

CHAPTER 7

SUMMARY AND CONCLUSIONS

7.1 SUMMARY

The highway accidents scene in India, as in many developing countries, is characterized by mixed traffic comprising of heavy vehicles, light commercial vehicles two wheelers with different sizes and speeds. Serious efforts have not been made to adopt traffic segregation measures, India has only 100 million vehicles as per registered motor vehicles in 2007 and 70 percent of it is the most vulnerable two wheelers. The total number of accidents was 323.7×10^3 in 2001 and 390.4×10^3 in 2005. The number of persons killed was 80,262 in 2001 and 98,254 in 2005. In India, about 125000 people get killed (estimated for the year 2009) in road traffic accidents and more than another half-a-million are injured annually. It is estimated that the country losses around Rs.75000 Crore (estimated for the year of 2009) annually due to road traffic accidents which is 2-3 percent of GDP. In 1951, India had only 26,890 registered motor cycles and scooters. However, in 1977 the number motor cycles and scooters swelled to 0.576 million and further to 10.617 million in 1989. The total road length in the country in 1950 to 1951 was about 0.4 million km. Today it is about 3.3 million km and now it is the second largest in the world. As per present estimate this road network carries nearly 65 percent of freight and 85% of passenger traffic. The road traffic is estimated to be growing at a rate of 7 to 10 percent per annum while the vehicle population is growing at a rate of 12 percent per annum. The NH and SH together (6% of the network) carries 75-80 percent of the road traffic in

the country. On the whole, In India more than 80,000 people are killed and nearly 400,000 persons are injured in about 300,000 road accidents every year. The economic loss to the society on account of road accidents is estimated to be about US Dollar 600million every year.

Highway accidents are influenced by the factors related to traffic flow, segment length population. But models have been generally built ignoring the complexity of accident occurrence and involving only one, two, three or four variables like traffic flow, ownership, road length etc. such models over simplify the complexities of the accident incidence. Number of authors have attempted to study the accident scene by relating to econometric and social variables like real earned income, alcohol consumption, vehicle speed, percentage of male drivers to total drivers, industrial activity, safety regulations etc,. These models are better than previous groups since they have considered at least a set of variables which indirectly influence the occurrence of road accidents. However they too would not be useful in Indian context, where the important contributing factors are traffic flow, speed, and segment length and road environment. Some authors have built models using traffic volume and road features like road curvature, pavement width and number of junctions per km. Models discussed here suffer due to their failure in taking all important variables which directly contribute to accident occurrence. These models also do not reflect and account for mixed traffic flow prevailing in India. Modeling the traffic accidents scene bringing together the influence of all relevant factors is therefore requires attention.

For this study about 120km stretch of National Highway-67 between Coimbatore and Karur was selected. Road inventory survey was conducted throughout the length and for every 2 km road inventory details like number of access roads, horizontal curves and nature of areas were collected as discussed in chapter 3. Total length of study stretch was divided

into nine segments with different length ranging from 8 km to 24km, according to jurisdiction of the nine police stations namely Singanallur, Sular, Palladam, A.V.Palayam, Kangeyam, Vellakoil, Thennilai, Paramathy and Karur from where accident statistics were collected for the year 2005 to 2010. Traffic volume in Singanallur segment increased by 38% in five years. On an average the traffic volume increased by 6.7% every year. The number of LCVs, two wheelers and heavy vehicles respectively increased by 28%, 23.8% and 92% in five years. On an average these vehicles increased by respectively 6.9%, 5.8% and 11.5% every year. The 85th percentile speed of LCVs increased by 13% in five years and on an average it increased by 5.86% every year. The number of accidents increased by 81.52% in five years and on an average it increased by 13.7% every year, except the year 2007 where the number of accidents reduced by 2.5% , while the number of two wheelers dropped by 1% in the same year.

Traffic volume in Sular segment increased by 44.5% in five years. On an average the traffic volume increased by 7.7% every year. The number of LCVs, two wheelers and heavy vehicles respectively increased by 44.5%, 13.5% and 169% in five years. On an average these vehicles increased by respectively 7.7%, 3.2% and 17% every year. The 85th percentile speed of LCVs increased by 18.46% in five years and on an average it increased by 6.76% every year. The number of accidents increased by 150% in five years and on an average it increased by 25% every year.

Traffic volume in Palladam segment increased by 37.6% in five years. On an average the traffic volume increased by 6.8% every year. The number of LCVs, two wheelers and heavy vehicles respectively increased by 25.5%, 24% and 88.2% in five years. On an average these vehicles increased by respectively 4.7%, 13.6% and 3.8% every year. The 85th percentile speed of LCVs increased by 32% in five years and on an average it increased by

5.86% every year. The number of accidents increased by 17.18% in five years and on an average it increased by 4.6% every year.

