ANALYSIS OF ROAD ACCIDENT MODEL IN KAITHAL CITY

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Abstract - *In the world of today, road accidents are undoubtedly the most frequent cause of the most of the damage. Road accidents can happen due to various reasons related to driver, vehicle and the environment. Different kinds of models built in various countries to study the accident scene have been discussed. It is shown that these models are not comprehensive in accounting all the variables associated with the traffic accident scene. It has also been shown that a large number of variables are to be used to study the accident scenes of Indian urban roads. The aversion of street accident is critical and can be guaranteed by strict laws, specialized and police controls, preparing drivers, and so on. The main objective of this paper is to study the records of road accidents since the year 2016 and also to discuss some measures that could help us in controlling road accidents in future. The paper also includes future forecasting of road accidents in the year 2019, which may happen if necessary steps are not taken to control them.*

Key Words: **Accidents, Comprehensive, Vehicle, Aversion, Future Forecasting**

1.INTRODUCTION

Fast development of populace combined with expanded economy exercises has brought about huge development of engine vehicles. Auto collision related passings and wounds result in substance financial misfortunes as well as genuine physical and mental sufferings. Creating nations are substantially more influenced from car crash than created nations. The thruway organize is quickened at quick rate and the wellbeing of vehicular development turns into a worry for everyone because of revealing of loss of lives and properties long with lethal wounds and periodical deterrent of movement stream. National expressways give the effective versatility and availability work. The expanding street mishaps have made social issues because of loss of lives and human tragedies. Street mishaps are basically caused by communication of the vehicles, street client and roadway conditions. Every one of these essential components includes various sub components like asphalt qualities, geometric highlights, activity attributes, street client's conduct, vehicle configuration, driver's qualities and natural angles. Causation of mishaps can be surely knew with the assistance of examination of accident insights, which can give pieces of information to numerous elements of street accidents and announced spearheading chip away at the investigation of street accidents. Various examinations on exploring the varieties in the rate of accidents have been done in India in various urban areas, for example, Delhi, Ahmadabad, Hyderabad, Chennai, Bangalore, and Kolkata for foreseeing street mishap utilizing populace. In this examination an endeavor has been made to create Road Accidents Models for Kaithal City for a chose Stretch of SH-12.

1.1 Traffic Accident in India

Urban transport offices in the greater part of the Indian urban areas are insufficient and falling apart finished the years. The advancement of open transport framework has not kept pace with activity request both as far as quality and amount. With the rising mechanization and extending street organize, travel hazard and movement introduction develop at substantially quicker rate, as the development of enrolled vehicles constantly out numbers populace development. Today street car crashes are one of the main sources of passings, inabilities and hospitalizations with serious financial cost over the India:

1.2 Traffic Accident in Haryana

The statisticsmaintained by the Haryana Police, uncovered that the state positions number 10 in the nation to the extent street mishap are concerned. Around twelve individuals bite the dust and another 27 to 30 maintain wounds each day on the Haryana streets. As indicated by information, around 11,000 street accidents happen each year Haryana. In contemplate led by the state movement police, it was uncovered that substantial vehicles like trucks, transports lorries, beats and vans add to the greatest number of deadly mishaps in the state. The examination additionally demonstrated that the quantity of men kicking the bucket in street mishaps is much more than ladies, out of the aggregate number of lethal and non-deadly accidents, 80% men either support wounds or bite the dust

2. LITERATURE RIVEW

K. Nachimuthu and P. Partheeban(2017). Their investigation bargains on expectation of street accidents for Chennai city utilizing framework progression approach. For this situation, the reenactment street accidentexpectation demonstrate was produced from the base year 2016. Chennai City street accident information was gathered from 2006 to 2016 from Chennai.

Rua Dr. Roberto (2011) introduces a novel mishap demonstrating methodology using an adaptable capacity named the translog work that enables future research to embrace another understanding of the versatility of logical factors. This investigation exhibited the capability of the translog work NB model to give new experiences into the manners in which that informative factors impact mishap recurrence. The translog show is ordinarily utilized in econometric investigations wherein it gives a flexiblefunction frame to display second-arrange impacts, hence enabling the flexibility to fluctuate as indicated by the size of the informative variable.

S. Harnen, R S Umar, S V wong (2004) did an examination on urban streets in Malaysia going for creating models for anticipating bike crashes at signalized crossing points. The conclusion drawn from this examination was that number of cruiser crashes was corresponding to the level of activity entering the convergences.

3. METHODOLOGY OF STUDY

3.1 General

The investigation goes for creating Road Accidents Models for Kaithal city on a chose stretch of Ambala road - ITI Kaithal – KKR Bypass – Bus-stand Kaithal – passing through (SH-12) Railway Road Kaithal.. With this target in see, the mishap information for most recent three long periods of the chose street stretch of SH-12 from ITI Kaithal to Railway Road Kaithal, are gathered from various sources. After examination of the information, models for forecast of mishaps in future are produced on premise of which healing measures and enhancements are recommended.

