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Accidental Analysis and Comparison Between Two different Routes

Suresh Soni[1], Arun Kumar[2], Aman Kumar Goyal[3] and Devendra Kumar Jhanginia[4]

[1,2,3,4]*Department of Civil Engineering, Poornima Institute of Engineering & Technology, Sitapura, Jaipur, Rajasthan, India*
E-mail: [1]suresh.soni@poornima.com, [2]2014pietcivarun@poornima.org, [3]2014pietcivaman@poornima.org

Abstract—*As the populace is builds step by step the quantities of vehicles are additionally expanding. As the vehicles are expanding, Number of accidents likewise increments. The examination incorporates accumulation of optional mischance information and organizing the clumsy areas by utilizing Weighted Severity Index (WSI) strategy. WSI technique takes after an arrangement of relegating scores in view of the number and seriousness of mischance in that specific area over the most recent couple of years. The main aim of this paper is to analysis the accidents and comparison between two types of roads Tonk Road (B2 by pass to Rambagh Circle) and JLN Marg (Jawahar circle to Birla Mandir) in the District Jaipur, State of Rajasthan, India. So the principle point of this investigation is accordingly, to examination the significant mischance dark spots on Tonk road and JLN marg, Jaipur and change in it.*

Keywords*: Populance, Mischance.*

1. INTRODUCTION

In India roads mishaps kill a bigger number of individuals than a few plagues. The poor movement administration and transportation framework brought about 1, 50,000 passing and left the greater part a million harmed each year, insisting the nation's status as among the least secure on the planet for street clients. The report 2015 from the Indian Institute of Technology, Delhi, says wounds requiring hospitalization are probably going to be thought little of by a factor of four and for all wounds by a factor of 20 .The danger of a deadly mishap has been rising relentlessly: outright fatalities in 2015 demonstrated a 6 for every penny normal yearly development rate contrasted with 1970 figures [1]. As indicated by information the greater part of those slaughtered in 2015 were in the profitable age gathering of 15 to 34, indicating a disastrous loss of youthful lives. While the quantity of street fatalities expanded in every huge state, 10 littler ones and UTs, including Delhi and Chandigarh, announced decay. Assam is driving as far as mishaps which decrease of 115 passing in 2015 in contrast with the year 2016, while fatalities dunked by 49 in Delhi. The expanding number of fatalities and street crashes - up from 4.89 lakh in 2014 to more than five lakh in 2015 - showed how a huge number of activities taken by the Center and state governments for street security had little effect.

Distinguish coincidental dark spots on two stretch (extend of 14km) from Rambagh Circle to India Gate considering the inadvertent information gave by the Police Station amid year 2015-2017. There are add up to 325 number of mishaps happened on the chose extend of tonk street national roadway 12. 99 individuals lost their life, 69 individual Because of street mischances there is event of high social, financial and financial cost of the fatalities and wounds thus, there is tangible require of powerful measures and approaches for limitation of street mishaps make it basic to contemplate the reasons for street mishaps. Uals are horrifyingly harmed and 235 individuals are minor harmed inside this 14km extend.

Fig. 1: (Stretch B2 Bypass to Rambagh Circle)

Fig. 2: Stretch Jawahar Circle to Birla Mandir

2. METHODOLOGY

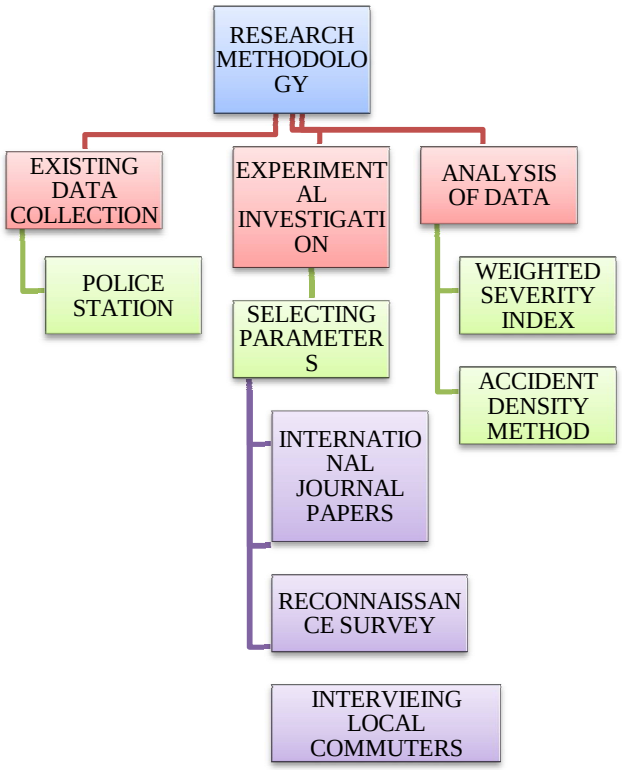

Fig. 3: Research Methodology

Recognizable proof of coincidental dark spot is the strategy to discover that are especially unsafe where mischance had happened verifiably un this examination the distinguishing proof of such dangerous areas are done in light of unplanned record accessible about area of mishaps and characterization of mischance's and others by utilizing different technique like positioning and seriousness file[2]. The incorporates:

To collect data on Tonk Road and JLN marg.

Data collect from police station.

Definite investigation of the recognized dark spots.

To discover diverse strategies to organize unsafe areas.

To recognize different movement and street related components causing mishaps.

