Research paper on Accident Analysis of Jalandhar To Phagwara Road Stretch (NH44)

¹Er. Shahid Mushtaq Bhat, ²Er. Manish Goel, ³Dr Pooja Sharma

¹M.Tech Scholar, ²Assistant Professor, ³Head Department Of Civil Engineering, ^{1,3}Desh Bhagat University Amloh Mandi Gobindgarh, Punjab. ²Guru Nanak Instutution, Mullana Kurukshetra University

Abstract: The Government alone cannot tackle road accident problems .There is need of active stake-holders to promote i mplementation of road safety measures .Addressing road safety is necessary that need to involve multiple agencies and sec tors like health, transport and police, The present study provide the magnitude and various dimensions of road accident i n India. The analysis and cause of accidents in this study will help to create awareness, guidelines and assist in informed de cision making on road safety.

In India the motor vehicle population is growing at a faster rate than the economic and population growth .The in crease in growth of motor vehicles has increased road accidents .According to World Health Organisation, road traffic inj uries are the sixth leading cause of death in India with a greater share of hospitalization, deaths, and disabilities.

The area on which the study is to be done on is from Jalandhar to Phagwara (NH44), it's about 23 kilometre dista nce with high density traffic and greater no of road accident. The study needs to be of micro level, so that the minute cause of accidents on highway can be Analysed, That involve the pavement, Vehicle, Driver and Environment factor.

Keywords: India, NH44, Safety, road, Driver, vehicle etc

INTRODUCTION

General 1.1

In India the motor vehicle population is growing at a faster rate than the economic and population growth .The increase in growth of motor vehicles has increased road accidents .According to WHO, road traffic injuries are the sixth leading cause of death in Ind ia with a greater share of hospitalization, deaths, and disabilities.

The no of vehicle is India is shown in table 1.1. This data show that total no of vehicles increased from 37 million in 1997 to 73 million in 2004, This represents average increase of 11% of motorised two wheelers and cars and 7% for trucks and buses, However all of the vehicles remain in official records but only 60 to 70% of them ply on roads. Table 2 shows the sales figure in 2007 and 2017, it also shows the annual increase of 10-12% per year. Table 1.2 shows the no of road traffic fatalities and the population of India from 1997 to 2007. The no of fatalities increased at an average rate of 5% per year from 1997-2003 and the rate has increased 8% per year since then, The no of fatalities per year remained 79-83 in period 1997-2003 and has since increased to 101.

1.4.1 Age and Gender

Figure 1.1 shows the distribution in road traffic fatalities in 2007 by age group and gender. In 2007, 15% victims were females. This is because of low exposure and representation of women on roads. Children and 14 years and younger compromise only 6% of the fatalities, though their share in the population is 32%. The fatalities in the age groups 15-29 and greater than 60 years is similar to their representation in the population, but the middle aged groups 30-44 and 45-59 are over represented by about 70%. The low representation of children (2 fatalities per 100,000 person) is curious because no of children's walk and use bicycle for travelling purpose



Fig. 1.1: Distribution in road traffic fatalities in 2007 by age group and gender.

1.4.2 Time of Day

Figure 1.2 gives the proportion of fatalities by time of day in 35 cities of India (population>1 million) and in the rest of the country including rural roads. In the period 8:00 to 10:30 the proportions remain high and similar both in the large cities and elsew here. In the late night hours (20:00 to 22:00) traffic volumes are lesser then the peak day time rates, but fatality rates do not reflect this. In early morning the traffic flow is much lower than in large cities, but relatively higher in the rest of country .We can summa rize that high rates in night could be due to higher speeds, when traffic volume is higher /lower and speed of driving is higher un der the influence of Alcohol .Alcohol comes from hospital study in Delhi where 29% two wheeler drivers admitted they were dru nk before crash ,in Bangalore 29% admitted crash before driving in night time ,and 35% checked were under the influence of alcohol in night time.



