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Accident Cause Model for Talawade, Pune, Maharashtra.

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Abstract: *It is projected that road traffic injuries will move up to the third position by the year 2020 among leading causes of the global disease burden.Talawade being a major industrial area in P.C.M.C. due to which lot of heavy vehicles operate along with the local travellers. Hence, the area is prone to accidents. We studied the various accident causes in Ganeshnagar by preparing questionnaire & creating Google form. From which 40% being due to road condition,32% overtaking problems, 14% improper pedestrian crossing 10% maintenance problem & 4% personal problem. We analyzed the geometric errors on the location & also the peak hour of occurance was observed to be 8.00am -11.00am & 3.00pm-10.00pm. The outcomes of the study will help in minimizing the accidents & allow the safe travel with growth in the industrialization.*

INDEX TERMS: *black-spot, Questionnaire, collision diagram, accident cause model.*

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I. Introduction

A road traffic accident (RTA) is any injury due to crashes originating from, terminating with or involving a vehicle partially or fully on a public road. The Global status report on road safety 2013 indicates that worldwide the total number of road traffic deaths remain unacceptably high at 1.24 million per year. Road traffic injuries are the leading cause of death among young people, aged 15–29 years. Children, pedestrians, cyclists and older people are among the most vulnerable of road users constituting half of those dying on the world‟s roads. India is no exception and data showed that more than 1.3 lakh people died on Indian roads, giving India the dubious honor of topping the global list of fatalities from road crashes. Rapid urbanization, motorization, lack of appropriate road engineering, poor awareness levels, nonexistent injury prevention programmers‟, and poor enforcement of traffic laws has exacerbated the situation. India has the highest road traffic accident rate worldwide with over 140,000 deaths annually, beating even China. Every hour, nearly 14 lives are lost due to road accidents in India. Total deaths in Maharashtra are 9205 in year 2015 as per survey.

II. Literature Review

Road condition :-

Identification of factors in road accidents through in-depth accident analysis by Mouyid bin Islam ,KunnawKanitpongthailand.

This paper addresses an in-depth study through crash investigation and reconstruction. This research paper establish the linkage between the causes and consequences with event. They studied accidents by drawing the driving path on software .They have listed the various factors like - Lack of street lighting, No “Speed Limit” sign along the roadside. Lack of conspicuity of the static roadside objects during nighttime.

A Descriptive Study on the Consciousness of Traffic Rules among the people of „Amdavad‟ By PoonamArora.

One of the biggest problems regarding transportation that the city is facing is the congestion that millions of commuters face each day on roads.

The paper reveals and concludes that the majority of the drivers does not follow rules and traffic signs while driving. A very small chunk doesn‟t believe in following traffic signal which causes accidents and other traffic problems. Failing to keep lane . Failing to yield right of the way . Driving in excess of speed .

B. Vehicle condition:-

Traffic Analysis and Road Accidents: A Case Study of Hyderabad using GIS by **M. Bhagyaiah1, B. Shrinagesh.**

This Paper addresses to increase of vehicle the major accidents are happened. The increase of vehicle has lot of pressure on the existing roads and ultimately resulting in road accidents. From 2001 there is an increase of 202 percent of two wheeler and 286 percent of four wheeler vehicles with no road expansion. Motor vehicle crashes are a common cause of death. GIS helps to locate the accident hotspot.

C. Age of Driver : -
Road Traffic Accidents in India: - Issues and challenges by Sanjay Kumar Singh.
This research paper is based on the age group of drivers. The age group of 30-59 years is the most vulnerable population group In this group the most road accidents are happened. The age group of 30-59 males face higher level of fatalities and injuries than the female. Road accidents are relatively higher in extreme weather and during working hours.
Fatal Road Traffic Accidents among Young Children by Harnan.Singh,AD.Aggarwal.
This Paper addresses to studiedthe major accidents are caused by young children‟s. Children themselves were at fault in majority of cases Young children‟s are extremely vulnerable to such injuries which are vastly preventable 59 cases of fatal road traffic accidents in children aged below 16 years were studied. The most common age group involved was 13-16 years. The study highlights the pattern of fatalities due to road accidents in children and suggests suitable preventive measures to reduce burden of childhood mortality due to road accidents

D.Human Behaviour : -
Preventing Traffic Accidents With in Vehicle decisions Support System – The Impact Of Accident Hotspot Warning On Driver Behaviour by Benjamin Ryder
This paper is based on the road accidents are happened due to the human behavior while driving. In this paper they provide the evidence in- vehicle decision support systems (DSSs) can have significant positive effects on driving behavior and collision avoidance.