A). Existing Data Collection

There are two strategies to recognize mishap dark spots. One is by leading physical review considering dominating reasons for mischance and other is to dissect the mishap information existed of a specific extend. System for this exploration incorporates distinguishing proof of dark spots by relating the physical overview with existing mischance information. Existing information was gathered from Police Station.[3]

Keeping in mind the end goal to decide the clumsy areas in our general vicinity of enthusiasm, following information.

B). Experimental Investigation

There are numerous parameters that can cause mishaps on national thruways however just the parameters that are more prevalent in the chose territory. These elements were settled based on following variables (i)International Journal Papers (ii)Reconnaissance Survey (iii)Interviewing Local Commuters.[3]

C.) Analysis of Existing Data

Examination of mishap information of three years on chose extend should be possible by two strategies

I. Accident Density Method
II. Weighted Severity Index Method

Table 1: Accident Data on B2 By Paas To Rambagh Circle

Section of stretch (each of 1000m)			Accident data											
Section	From	To	2015				2016				2017			
			T	M	G	D	T	M	G	D	T	M	G	D
A	B2 bypass intersection	Durgapura bus stop	17	10	2	10	5	3	2	1	4	4	2	3
B	Durgapura bus stop	Gopalpura bus stop	8	6	1	1	8	5	4	3	2	5	2	1

C	Gopalpura bus stop	Gandhi nagar bus stop	8	6	2	2	6	8	5	2	4	5	3	3
D	Gandhi nagar bus stop	Laxmi mandir tiraha	5	3	0	5	6	7	5	1	3	5	1	1
E	Laxmi Mandir tiraha	Nehru garden	10	9	2	2	7	4	3	3	6	2	2	1
F	Nehru garden	Mahatma Gandhi marg	2	2	0	0	8	4	2	2	4	5	2	1
G	Mahatma Gandhi marg	Ram bagh Circle	5	3	1	0	6	4	4	2	8	7	3	1

Here

T = Total number of accidents

M = Number of peoples minor injured

G = Number of people grievously injured

D = Number of peoples dead

Table 2: TYPES OF VEHICLES INVOLVING IN ACCIDENTS ON NATIONAL HIGHWAY 12(SELECTED 7KMS STRETCH): 2015-2017

Vehicle	Number of vehicle			Total
	2015	2016	2017	
Car	54	45	70	169
Two wheeler (Bike & scooter)	29	30	41	100
Truck	1	3	7	11
Bus	4	2	4	10
Auto Rickshaw	15	9	8	32
Others*	7	8	11	26

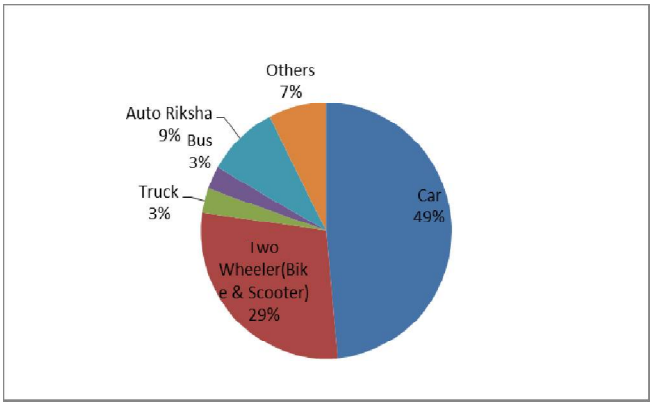

Fig. 4 Types of Vehicles Involving In Accidents on National Highway 12(Selected 7kms Stretch): 2015-2017

TABLE 3: ANALYSIS OF COLLECTED DATA (2015-2017)

Year	2015	2016	2017	Total in 3 years
Total no. of accidents	55	46	31	132
Minor injured	39	35	33	107
Grievous injured	8	25	15	48
Dead	20	14	11	45

TABLE 4: ACCIDENTAL DATA ON JAWAHAR CIRCLE TO BIRLA MANDIR

Section of stretch (each of 1000m)			Accident data											
Section	From	To	2015				2016				2017			
			T	M	G	D	T	M	G	D	T	M	G	D
A	Jawahar circle	Fortis hospital	13	10	5	2	10	9	3	2	9	8	3	0
B	Fortis hospital	Gaurav Tower	15	7	4	1	8	4	1	3	12	9	5	1
C	Gaurav Tower	M.N.I.T.	9	11	6	0	5	10	4	2	7	6	2	2
D	M.N.I.T.	Jal Dhara	8	5	2	1	7	4	1	4	11	12	8	0
E	Jal Dhara	Mahatma Gandhi circle	6	9	4	0	9	7	3	2	9	10	4	1
F	Mahatma Gandhi circle	Rajasthan University	10	13	6	0	5	11	5	4	5	15	7	1
G	Rajasthan University	Birla Mandir	11	8	3	2	8	8	2	3	4	6	2	2

Here

T = Total number of accidents

M = Number of peoples minor injured

G = Number of people grievously injured

D = Number of peoples dead

TABLE 5: ANALYSIS OF COLLECTED DATA (2015-2017)

Year	2015	2016	2017	Total in 3 years
Total no. of accidents	72	52	57	181
Minor injured	63	53	66	182
Grievous injured	30	19	31	80
Dead	6	20	7	33

