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STUDY OF GEOMETRIC FEATURES OF ROAD AND ACCIDENT RATE

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Abstract – *The objective of the study of geometric features of road and accident rate wants to find various geometric features of road using post- & pre- analysis approach. It affects geometric features and accident rate. The study is based on traffic volume. Major accidents occurred due to speed, horizontal radius, lack of visibility, super elevation, steep gradient, vertical gradient. A total of 18749 vehicles from 8.00am to 8.00pm on Waghbil road were collected (combined vehicles), for analysis approach. The analysis shows ratio of vehicle count for every 15 mins interval. Manual calculation was the purpose for this investigation. Road & human safety are the major consideration of the project, basic methodology for better understanding. Studying, analysing and determining is the basic approach of this project.*

Keywords: traffic volume, visibility, super elevation, gradient, horizontal radius.

INTRODUCTION

Basic means of transportation is roadway. It is easily accessible. Accident rates are increasing as population is increasing. There is lack of safety and accident are caused due to human errors and quality/geometry of road, as road factor plays important role in the study. Chances of accident are less where precautions taken are more.

There are various black spots in which probable accidents are occurred .the basic reason to study the geometric feature of road is to minimize the accident rate.the factors which cause the accidents are super elevation, horizontal radius, horizontal alignment, visibility, gradient and speed limits.

While studying this various factors of road in this country the problem could be put forth and by studying every detail one can understand that what type of accidents are occurred to what kind of road

1.1 Objectives

In present work study of traffic volume and provision of safe geometric features plays important for prevention of accident rate. This study deals with achieving following objectives.

1. To study the various geometric factors of road.

2. To study the role of the geometric factors of road on accident rate.

3. To determine accident rate.

4. To determine safe geometric factors of a road to minimize the accident rate.

Geometric features

Horizontal Radius-

The radius is found out from the alignment of the road at the location, the tangents are drawn from centreline of the road and the radius with the tangent is found out .this gives the radius and is measured in meters.

Visibility-

Visibility or a sight distance is obtained directly from the software along the road for 10m intervals.it is the distance up to which the driver can safely view the road without any obstacles or it is the distance available to stop the vehicle before crashing into the obstacle on the road.

Super elevation-

It is the banking provided on roads to resist the centripetal force on the vehicles while travelling along the curves.

Gradient-

Gradient is the rate of rise or fall along the length of the road w.r.t horizontal.it is expressed as 1 in n.(1 in vertical unit to n horizontal unit)

Terrain-

Depending on slope of the land terrain is classified as follows.

Terrain classification	Slope of location (%)
Plain	Less than 10
rolling	10-25
mountainous	25-60
steep	Greater than 60

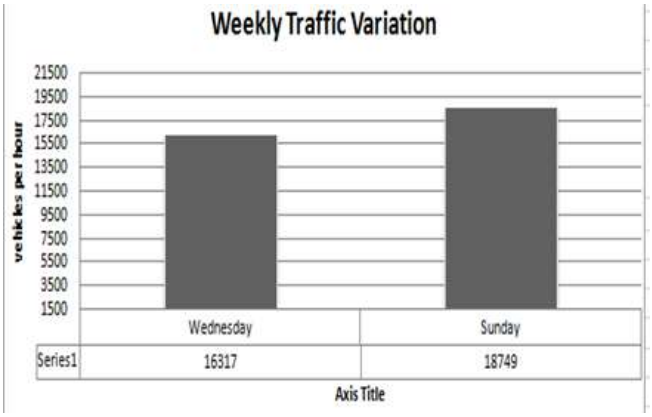
2. Analysis and Discussion

Collection of data - we have selected a four different sites considering our required geometric features and the sites are –Waghbil, Borpadle , Joitba., amongst which detail description if Waghbil site is discussed .the collection of data for accident rate of past three years is collected from respective police

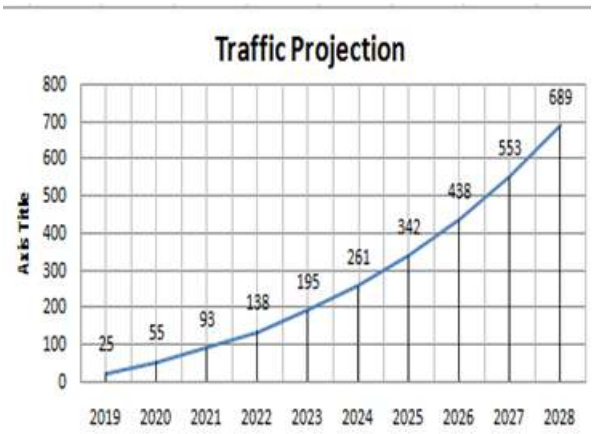
station. Study of traffic volume on daily basis has been carried out of weekends as well as week day at an interval of 15 mins from 8.am to 8.pm.Heavy traffic is observed in peak hours in morning as well as in evening and low traffic at afternoon .Analysis is done on sheet of traffic volume count survey .provision of speed limit sign.