E. Provide Safety & Prevention Measures:-
Safety Measures for Controlling road AcccidentsInjuries And Fatalities by ManishaMinesh Desai.
It is difficult to imagine life without it tremendous growth of both road network and road traffic in India bought the problem of road accident resulting in injuries and fatalities In this paper we studied graph ,road accident statistics Vs no of accident ,as per WHO 12 Lakh people die every year out of which more than 83000 people die in India while 5 times is seriously injured. In this paper we have studied some safety provisions regarding the driver which include driver training and testing, driver behavior, over speeding, Drug or alcohol consumption etc

Road Traffic Accidents In India by S.M. Sharma.
There is tremendous rise in road traffic accident due to vehicular volume, increase in vehicle speed, poor driving skills, drunk driving, bad roads, poor traffic controls, lack of public awareness etc. So the solution for this is to reduce vehicular traffic give training to the drivers regarding road safety measures it can also be improved by introducing some strict rules and regulations. Theroads must be displayed with various regulatory signs and signal, boards crossings and highway, stop and give way sings and traffic lights. Road accidents are increased due to rapid urbanization and industrialization and due purchasing power of people they are able to buy all kinds of vehicle .and construction of alternative routes has not kept the pace with volume of traffic we see.

Methodology
This study is focused on the collection of data of accidents through respected authorities, studying the causes which may trigger accidents. It also deals with studying various suggestions and applying according to the feasibility & recommends it to the authorities.

CASE STUDY [Talawade] :
The area of talawade is the accident prone area. We observed this from the news obtained from „TIMES OF INDIA‟ newspaper and also from the people‟s opinion.

CHARACTERSTICS OF ROAD
Location of site :Ganeshnagar, near MSCB officeTalawade road, Pune 411062
Width of road : 15m
Length of road(A) : 86.4 m
Length of road (B) : 100 m
Average speed: 40 km/hr
Side Margin : 3.6 m
B opposite side : 4.3 m (Right)
MSCB side : 5.6 m

TECHNICAL TERMS
Stopping sight distance:
The clear distance ahead needed by a driver to bring his vehicle to a stop before meeting a stationary object on the road is called as stopping sight distance
$SSD = Vt + V^2/gf$

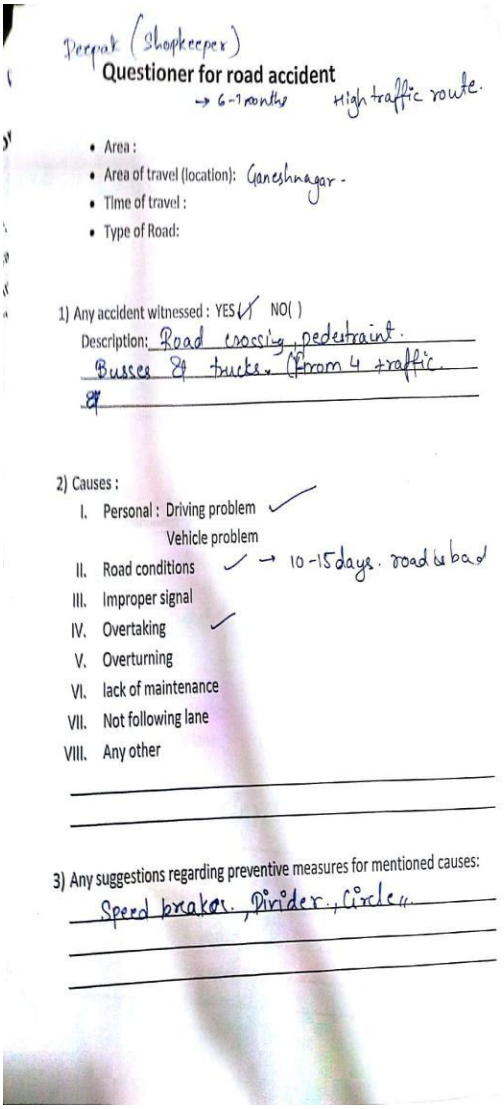
Super elevation:
The inward transverse inclination provided to the cross section of the carriageway at horizontal curved portion of the road is called super elevation