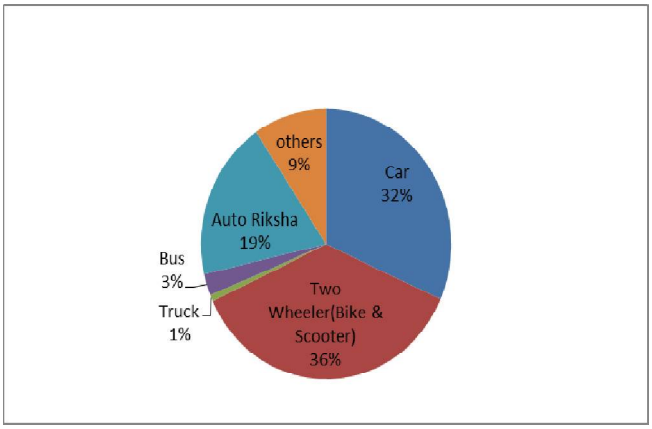

Fig. 5: Types of Vehicles Involving In Accidents on Jln Marg (Selected 7kms Stretch): 2015-2017

TABLE 6: TYPES OF VEHICLES INVOLVING IN ACCIDENTS ON JLN MARG (SELECTED 7KMS STRETCH): 2015-2017

VEHICLE	NUMBER OF VEHICLE			Total
	2015	2016	2017	
Car	51	47	41	139
Two wheeler (Bike & scooter)	39	45	55	139
Truck	0	1	2	3
Bus	2	3	5	10
Auto Rickshaw	25	19	29	73
Others*	11	10	15	36

3. ANALYSIS OF ACCIDENT DATA

A. Accident Density Method

It is the density or number of accidents on particular stretch on a highway.

Unit length is taken as 1000m.

Predetermined number of accidents is calculated as average number of accidents that have occurred per unit length. 4]

B. Sample Calculation

Chainage selected here is ranging of 13kms.

The total number of accidents is then found out which have occurred in this chainage.

With a unit length of 1000m the accidents occurring for each km (1000m) is separately found out and accidental density is found

The accidental density benchmark is calculated by the total number of accidents in that stretch to the distance of the stretch.

For eg : For chainage ranging having distance here is 13km and the accidents occurring have been found to be 82 in year 2104

Accidental density benchmark= Number of accidents/ distance of stretch

Accidental density benchmark= 55/7=7.8

It means if selected section of stretch (1000 meter) having number of accidents more than 6.30 is consider as black spot.[4]

Eg; Section B having number of accidents is 8 (more than 6.30), thus it comes under black spot region.

4. RESULTS

Analysis of Data By Accident Density Method (Year 2014)

Strech 1 B2 By Paas To Rambagh Circle

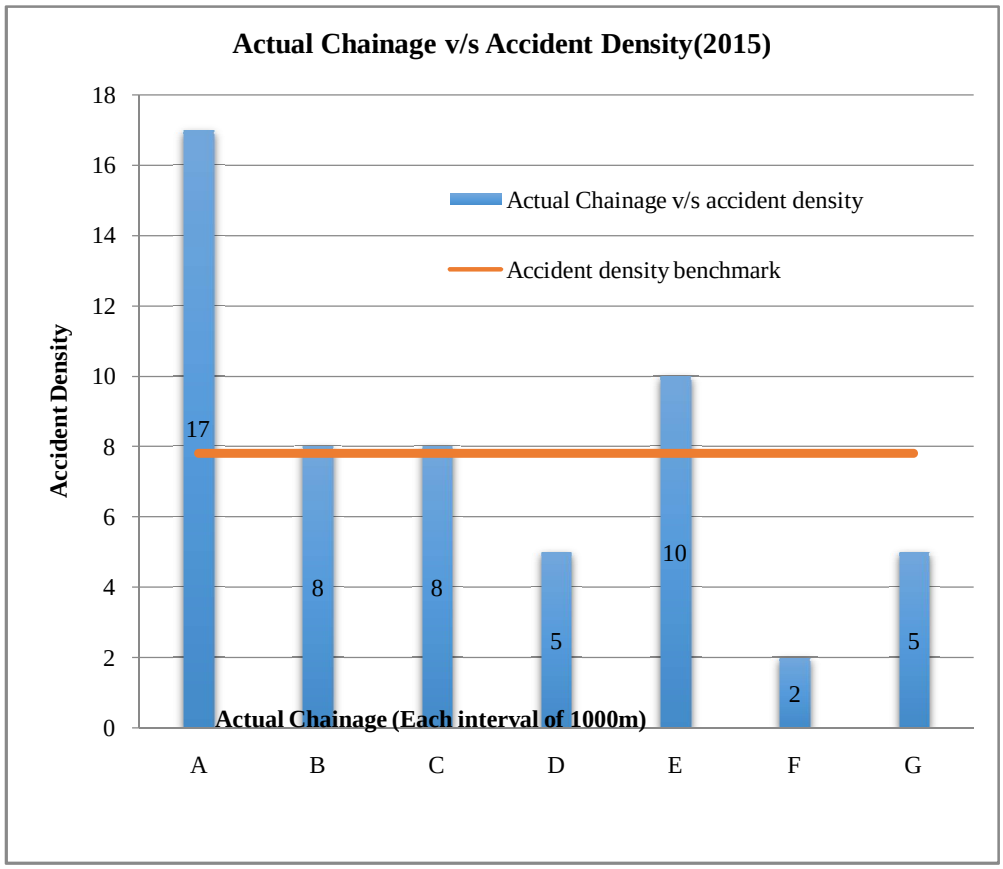
Actual Chainage v/s Accident Density(2015)
Accident Density
18
16
14
12
10
8
6
4
2
0
Actual Chainage v/s accident density
Accident density benchmark
17
8
8
5
10
2
5
Actual Chainage (Each interval of 1000m)
A
B
C
D
E
F
G