3.2 Identification of the Problem

Because of the exceedingly heterogeneous nature of activity in Kaithal city going from walkers, creature drawn trucks, rickshaws, and pushcarts to mechanized vehicles like engine cycle, three wheelers, engine autos, transports, trucks the level of accidents is expanding step by step. The erratic example of the streets, nonattendance of legitimate activity controlling gadgets and absence of driving order in individuals is the fundamental reason of expanding patterns of mishaps in the city.

This issue has been perceived in the examination based on which the models are created for street accidents forecast. These models will be utilized as an apparatus for recommending healing measures in order to enhance level of street security in Kaithal city

3.3 Data Collection and Tabulation

The accident information of the chose stretch of SH-12 from ITI to Railway Road Kaithalare gathered from Police station

closeVishavkarmachowk, Police station Bus Stand for most recent three years (2016-2018). Street accident information incorporate the data like number of mishaps for singular year, kind of mishap, vehicles associated with the accident, time of accident, age of the people who endured the accident.

3.4 Identification of Accident Prone Stretches and Remedial Measures

For finding the dark spots/clumsy stretches, the stretch under investigation is separated in to eleven portions beginning from ITI Kaithal to and finishing Railway Road. Clumsy stretches are distinguished utilizing three strategies. These techniques are :

- By finding the Average number of Accidents every year.
- By discovering Average Number of Accidents per kilometer street length.
- By finding Weighted Accident Severity Index (WASI).

Based on over three qualities, rank is given to the isolated stretches. This piece of the investigation gives the data from which the deliberate changes in approach, plan, control and requirement can be created. In the wake of distinguishing clumsy stretches in the city, medicinal measure are proposed to make clumsy stretches safe and to diminish the accidents out and about in future.

3.5 Model Development

In this section development of suitable relationship between accidents and other parameters like population, number of registered vehicles and traffic volume is made for their use in prediction of accidents in future. These models can be used as tools to measure the effectiveness of future safety improvements to be implemented in the city.

4. DATA COLLECTION

4.1 General

Street transport is essential to by and large improvement of nation. Sadly, deficient thoughtfulness regarding security has implied that street transport frameworks have created in ways that have prompted critical loss of lives, wellbeing and riches. Solid and precise information are expected to bring issues to light about the size of street movement wounds, and to persuade policymakers regarding the requirement for activity. Solid and exact information are additionally expected to accurately distinguish issues, chance factor and need regions, and to plan system, set targets and screen execution. Street accident information accumulation is utilized to enhance vehicle crashworthiness and enhance wellbeing of street client.

4.2 Data Collection Sources

The requisite data that is collected for developing road accident models for Kaithal city has been obtained from three different sources and they are as follows:

1. Police Records
2. Field Study
3. PWD B&R

With the prior permission of the concerned superintendent of Police (S.P), Kaithal, The accident data Kaithal city were collected for last three years (2016-2018) from the two Police Station of Kaithal City situated along the SH-12 from ITI to Railway Road Kaithal. These police stations are PSPoliceLine, PS Bus Stand.

4.3 Presentation of the Data

The data so obtained from of FIR's sorted out yea -wise in simplified way and is presented in excel spreadsheet as shown in Table 1. the information regarding occurrence time location, vehicles involved and type of injury is extracted.

Table 1 Accident data of Kaithal City

Year	Population	Vehicles	Fatalities	Injuries	Total Accidents
2016	301372	17910	15	46	45
2016	309795	19943	23	55	58
2017	319056	22207	29	57	63

5 DATA ANALYSIS AND MODEL DEVELOPMENT

5.1 General

The analysis of road accident data for the development of road accident models can be done based on various features. The following features are used in this dissertation work:

1. Accident severity index
2. Accident fatality risk
3. Variation in deaths with population
4. Accident risk
5. Variation in accident with population
6. Accident fatality rate
7. Variation in accidents with number of registered vehicles
8. Variation in death with number of registered vehicles
9. Variation in accident with traffic volume
10. Variation in death with traffic volume
11. Time of accident
12. Stretch- wise distribution of accidents.
13. Vehicles involved in accidents
14. Age-wise distribution of accidents
15. Type of injuries

The above features are analyzed for the development of accident models in this study using simple linear regression.

5.2 Accident Severity Index (ASI)

The accident severity index measures the seriousness of an accident. It is defined as the number of persons killed per 100 accidents. Tables 2 present Accident Severity Index for Kaithal city from 2016 to 2017. It is seen from the table that the Accident Severity Index has gradually increased from 33.33 in 2016 to 46.03 in 2017.