Traffic volume in A.V.Palayam segment increased by 42.8% in five years. On an average the traffic volume increased by 7.4% every year. The number of LCVs, two wheelers and heavy vehicles respectively increased by 43.5%, 19.1% and 114.2% in five years. On an average these vehicles increased by respectively 7.5%, 3.6% and 16.6% every year. The 85th percentile speed of LCVs increased by 46% in five years and on an average it increased by 8% every year. The number of accidents increased by 9.52% in five years and on an average it increased by 11.81% every year.

Traffic volume in Kangeyam segment increased by 35.8% in five years. On an average the traffic volume increased by 6.3% every year. The number of LCVs, two wheelers and heavy vehicles respectively increased by 17.5%, 28% and 89% in five years. On an average these vehicles increased by respectively 5.5%, 5% and 15% every year. The 85th percentile speed of LCVs increased by 14.5% in five years and on an average it increased by 6.2% every year. The number of accidents increased by 61.54% in five years and on an average it increased by 11.8% every year, except the year 2007 where the number of accidents decreased by 6.1% , while the number of LCVs dropped by 3.4% in the same year.

Traffic volume in Vellakoil segment increased by 46.1% in five years. On an average the traffic volume increased by 8% every year. The number of LCVs, two wheelers and heavy vehicles respectively increased by 46%, 15.8% and 152% in five years. On an average these vehicles increased by respectively 8%, 3% and 20.7% every year. The 85th percentile speed of LCVs increased by 38.77% in five years and on an average it increased by 5.8% every year. The number of accidents increased by 18% in five years and on an average it increased by 12% every year.

Traffic volume in Thennilai segment increased by 39.5% in five years. On an average the traffic volume increased by 7% every year. The number of LCVs, two wheelers and heavy vehicles respectively increased by 36%, 25% and 101.6% in five years. On an average these vehicles increased by respectively 6.4%, 4.6% and 15.6% every year. The 85th percentile speed of LCVs increased by 36% in five years and on an average it increased by 6% every year. The number of accidents increased by 95% in five years and on an average it increased by 14.4% every year.

Traffic volume in Paramathy segment increased by 49.7% in five years. On an average the traffic volume increased by 8.5% every year. The number of LCVs, two wheelers and heavy vehicles respectively increased by 49.7%, 28.8% and 103% in five years. On an average these vehicles increased by respectively 8.4%, 6% and 15.6% every year. The 85th percentile speed of LCVs increased by 26% in five years and on an average it increased by 4.76% every year. The number of accidents increased by 114.58% in five years and on an average it increased by 16.63% every year.

Traffic volume in Karur segment increased by 35% in five years. On an average the traffic volume increased by 6.2% every year. The number of LCVs, two wheelers and heavy vehicles respectively increased by 20.5%, 28% and 80% in five years. On an average these vehicles increased by respectively 4.2%, 16.8% and 9.1% every year. The 85th percentile speed of LCVs increased by 36% in five years and on an average it increased by 6.36% every year. The number of accidents increased by 95.8% in five years and on an average it increased by 32.8% every year, except the year 2008 where the number of accidents decreased by 40.4% , while the number of heavy vehicles dropped by 12% in the same year.

7.2 CONCLUSIONS

The following Conclusions were reached from the highway traffic studies and analysis of accidents

- Traffic volume in the highway increased by 7.2% every year, out of which 6.6%, 6.8% and 15% were contributed by LCVs, two wheelers and heavy vehicles.
- Number of accidents in urban highway segment increased by 15.8% and in rural highway segment by 16% every year, respectively.
- A 1% decrease in number of two wheelers caused 2.5% reduction in number of accidents in urban segment while a 3.4% decrease in number of LCVs caused 6.1% reduction in number of accidents and a 12% decrease in number of heavy vehicles caused 40.4% reduction in number of accidents.
- In urban segment 50% of traffic volume was contributed by LCVs while 30% and 20% were contributed by two wheelers and heavy vehicles.
- In rural segment 50% of traffic volume was contributed by LCVs while 37% and 12% were contributed by two wheelers and heavy vehicles.
- Traffic volume, Percentage of Heavy Vehicles, 85th Percentile Speed of LCV's, number of access roads and horizontal curves were positively correlated with number of accidents while segment distance was with negative correlation.

- There was minimum traffic flow of 5% of ADT in early morning from 2:00 to 6:00 hours, generally more number of accidents in highways likely to occur during this time.
- The multiple linear regression model built using six variables has been tested for traffic flow, 85th percentile speed of LCV's and road environment which normally represent the scene in Indian highways. The same model could also be studied and evaluated for Similar highways in developing Countries.

7.3 RECOMMENDATION FOR FURTHER RESEARCH

The limited work in this study could be taken as the need of the hour towards highway accidents and thereby making the respective agencies to realise the importance of highway safety and to take the control measures to bring down the accident rate in National Highways and State Highways. In this work only limited number of traffic variables and road environment is taken. This work could be extended in the following ways.

- All road geometric variables could be involved
- Traffic flow and speed have been considered and traffic density not involved.
- This work has been attempted on undivided two-lane highway, other category of highways could be tried out.