Fig. 6

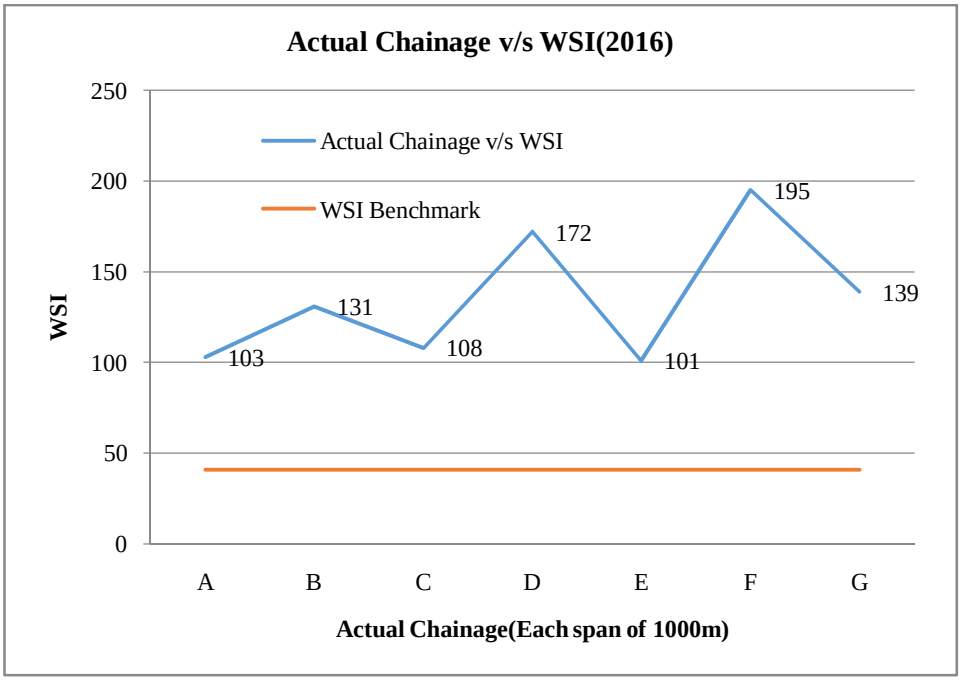
Actual Chainage v/s WSI(2016)
WSI
250
200
150
100
50
0
Actual Chainage v/s WSI
WSI Benchmark
103
131
108
172
101
195
139
A
B
C
D
E
F
G
Actual Chainage(Each span of 1000m)

