International Journal of Trend in Scientific Research and Development (IJTSRD)
International Open Access Journal
ISSN No: 2456 - 6470 | www.ijtsrd.com | Volume - 2 | Issue – 3

Spot Speed Study for Accident Analysis and Mitigation Measures on Wardha-Pawnar Road

S. V. Nimkar
IV[th] Sem, M.E Civil (TE&M)
DRGITR, Amravati,
Maharashtra, India

Dr. M. R. Vyawhare
Ph.D.M.Tech (Structure),
HOD Civil Department
DRGITR, Amravati,
Maharashtra, India

Prof. V. S. Umap
M. Tech (Structures),
DRGITR, Amravati,
Maharashtra, India

ABSTRACT

Accident is a term used to represent sudden fatal event with multiple reasons, persons, properties and things evolved. The main cause of accidents by many researches is concluded as speed factor & speed is the parameter which mainly depends upon the owner of vehicle and class of road. This parameter is divided in to spot speed & journey speed. The paper contains the full part of spot speed which was studied and resulted on project location and obtained results are further considered in analysis and mitigation measures.

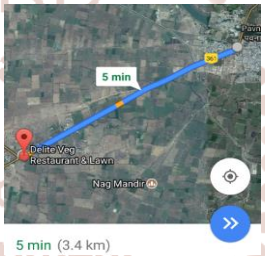
I. INTRODUCTION

Spot sped-It is the instantaneous speed of a vehicle at a specified location. Spot speed study is the one key factor which can give an idea about the accidents causes hence for evaluation and remedial measure of accident s this speed study has been carried out the method used for study is long base direct timing procedure on a patch of Wardha Pawnar road. The results from the study are presented in tabular form for analyzing variations in speed and correlate the permissible maximum speed for moving vehicles on selected road patch and then suggestion will be suggested.

II. STUDY AREA

The existing location for spot speed study is on Wardha Pawnar road of 3.4km patch started from hotel delight to end at Dham river bridge. The Wardha Pawnar road is the patch of Aurangabad-Nagpur road designated as NH-361

It is a two way single lane road with width at carriage way as 6.90m and 1.80m shoulders on both sides. The pavement is a high type bituminous type.



III. METHODOLOGY

Following are the methods of spot speed study

1. Long base
a) Radar speedometer
b) Photographic method

2. **Short Base**
a) Direct timing
b) Enoscope
c) Pressure and contact tube

Here we used long base direct timing procedure This method consists of taking two reference points on pavement at a suitable distance apart can be taken from the following table:

STREAM SPEED IN KMPH	LENGTH IN METERS
Less than 40	27
40-65	54
More than 65	81

The observer starts and stops stop watch as a vehicle crosses these two marks. From the known distance and measured time intervals speeds are calculated.
The modifications in above process is that the two observers are taking reading in such a way that one observer stand at 1st point and second observer stands at 2nd reference point. When vehicle passes signal the second observer stars watch and when vehicle cross second observer he stops watch in such a way timings of various vehicles under consideration are recorded and used for further calculations.

IV. OBSERVATIONS

The observations are done at three patches of road.

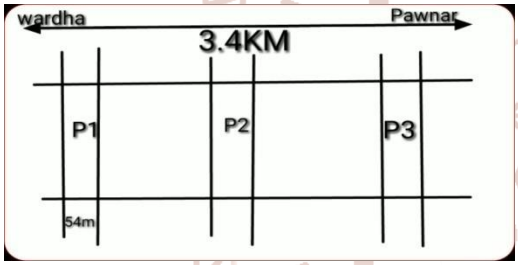


Diagram for patches of observations.

Observations for patch no.1 are as follows

Location: - Near the bridge of Dham river on Wardha Pawnar road. Time-10.00a.m Date:-28/01/2018 Patch length:-54 m.			
SR. NO	TIME FOR PASSING 54M PATCH LENGTH FOR DIFFERENT CATEGORY OF VEHICLES IN SECONDS		
	2WHEELER	3WHEELER	4WHEELER
1)	5.30	3.61	7.43
2)	3.64	3.55	6.41
3)	2.99	3.94	6.53
4)	2.99	4.87	6.07
5)	3.94	5.77	5.77
6)	3.88	5.34	5.65
7)	4.35	5.33	6.01
8)	4.65	5.89	4.32
9)	5.13	6.02	4.39
10)	4.88	4.36	4.91

Photographs taken for patch no.1

Observations for patch no.2 are as follows.