Table 2 Accident Severity Index (ASI)

| Year (1)	Number of person killed (2)	Total number of Accidents (3)	ASI (4)= (2/3)x100
2016	15	45	33.3333
2016	23	58	39.6551
2017	29	63	46.0317

The increase in the accident severity index seems to be the result of lack of medical facilities available in the Kaithal city.

5.3 Accident Fatality Risk

The accident fatality risk, defined as the number of accidental death per 1,00,000 population. The fatality risk of Kaithal city is shown in table 3. The rate of accident fatality risk of has shown increasing trend from year 2016 to 2018. As it value reaches 18.71 in year 2018. The graphical representation of accident fatality risk is shown in fig. 1.

Table 3 Accident Fatality Risk

Year (1)	Number of person killed (2)	Estimated mid- year population (3)	ASI (4)= (2/3)x100000
2016	15	301372	11.35
2017	23	309795	15.89
2018	29	319056	18.71
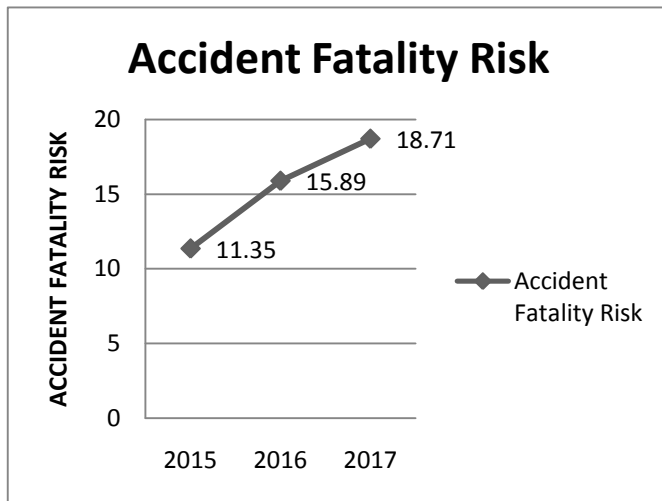
Figure 1 Accident Fatality Risk (Persons Killed per 1,00,000 population)

This characteristic of accident is dependent on the population factor. As from the above figure it is clear that population of the city is increasing every year due to which vehicle population is also increasing. As a result more accidents are occurring every year and fatality risk is increasing due to lack of safety improvements taken in the city.

6. CONCLUSSIONS

The accompanying conclusion is drawn from the investigation:

1. The Accident Severity Index (ASI) for Kaithal city has expanded from 33.3% of every 2016 to 46.0% of every 2017. It showed more passings occurring in street accidents.

2. The increment in accident casualty hazard from 11.4 to 18.7 in most recent three years shows that mishaps are causing more passings for a given populace.

3. Population, quantities of enrolled vehicles and movement volume out and about have expanded over the most recent multi year prompting increment in the quantity of mishaps fatalities.

4. The rate increment in accidents is observed to be right around two and half occasions and the rate increment in passings is observed to be just about five times the relating increment in populace.

5. The rate increment in mishap is observed to be just about two times and the rate increment in passings is observed to be right around four times the comparing increment in enrolled vehicles.

6. The rate expanded in mishap is observed to be just about three times and the rate increment in passings is observed to be right around six times the comparing increment in rush hour gridlock volume. Every one of these focuses

demonstrate that the measure taken for lessening accidents in the past are not sufficient.

7. It is watched that the level of day time accidents (69.5%) is considerably higher than the evening time (30.5%) mishaps. This might be credited to high movement volume and high activity blockage out and about amid day time.

8. Accident inclined fragment have been distinguished on 10 km stretch of the street under examination utilizing different strategies. The most accidents inclined section is recognized as ITI to Govt. School Model town Intersection.

9. The explanations behind more accidents on this portion incorporate a) SH-12 meeting with NH-1 without appropriate blending and separating paths, b) infringement of carriageway on SH-12 and on corners of the bends with by vehicles for the most part auto rickshaw, c) meeting of cross-street from Govt. School side and from ITI chowk on SH-12, d) nonattendance of working sign light on Govt. School demonstrate town convergence, e) exceptionally poor state of street asphalt in this fragment of the street, f) nonappearance of trail for person on foot and g) nonappearance of street markings. A significant number of these reasons are observed to be substantial for other clumsy portions of the street also.

10. According to the sorts of vehicles associated with accidents, it is watched that bikes are engaged with most extreme number of mishaps (39%), trailed by transport/trucks (30%), autos (17%) and other (14%).

11. It is watched that monetarily dynamic age gathering of the general public that is 30-40 years involved the greatest offer in mishaps (50.66%) trailed by age gathering of 16-29 years (29.33%) and 40-60 years (15.11%).