Fig. 7

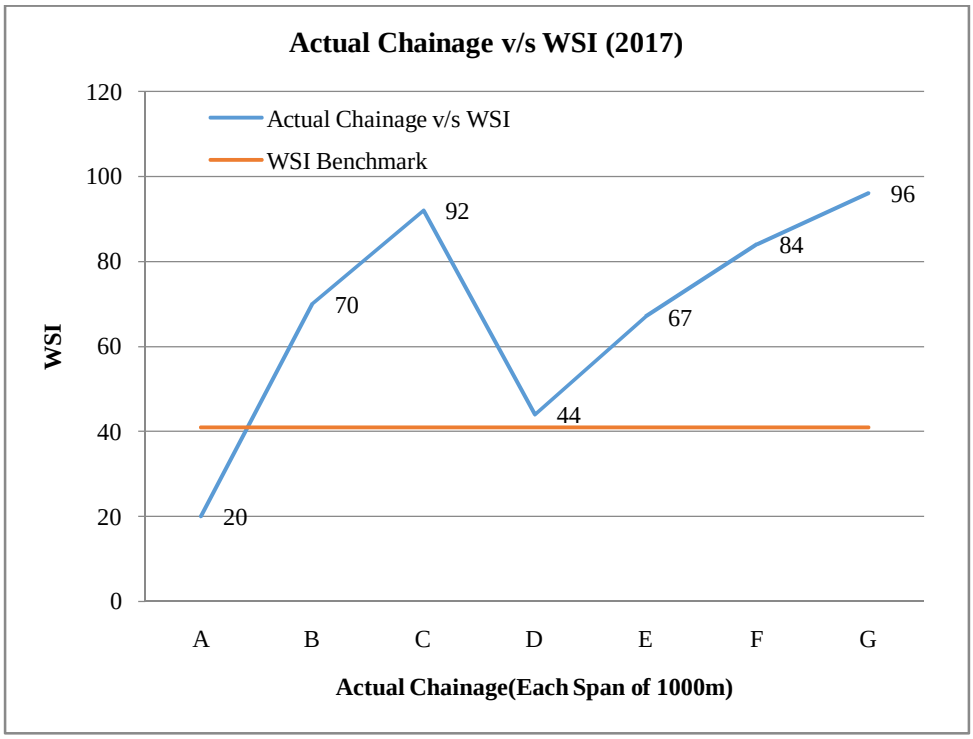

Fig. 8

Strech 2 Jawahar circle to Birla mandir

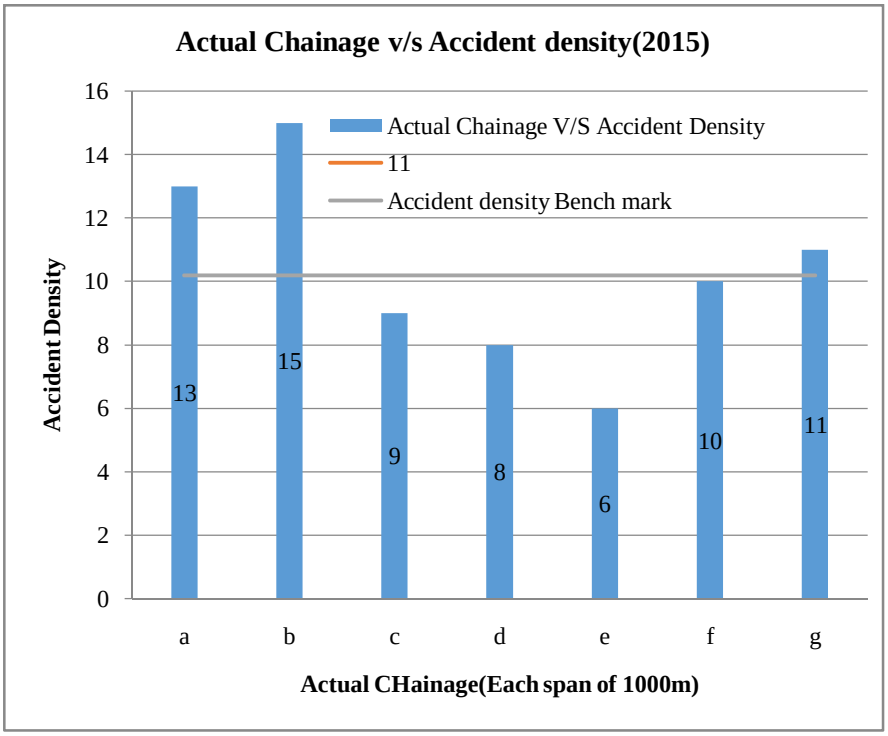

Fig. 9

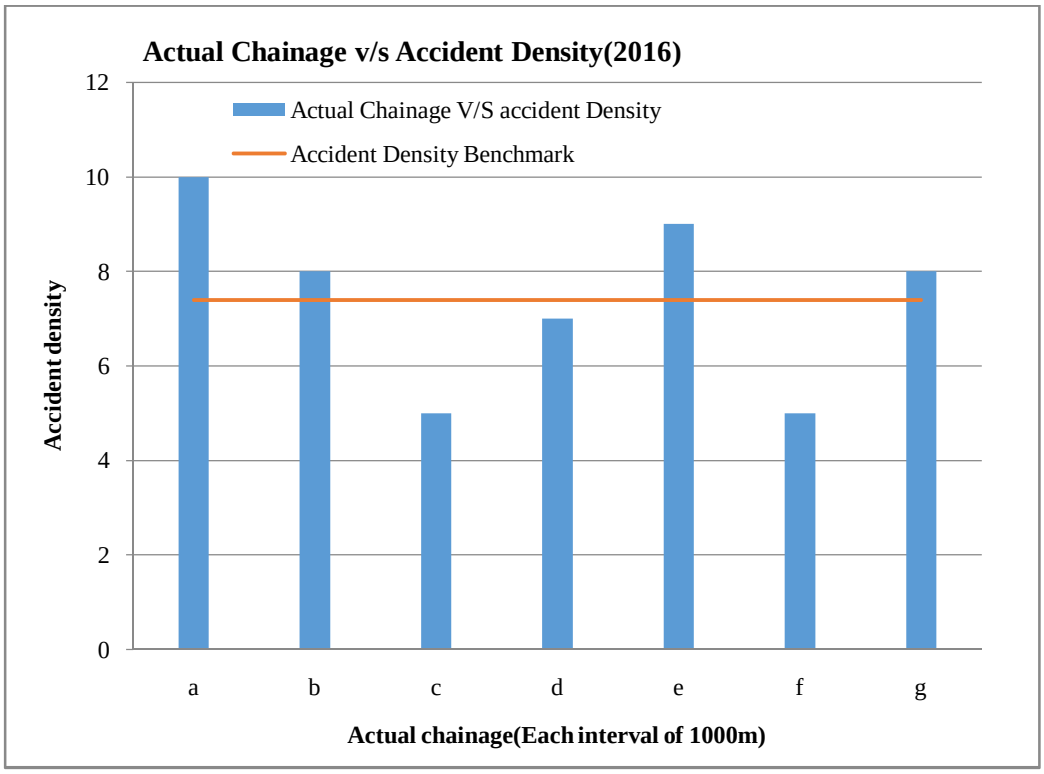
Actual Chainage v/s Accident Density(2016)
Actual Chainage V/S accident Density
Accident Density Benchmark
Accident density
0
2
4
6
8
10
12
a
b
c
d
e
f
g
Actual chainage(Each interval of 1000m)