Location: Near mama bhang dargah on Wardha Pawnar road. Time-2.p.m Date:-28/01/2018 Patch length:-54 m.			
SR.NO	TIME FOR PASSING 54M PATCH LENGTH FOR DIFFERENT CATEGORY OF VEHICLES IN SECONDS		
	2WHEELER	3WHEELER	4WHEELER
1)	4.37	6.02	3.66
2)	4.44	6.37	3.32
3)	3.94	4.47	4.06
4)	4.01	6.01	4.14
5)	4.35	5.89	4.32
6)	5.55	5.33	3.00
7)	5.71	6.41	4.46
8)	4.82	3.53	3.91
9)	4.08	5.80	3.18
10)	3.37	6.07	5.22

Photographs taken for patch no.2

Observations for patch no.3 are as follows.

Location:-Near hotel Delight, Wardha Pawnar road. Time:-5.00 p.m. Date-28/01/2018 Patch length:-54m			
SR. NO	TIME FOR PASSING 54m PATCH LENGTH FOR DIFFERENT CATEOGARY OF VEHICLES IN SECOND		
	2WEELER	3WHEELER	4WHEELER
1)	3.30	3.88	4.27
2)	3.41	4.76	4.44
3)	3.02	3.82	4.52
4)	3.20	3.98	3.34
5)	2.67	4.56	3.65
6)	3.89	4.99	3.79
7)	4.07	4.04	4.66
8)	4.44	4.55	3.82
9)	3.71	4.93	4.18
10)	3.66	5.03	3.01

Photograph taken for patch no.3

V. CALCULATIONS

Calculations are done in following steps

1) To obtain speed in kmph use following formula.

$$V = (D/T)*(18/5)$$

2) Divide the speed in speed groups.
3) Calculate % frequency
4) Calculate cumulative % frequency
5) Draw a graph mid speed vs. cumulative % frequency.
6) Find the 85th, 98th and 15th % speed.

Repeat above procedure for each patch

For patch no.1

Speed (Kmph)	Mid Speed	Frequency	% Frequency	Cumulative % Frequency
0-10	5	0	0	0
10-20	15	0	0	0
20-30	25	3	10	10
30-40	35	13	43.3	53.3
40-50	45	9	30	83.3
50-60	55	3	10	93.3
60-70	65	2	6.6	99.9

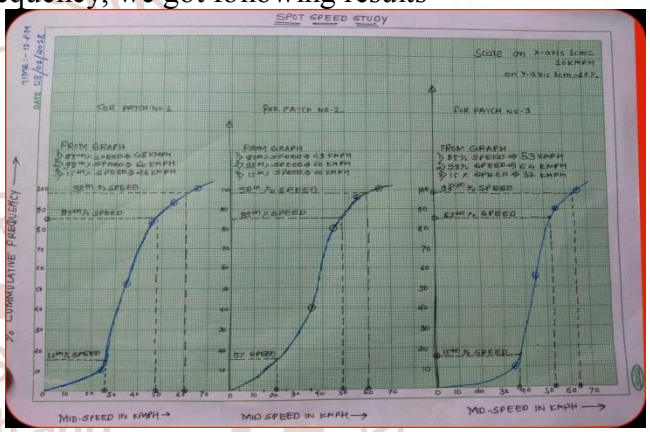
For patch no.2

Speed (Kmph)	Mid Speed	Frequency	% Frequency	Cumulative % Frequency
0-10	5	0	0	0
10-20	15	0	0	0
20-30	25	0	0	0
30-40	35	12	40	40
40-50	45	12	40	80
50-60	55	5	16.6	96.6
60-70	65	1	3.3	99.9

For patch no.3

Speed (Kmph)	Mid Speed	Frequency	% Frequency	Cumulative% Frequency
0-10	5	0	0	0
10-20	15	0	0	0
20-30	25	0	0	0
30-40	35	3	10	10
40-50	45	14	46.6	56.6
50-60	55	10	33.3	89.9
60-70	65	3	10	99.9

By drawing graph mid speed vs. cumulative % frequency, we got following results



From graph following results are obtained.

For patch no.1
1.85th % mid speed= 48 kmph
2.98th % mid speed= 60kmph
3.15th % mid speed= 26kmph

For patch no.2
1.85th%midspeed=49kmph
2.98th%midspeed=60kmph
3.15th%midspeed=20kmph

For patch no.3
1.85th %mid speed =53kmph
2.98th %mid speed =64kmph
3.15th %mid speed=37kmph

Average 85th % speed=50kmph
Average 98th % speed=61.33kmph
Average 15th % speed=27.66kmph

CONCLUSION

From the above results it is seen than the average speed of vehicles is 61.33 kmph For 98th % which is also taken for designing of road geometries hence for speed of 61.33 kmph road geometries are of sufficient capacities therefore for the selected location speed is not main factor for accidents.

REFERENCES

1. Khanna & Justo, Highway engineering and geometric design Nem Chand & Bros.2011
2. Kadiyali L.R, Traffic engineering and transport planning, khanna publishers new Delhi.2009
3. Pocket book for highway engineers, Indian road congress, Delhi
4. A.K.M Abir & Md Sami Hasnaine, Traffic speed study.