12. Maximum accident fall in the class minor damage compose (49.77%) trailed by deadly kind (30%) and real damage compose (20%).

13. Simple Linear Regression different Linear Regression is utilized to created mishap models for Kaithal City. In all out six models are produced utilizing straightforward direct relapse relating mishaps and passings with populace, enrolled vehicle and movement volume. It is watched that movement volume effectsly affects number of accidents and passings when contrasted with populace and number of enrolled vehicles.

14. Two models have been created utilizing numerous straight relapse relating mishaps and passings with populace, enlisted vehicles and activity volume. These models, in any case, are not observed to be reasonable as basic liner relapse models.

15. On the premise of the information investigation, normal for mishaps and field visits directed for the examination the therapeutic measure have been recommended to diminish accidents on the clumsy sections of the concentrated stretch of the street. These measures incorporate a) speed restrict for different vehicles, b) arrangement of pathways, activity lights and street markings, c) evacuation of infringement particularly on bends of crossing point for guaranteeing sufficient sight remove, d) arrangement of parking spots

particularly spaces particularly for auto rickshaw and e) strict authorization of directions.

REFERENCES

- Faustino Prieto, Emilio Gomez-Deniz& Jose Maria Sarabia from SarabiaaaDepartment of Economics, University of Cantabria, Avenida de los Castros s/n, E-39005 Santander, Spain&Department of Quantitative Methods and TiDES Institute, University of Las Palmas de Gran Canaria, E-35017 Las Palmas de G.C., Spain (Accident Analysis and Prevention 71 (2014).
- K. Nachimuthu& P. Partheeban(2017) Development of A Road Accident Prediction Model Based on System Dynamics Approach(Volume : 3 | Issue : 9 | Sept 2017 | ISSN - 2249-555X).
- Rua Dr. Roberto Frias 4200-465 Porto, Portugal Civil Engineering Department, School of Engineering, Porto University (Accident Analysis and Prevention 43 (2017).
- Road Accidents Study Based On Regression Model: A Case Study of Ahmedabad City by ManishaMinesh Desai &Prof.A.K.Patel.
- Ramesh and M. Kumar (2017), "Road Accident Models for Hyderabad Metropolitan city of India", Indian Highway Journal, volume 39, no. 7, 2017.
- Tortum and MuhammedYasin (2016), Modelling Traffic Accidents in Trukey using Regression analysis", Igdir University Journal of the Institute of Science and Technology, Volume 2, Issue 3, pp:69-78,2012.
- "Accidental Deaths and Suicides in India 2016, 2016 and 2017", published by National Motor Transport Statistics of India. Ministry of Surface Transport. New Delhi.
- Department of Economic and Statistical Analysis, Government of Haryana, Chandigarh.
- Global Status Report on Road Safety (2016) Published by World Health Organization.
- Keli K, Stephanie A. Rowcliffe (2008), "Missing the Signs" The Impact of Cell Phone Use on Driving Performance", Journal of Psychology, Volume 1, 2008.
- M. Ziyadi, F R Moghadam (2016), "Prediction of Accident Severity using Artificial Neural Networks", International Journal of Civil Engineering, Volume 9, No 1, March 2017.
- Mustafa Callisici, M Melik and Omer Cansiz (2016), 'Use of Artificial Neural Network to Estimate Number of Persons Fatality Injured in Motor Vehicle Accidents', Proceedings of the 3rd International Conference on Applied Mathematics, Simulation, Modeling, 2016.
- MORTH (Ministry of Road Transport and Highways) survey report on Road Accidents.
- National Crime Record Beurau (NCRB), Ministry of Home Affairs, Governement of India, New Delhi.
- National Transport Planning and Research report on Road Accidents.
- P. Pramada VALLI (2004), "Road Accidents Models for Large Metropolitan Cities of India", International Association of Traffic and Safety Science Research, Volume 29, No. 1, 2005.
- Road Traffic Education Institute, New Delhi, Report on Road Traffic Accidents (2006).
- R K Singh, S K Suman (2001), "Accident analysis and Prediction of Model on National Highway" International journal of advanced technology in Civil Engineering, Volume 1, issued 2, 2012.
- SandipChakraborty and Sudip K Roy (2005), "Traffic Accident Characteristics of Kolkata", Transport and Communication Bulletin for Asia and the Pacific, No. 74, 2005.
- S. Harnen, R S Umar, S V Wong (2004), "Development of Prediction Models for Motorcycle Crashes at Signalized Intersections on Urban Road in Malaysia", Journal of Transportation and Statistics, Volume 7, no. 2, 2004
- S K Singh and Ashish Mishra (2004), " Road Accident Analysis: A case Study of Patna city:, Urban Transport Journal 2(2): 60-75.