Fig 1: Site waghbil (Kolhapur ratnagiri highway)

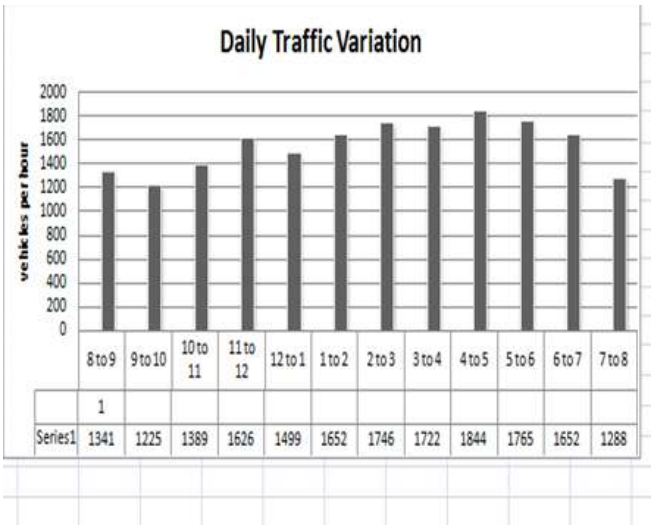
Average Daily Traffic		PCU
DAY	TOTAL	TOTAL
Weekday	16317	15919
Weekend	18743	15417
Total	35066	26998.9
Average	17533	13499.45



Years	ADT vehicle/day	CSA, msa
2019	**20155**	**25**
2020	**21666**	**55**
2021	**23291**	**93**
2022	**25038**	**138**
2023	**26916**	**195**
2024	**28935**	**261**
2025	**31105**	**342**
2026	**33438**	**438**
2027	**35946**	**553**
2028	**38642**	**689**



Max along Traffic	Total
8 to 9	1341
9 to 10	1225
10 to 11	1389
11 to 12	1635
12 to 1	1499
1 to 2	1652
2 to 3	1745
3 to 4	1722
4 to 5	1644
5 to 6	1785
6 to 7	1652
7 to 8	1288
total	18749



Preventive measures for Waghbil road : For this road traffic is high. In order to reduce traffic speed limit signs and diverging signs should be provided. To reduce accident and safe drive, road studs should be provided at the curves.

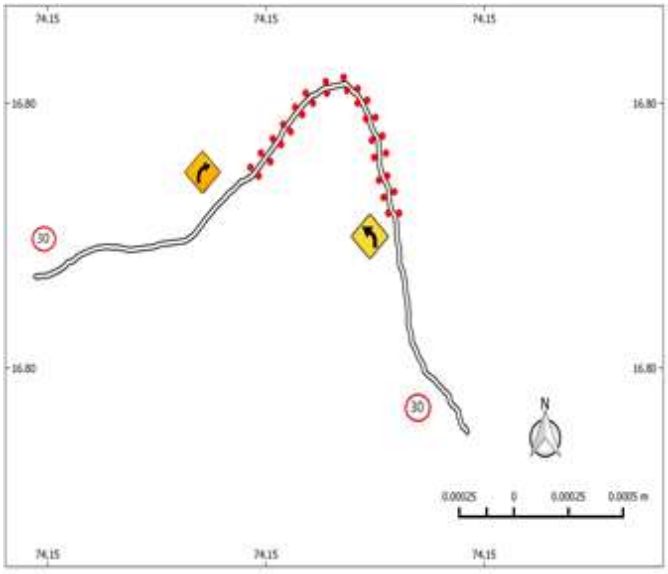


Fig -2 :Preventive measures for Waghbil

3. CONCLUSIONS

In this study, we have studied site of Waghbil for the geometric features of the road as super elevation, horizontal radius, horizontal alignment, visibility, gradient and analysis is done.

Hence, we can conclude that provision of bypass, speed limit signs, diverging signs and road studs should be made for safe driving to reduce accident rate.

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