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Black Spot Analysis on NationalHighways

A.N.Dehury[1], ,A.K.Das[2],A.K.Pattnaik[3] U.Chattraj[4],P.Bhuyan[5],M.Panda[6]
[1]Post Graduate Student, [2]Post Graduate Student ,[3] Post Graduate Student [4]Assistant Professor,
[5] Assistant Professor [6]Professor
Department of Civil Engineering, National Institute of Technology, Rourkela – 769 008, Orissa, India

Abstract

India is a developing country. Accident severity is increasing in increasing order due to increasing in vehicle population.Accident leads to disablement,death,damage to health and property,social suffering and general degradation of environment.The main cause of accidents are the driver,vehicle and road environment.Generally accidents occurs at intersection where low volume traffic mixes with high speed traffic.The location in a roadway where the traffic accident often occur is called a blackspot.A case study was taken on NH-55 of angul district in Orissa state.The main problems on this road are obstruction visibility,badshoulder,trees and poles on the shoulder.Thedefiencies were analysed to improve black spot

KEY WORD-Accident Severity,NH-55,Black Spot

A.INTRODUCTION

To minimize the no of crashes by any kind and severity expected to occur on the entity during a specific period is known as road safety. Accidentsandthefatalitiesonroadaretheresult ofinter-playofanumber offactors.Road usersinIndia are heterogeneous innature,rangingfrompedestrians,animal-drivencarts,bi-cycles, rickshaws,handcartsandtractor trolleys, tovarious categories oftwo/threewheelers,motor cars,buses,trucks,and multi-axlecommercialvehiclesetc., The vehicle population has been steadily increasing because ofchangeinthestyleofliving ofpeople. Increase invehiclepopulationwithlimitedroadspaceusedbya largevarietyofvehicleshasheightened theneedand urgencyforawellthought-out policy ontheissueofroad safety. InIndiatherate ofaccident isdirectly proportional togrowthofvehiclepopulation.

B.IDENTIFICATION OF BLACK SPOTS

It istheproceduretolocatethosespotsintheroadnet work thatareparticularlydangerous. Thisstudydealswiththeprocedureforidentificationof hazardouslocationsorblack spotsastheyareoftencalled.Theproceduredescribedi sbasedonrecordedaccidents,data aboutaccidents,trafficvolumesandvehicle-kilometers. Othermethodsu s e d arefieldinvestigations,conflictstudies,questionnair esandinterviews,etc.Identification is a first step in improving road safety at a black spot. It has to be followed by diagnosis of the selected spots, finding countermeasures, estimating effects and costs, prioritizing, implementation and at last follow-up and evaluation.

In India 5 lacs road accidents occurs every year and 1.5 lacspepole are killed. This is a great problem for our country as 3% GDP are lost financialy and many precious lives are lost.Accidents are not natural but human tragedy.Hence road safety is a major concern.In Orissa angul and keonjhargarh has the highest no of accident due to industries based on coal and iron respectively.Study stretch was taken from Angul to Bhushan steel plant as it is surrounded by no of heavy industries like-Jindal,Nalco,Brg,Monnet,GaneshSponge,Navbha rat Ferro alloys,Gmretc.Accidentdatas were collected from police stations and analysed to study black spots.