Fig. 10

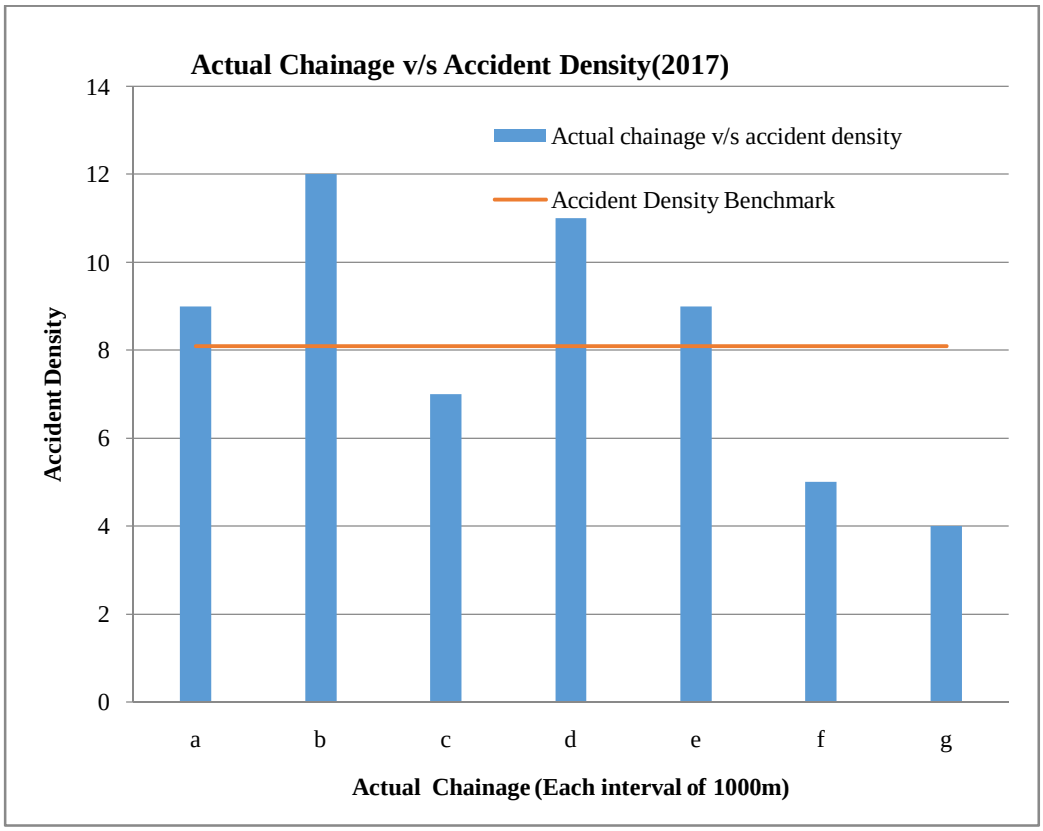
Actual Chainage v/s Accident Density(2017)
Actual chainage v/s accident density
Accident Density Benchmark
Accident Density
0
2
4
6
8
10
12
14
a
b
c
d
e
f
g
Actual Chainage (Each interval of 1000m)

Fig. 11

Accident density benchmark for year 2016 = 125/13 = 9.61

Number of black spot section = 6

B. Weighted Severity Index

In this method, scores are assigned to the accidents on the basis of their number and severity at that particular location.

Severity of that accident is classified as Grievous Injury (GI), Fatal (K) and Minor Injuries (MI).

WSI is calculated by the following formula

WSI = (41 x K) + (4 x GI) + (1 x MI)

Locations with WSI more than 41 are termed as accidental black spots.

Sample Calculation WSI

For section A of year 2014

WSI = 41x0+4x0+1x5 = 5 < 41

Analysis of Data by Weighted Severity Index (Year 2014)