$e = V^2/127R$

Here, V= 40kmph
t= 2.5 sec
g= 9.81
f = 0.15
R = 300m

$SSD = (40*2.5+40^2/9.81*0.15)$
= 1187.32m
$e = 40^2/127*300$
=4.19%
Condition of Road

As per our observation people face many problems due to improper sight distance, super elevation & no provision of traffic control devices. We visited RTO office at Moshi and Dehuroad Police Station for collection of accident data.



Deepak (Shopkeeper)

Questioner for road accident

→ 6-7 months high traffic route.

- Area :
- Area of travel (location): Ganeshnagar -
- Time of travel :
- Type of Road:

1) Any accident witnessed : YES ✓ NO( )

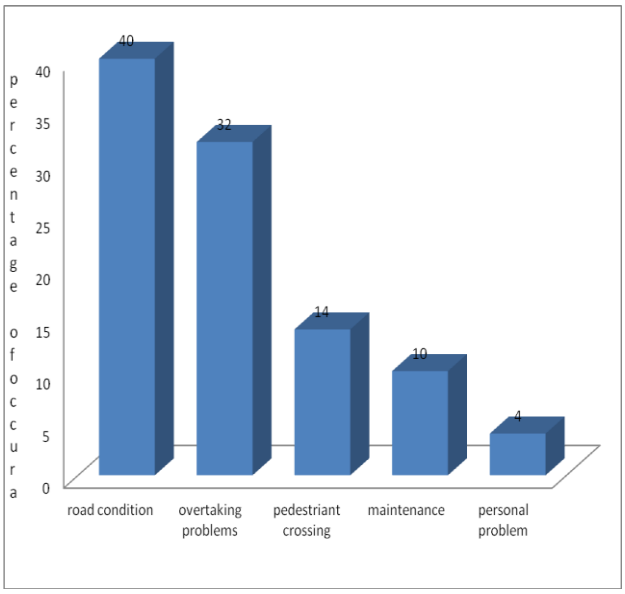
Description: Road crossing, pedestraint. Busses & trucks. (From 4 traffic.

2) Causes :

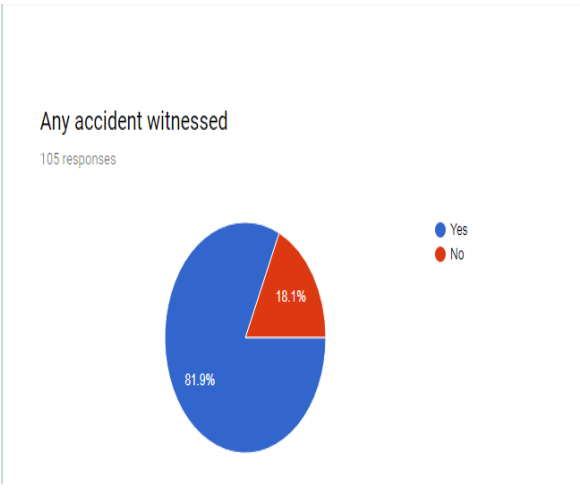
I. Personal : Driving problem ✓
Vehicle problem
II. Road conditions ✓ → 10-15 days. road is bad
III. Improper signal
IV. Overtaking ✓
V. Overturning
VI. lack of maintenance
VII. Not following lane
VIII. Any other

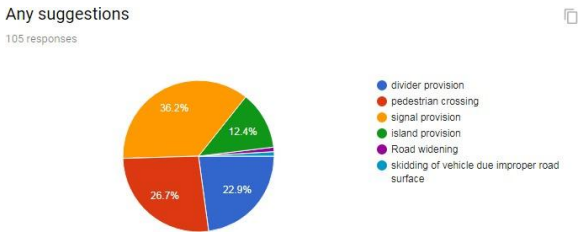
3) Any suggestions regarding preventive measures for mentioned causes:

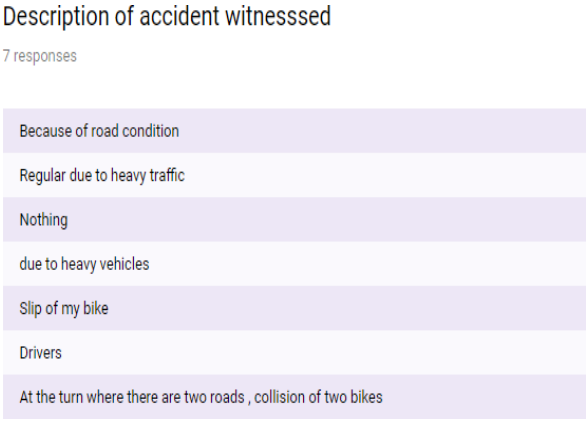
Speed breaker, Divider, Circle.

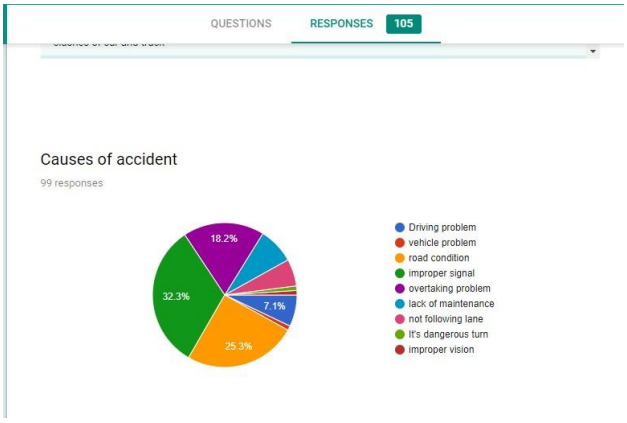


DATA GENERATED BY CREATING GOOGLE FORM









ACCIDENT CAUSE MODEL
We have developed an accident cause model by regression method as follows:
The equation is,

ACM=0.4IS+0.387RC+0.408DP+0.365OP+0.258VP

Where,
IS = Improper Signal
RC = Road Condition
DP = Driving Problem
OP = Overtaking Problem
VP = Vehicle Problem

For example:
eg 1. n= 3, x= 40
then $\bar{x}$ = 40/3 =13.33
Now, r = cov(x)/σx
= [1/3(40-13.33)] /[$\overline{1/3(40^2 - 13.33^2}$]

= 8.89/21.77
= 0.40

SR NO.	CAUSES	NO OF USER REVIEW
A.	Driving Problem	10
1	Psychological Problem	2
2	Speed	5
3	Distraction to Driver	3
B.	Vehicle Problem	
1	Improper Maintenance of vehicle	2
C.	Road Conditions	43
1	Improper Camber	14
2	Road Width, Road Margin	10
3	Improper Vision	9
4	Potholes	10
D	Improper Signal	40
1	Height of Signal	17
2	Signals are not in working condition	13
3	Time Cycle	10
E	Other problems	55
1	Overtaking Problem	35
2	Lack of Maintenance	13
3	Not Following Lane	5
4	It's Dangerous Turn	1
5	Improper Vision	1

Cause no	No of accidents (X)	No of causes (n)
A	10	3
B	2	1
C	43	4
D	40	3
E	55	5

Obtaining the data from the police station we found the values of certain causes of accidents.

Causes	No of accidents
I.S	42
R.C	45
D.P	13
O.P	60
V.P	5

Substituting values in the formula
ACM = 0.4*42+0.387*45+0.408*13+0.365*60+0.258*5
= 63 no. of accidents in a week

III. Conclusion

The following model concludes that huge number of accidents occur weekly.
The model consist of various causes by which accidents may occurs in that area.

IV. Results

Obtaining the data from the police station we found the values of certain causes of accidents .

Causes	No of accidents
I.S	42
R.C	45
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Substituting values in the formula

ACM = 0.4*42+0.387*45+0.408*13+0.365*60+0.258*5
= 63 no. of accidents in a week

V. Discussion

So from above results we have observe that due to overtaking problem, lack of maintenance, not following lane, and dangerous turns accident may take place and from the model we have concluded that 63no of accidents takes place in week.

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