Fig. 1.2 Road traffic accidents (%) by time of day in 35 cities with more than 1 million population and those in rest of Ind ia.

1.5 Fatalities on Rural Highways

The detailed data is not available for national and state levels for crashes' study collected on modal shares, vehicle speeds, and traffic crashes on selected locations on national and state highways around the country in late 1990's Table 4 (ref to page 11). Table 4 shows the type of road user killed on highways. The study reports that 65% trucks were part of fatal crashes ,Other study r eports say majority of crashes involve buses ,and 25% victims were pedestrians, rear-end crashes comprised 40% of total crashes with increasing rate of 3.9% per year.

1.6 Uses of Accident Data

1.

- **Engineering Uses**:
 - Determining the adequacy, size, shape and visibility.
 - In determining justification for traffic control device.
 - Planning pedestrian and safety features.
 - Determining speed zoning and speed control.
 - Precaution regarding parking.
 - Safe and efficient lighting.
 - Redesigning intersection.
 - Improving horizontal and vertical alignment.
 - Deficiency of rite of way.

2. Enforcement uses:

- Directing enforcement effort.
- Controlling pedestrian behaviour.
- Safe and efficient operation of traffic control device.
- Enforcing vehicle inspection measure.
- Parking regulation

3. Administrative and policy issue:

- ✤ Initiating and administering traffic safety program.
- Evaluating the success of traffic safety program.
- Determining accident cost.
- ✤ Amending the legislative measure.

4. Educational Uses:

- Planning and organizing school safety school educational program.
- Planning and organizing driver safety education al program.

5. Uses for motor vehicle administrator:

- Reviewing the procedures for licensing driver.
- * Reviewing the procedures for registration and licensing of vehicles.

6. Requirement of Accident Data:

- ✤ If the accident records are to be used, they should be accurate, comprehensive.
- Accident must be reported on a standard form so that uniform procedure is followed.
- ✤ The term describing accident must be accurately defined.
- The facility of being analyzed by a computer, the data should be coded properly.

1.7 Various types Of Accidents

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 to property, in which at least one moving vehicle was involved.

Person killed: Any person who was killed outright on the spot in the accident or whose death could be directly traced to the injury received in accident.

Fatal accident: An accident where one or more person(s) were killed.

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METHODOLOGY & DATA COLLECTION

3.1 Road And Its Effects On Accidents Pavement Surface:

Accidents are most common in this time of era due to rapid increase of traffic and the carriageways are not indeed meet the demands of this heavy traffic, Keeping the view of all aspects, The study of Accidents are carried out on the Stretch from (Jalandhar to Phagwara on NH44), further starting our work we are going to first focus on the Pavement and study the defects and testing the material Used in this pavement, Following below mentioned defects were found and analysed ,further the Results and Discussions were done on this for future better of road.

Corrugation:

It is the plastic deformation of top bituminous surface of the pavement along the horizontal direction. Its appearance is in the form of undulations or ripple formations on the top surface of the pavement. Corrugation occurs due to lack of stability of asphalt mixes when weather is quite warm. Corrugation is usually observed where vehicles exert a greater horizontal force to start or stop. If the surface having corrugation is thin it can be scarified and material can be re-laid. The elevated spots are cut by using a mechanical blade, with or without heating and then the surface is rolled out.



Depression:

Fig.3.4 Corrugations

As the name indicates, it is the localized area where the pavement surface sinks a little with respect to the finished surface. Depression in pavement occurs due to the differential settlement of inadequately compacted sub-grade due to wheel loads. Water starts to accumulate on the depression zone after rainfall, which gradually percolates and causes further damage to the pavement in that area. It may also arise due to improper mix design or settlement of lower layers of the pavement. Depressions can be rectified by filling the depressed part with premix aggregates.