Stretch 1: B2 by pass to Rambagh circle

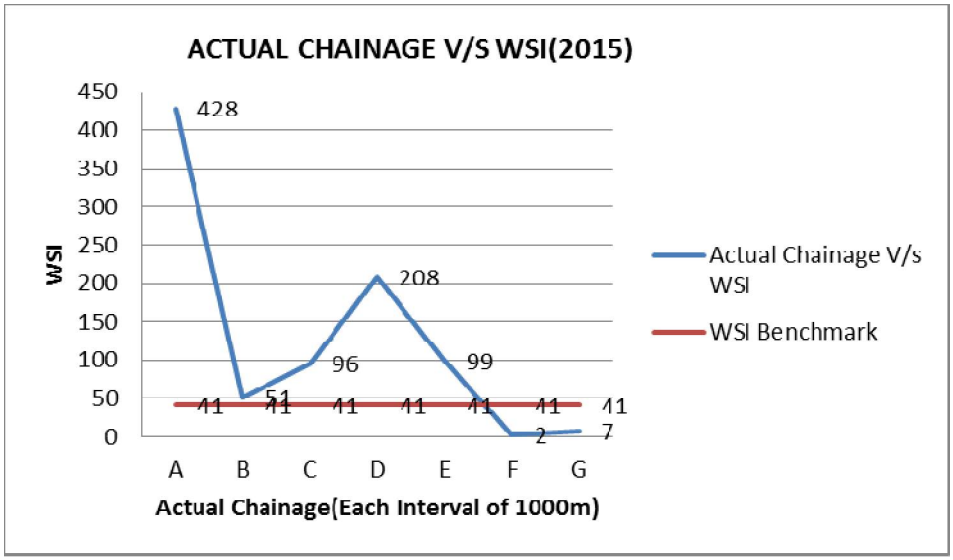

Fig. 12

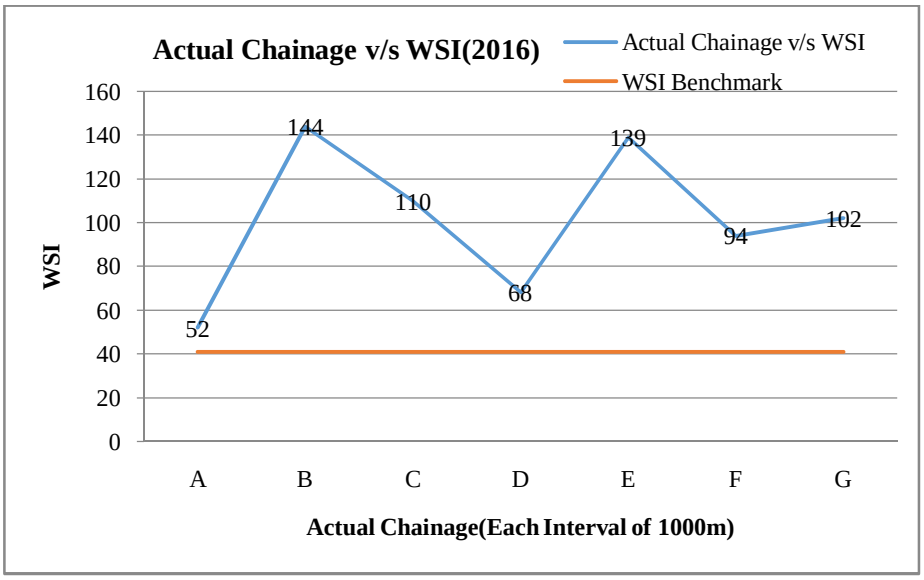

Fig. 13

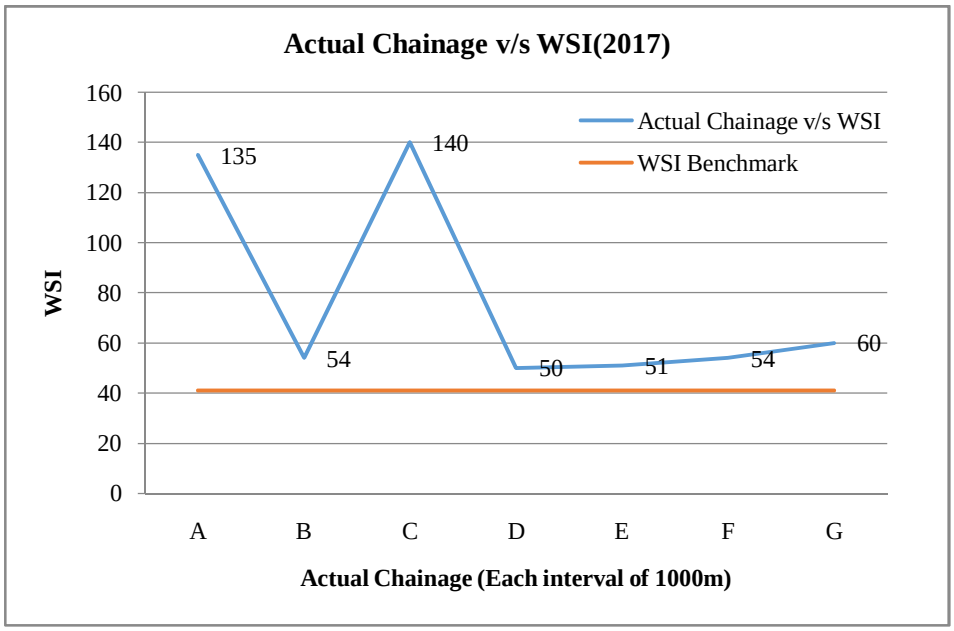

Fig. 14

Strech 2: Jawahar circle to Birla mandir

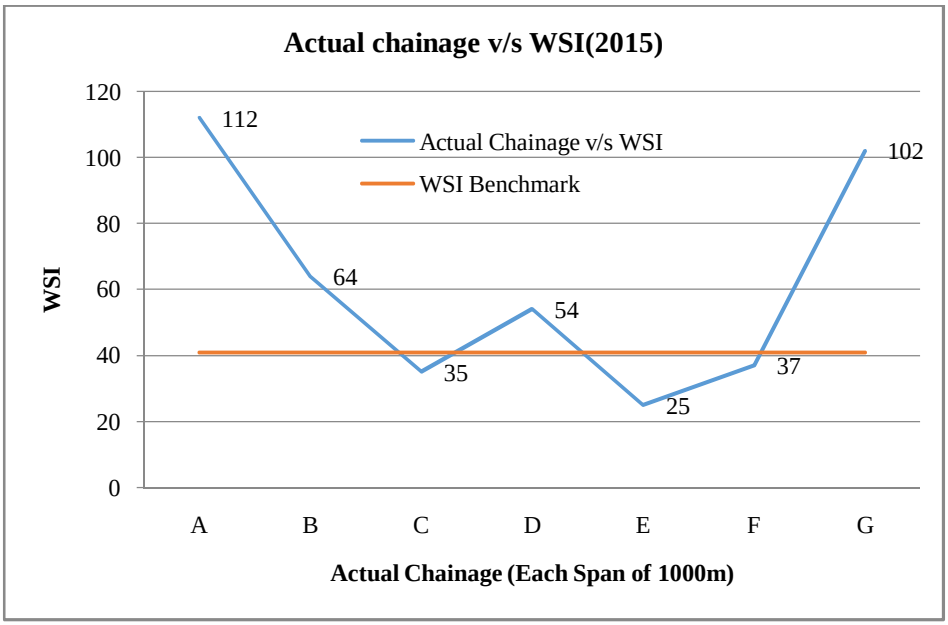
Actual chainage v/s WSI(2015)
120
100
80
60
40
20
0
WSI
112
64
35
54
25
37
102
Actual Chainage v/s WSI
WSI Benchmark
A
B
C
D
E
F
G
Actual Chainage (Each Span of 1000m)

