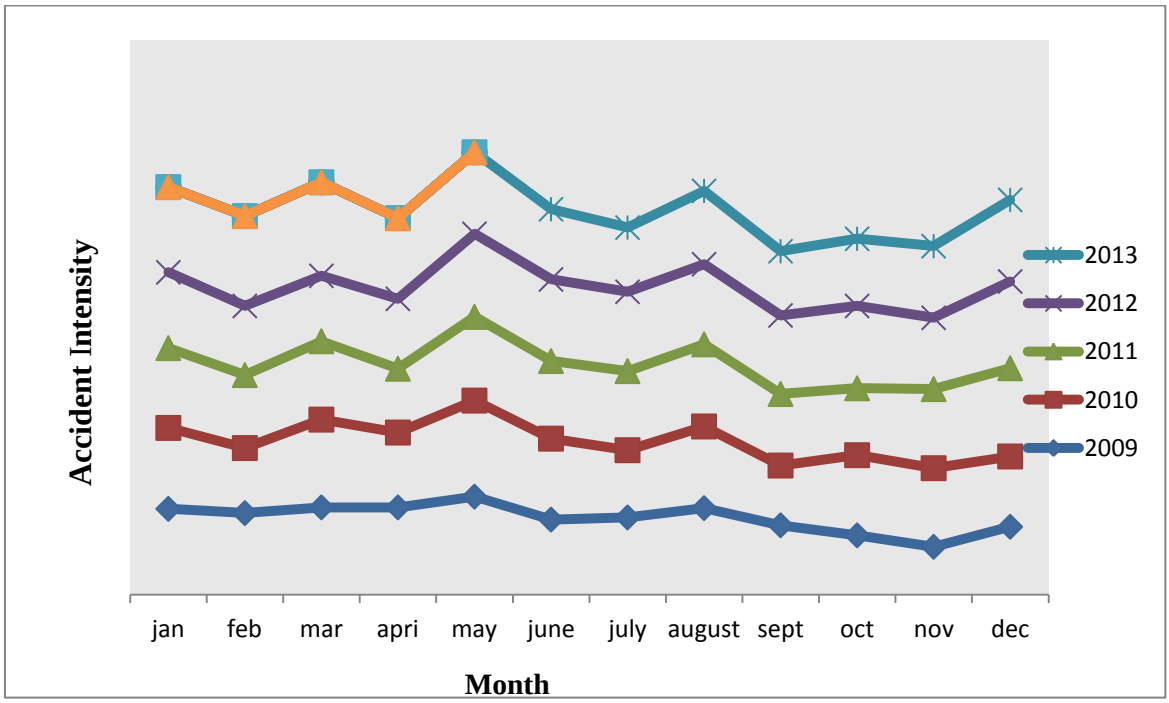

Figure4. *Accident Intensity by Month*

ACCIDENT DISTRIBUTION BY NATURE OF ACCIDENTS

Figure 5 shows the accident by nature of accidents. In Kanyakumari district more number of accidents occurs by head on collision. The main reason for head on collision is overtaking vehicles in turnings. The other factors like overturning, skidding, right turn collision, hit and run are comparatively low. The head on collision can be reduced by the attitude of drivers the quality of roads. The solutions for drivers are shown below super elevation, by giving proper signals while overtaking, avoid over loading of vehicles like tempo or lorry. The solutions for the road is by maintaining proper road width and shoulder width on the side of the road, good site distance by the road must be visible to the driver, and breaking site distance is also maintained.

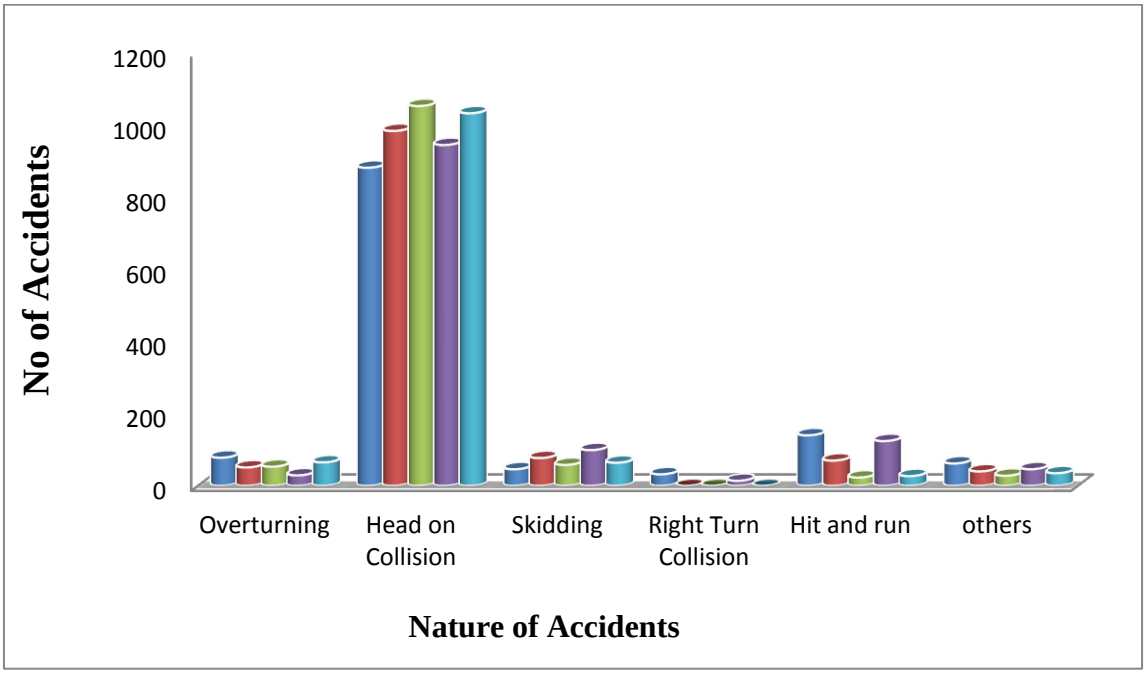

Figure5. *Nature of Accidents*

CONCLUSION

Road accidents cannot be totally prevented, but with proper environmental, engineering, and by social interventions it can be minimized to a higher levels. This study gives a clear outline about the road accident problems in Kanyakumari district. Also this study gives the point of view in order to develop improvement measures to mitigate the circumstances leading to road accidents in Kanyakumari district.

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AUTHORS' BIOGRAPHY

D.Allwin, received his B.E in Civil Engineering from Nanded University, Maharashtra and M.E in Hydrology and Water Resources Engineering from College of Engineering, Guindy. He is now working as an Assistant Professor in Department of Civil Engineering at Noorul Islam University, Kumaracoil. His research interests include Groundwater Modelling, Fluid Dynamics and Geophysical Analysis.

D.Sabin Deva Jerald, received his B.E in Civil Engineering and M.E in Construction Engineering and Management from Anna University in 2008 and 2010 respectively. He is now working as an Assistant Professor in Department of Civil Engineering in Wollega University, Ethiopia.