Fig.3.5 Depressions

Fatty Surface Or Bleeding:

Fatty surface or Bleeding is a surface defect related to bituminous pavement only. It is the accumulation of bitumen at the surface of pavement which occurs due to rise in temperature and usually occurs during daytime when temperature is high. At high temperature bitumen gets soft and occupies the available void space in aggregates. If the space offered by aggregates is insufficient, bitumen expands out onto the surface and forms a sticky shiny surface over the pavement known as bleeding or fatty surface. It is an irreversible process and the bitumen content that has bleed out will not go back into the pavement void space during winter season or due to variation in temperature. Proper mix design and selection of appropriate grade of bitumen and also provision of requisite void space can act as a remedy for this type of failure. Other possible reasons of bleeding are loss of aggregate cover, heavy prime coat and non-uniform application of binder. If bleeding is uniform and without any kind of surface irregularities, small size, clean, angular sand or other small size aggregates can be used over the surface and is particularly known as sand blotting or sand blinding. But if the bleed out surface irregular it is good to remove the affected portion and relay it with proper mix design



Formation Of Potholes:

When materials disintegrate locally bowl shaped holes of varying sizes on the surface of bituminous pavement are formed commonly referred as Pot holes sometimes extending to the base course. It is difficult to maintain the same level of homogeneity although the pavement due to variation of large number of parameters considered during pavement construction. The localized disintegration starts from those places which are the weakest spots in the pavement stretch.

- Potholes may occur due to a number of causes some of them are as under:
- \triangleright Inadequate quality control during construction.
- \triangleright Ingress of water.
- \geq Ravelling.

Potholes can be repaired by patchwork, a good bond between the existing pavement and newly laid patch is necessary. The level of patch is kept slightly above than existing bituminous pavement so as to allow its further compaction by traffic load.



Fig.3.7 Pot Holes

Loss Of Aggregates:

Such type of defects usually occur consequent to stripping and ravelling. The possible reasons for loss of aggregates from the pavement are as under:

- ✤ When the mix design is improper.
- Surface dressing is not properly designed.
- Rolling is inadequate.
- Traffic is allowed to flow before the pavement binder gets properly set.
- Hungry surface formation.

The loss of aggregates can be treated by adding a layer of slurry or fog seal or by replacement of disintegrated layer with fresh mix.

RESULTS AND DISCUSSION

4.1 Aggregate Crushing Value Test

Total weight of the sample (A) taken= 4.1kg

Weight of the sample (B) passing through 2.36 mm sieve after application of load=0.50kg

The Aggregate Crushing Value = $B/A \times 100$

=0.50/4.1 × 100 =0.12

BIS and IRC have certified that the crushing value of aggregates to be used in cement concrete pavement should not exceed 30%. The standard size aggregates to be used crushing strength test is the fraction passing through 12.5 mm sieve and retained on 10 mm sieve. When aggregates having size larger than 12.5 mm are used, it will give higher crushing strength value and use of aggregates having size less than 10 mm will give low aggregate crushing value.

4.2 Penetration Test:

The difference between initial and final penetration reading is taken as penetration value. The mean value of not less than three consistent penetration measures is reported as penetration value.

Bitumen Sample	Initial Reading	Final Reading	Penetration (mm)
Test 1	210	272	62
Test 2	272	340	68
Test 3	340	404	64
		Mean	65

Table 4.1 Penetration Test results

5.1 Conclusions

The Following Conclusions are drawn from the Study:

1. On the basis of analysis of data, characteristics of accidents and field visits conducted for the study, remedial measures have been suggested to reducing accidents on the accident-prone segments of the studied stretch of the road:

- a. Speed limit for various vehicles.
- b. Provision of footpaths, traffic lights, and road markings.
- c. Removal of encroachments especially on curves of intersections for ensuring adequate sight distance.
- d. Provision of parking spaces especially for auto rickshaws.
- e. Strict enforcement of regulations.
- f. Widening of all the narrow bridges/culverts.
- g. Improvement of sharp curves.
- h. Avoiding of overloading.
- i. Providing better road surface.

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