Fig. 15

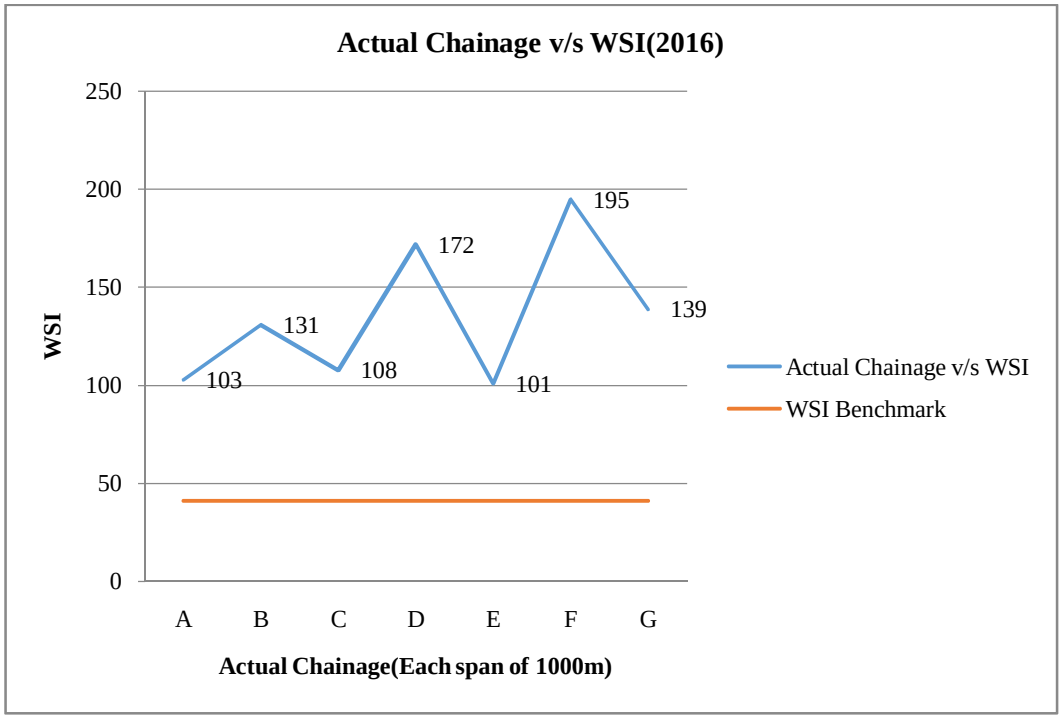
Actual Chainage v/s WSI(2016)
250
200
150
100
50
0
WSI
103
131
108
172
101
195
139
Actual Chainage v/s WSI
WSI Benchmark
A
B
C
D
E
F
G
Actual Chainage(Each span of 1000m)

Fig. 16

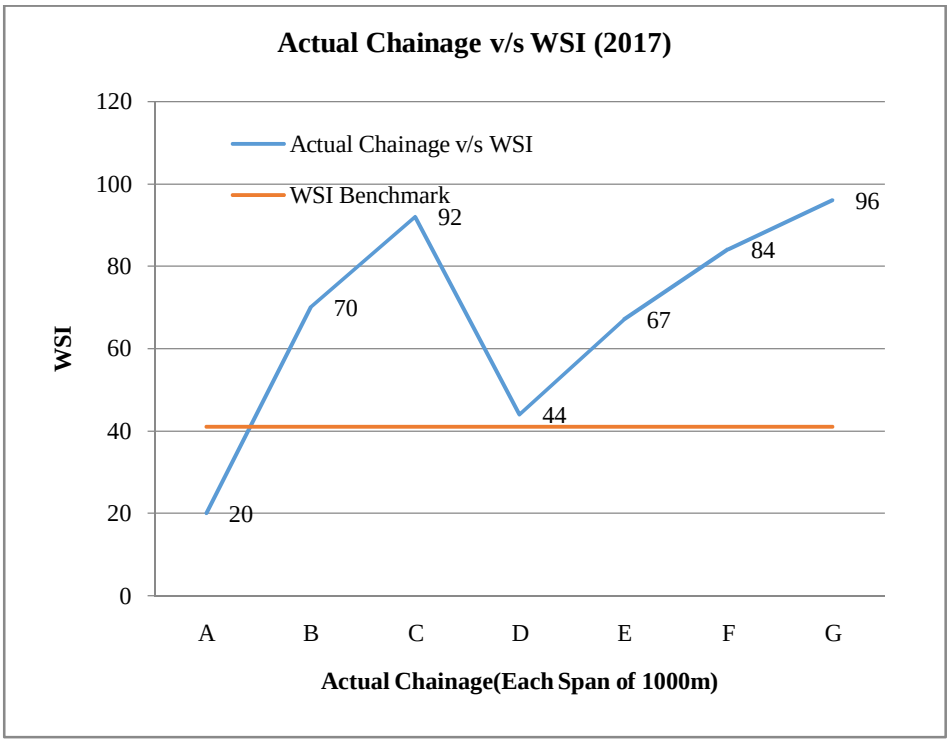

Fig. 17

5. CONCLUSION

By annalysing the accidental data from Accident

Density Method and Weighted Severity Index Method we found that according to the Accident Density Method on the span 1**.** B2 by pass to Rambagh Circle in year 2015 the Blackspot is 4, in 2016 the Blackspot is 3 and 2017 the Blackspot

is 2 and span 2. Jawahar circle to Birla mandir in year 2015 the Blackspot is 3, in 2016 the Blackspot is 4 and 2017 the Blackspot is 4.

By using WSI method on the span 1**.** B2 by pass to Rambagh Circle in year 2015 the Blackspot is 5, in 2016 the Blackspot is 7 and 2017 the Blackspot is 7 and span 2.Jawahar circle to Birla mandir in year 2015 the Blackspot is 5, in 2016 the Blackspot is 7 and 2017 the Blackspot is 6.After comparing both roads we found the maximum number of accidents are happening on span 2.(Jawahar circle to Birla mandir) So the more improvement are needed on span 2. Improvement such as Road marking,Sign,Signals,Geometric design and more.

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