C.OBJECTIVE AND SCOPE OF THE WORK

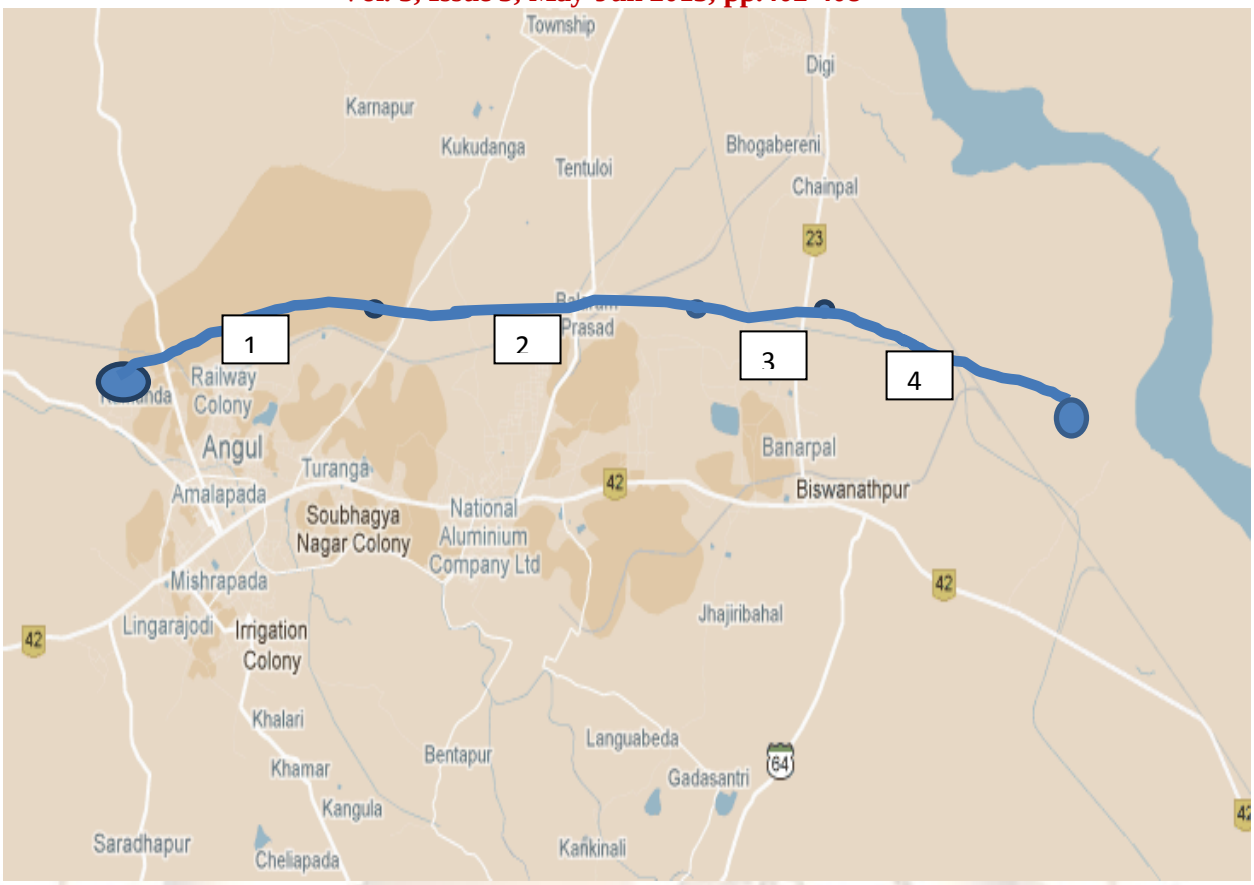
The whole stretch was divided in to four stretches.The accident data collected for the last ten years and to derive improvement measures.The study objectives include,

1.Identification of suitable black spot
2.Ranking of the identified black spots
3.Detailed analysis of top ranked spots and suggestion of possible improvement

BLACK SPOT IDENTIFICATION AND ANALYSIS

Study Stretch

NH-55 passing through angul city was selected for this study as shown in fig 1.



Stretch 1 angul to turanga,of 5 Km length.
Stretch 2 Turanga to CPP,of 5 Km length
Stretch 3 CPP to Banarpal, of 5Km length
Stretch 4 Banarpal to BhushanSteel,of 5 Km length

D.DATA COLLECTION

Datas were collected from FIR index from police department during period 2002-2011.
1.Time and Date of occurrence of accidents
2.Location of accident.
3.Details of accident i.efatalities,injuries and property damage.
Accident Frequency Method
Accident Rate = $\frac{M}{L}$
Where M = Total no of Accidents of a stretch
L = Length of Road

Table 1 Accident Rate

Name of stretch	Length	No of accidents in a year	
		Sum of 10 year	Accident rate
Angul to Turanga(I)	5km	228	45.6
Turanga to CPP (II)	5km	208	41.6
CPP to Banarpal (III)	5km	26	5.2
Banarpal to Bhushan steel(IV)	5km	239	47.8

Table 2 Frequency Of Accident

Distance of origin	No of accidents (2002-2011)	Frequency	Total frequency
0-5	228	32.5	32.5
6-10	208	29.6	62.1
11-15	26	3.7	65.8
16-20	239	34.1	100
Total	701	100	

From the Table 1 and 2 it is observed that frequency and rate of accident is more for stretch-4 followed by stretch-1,2,3 respectively

E BLACK SPOT ANALYSIS

The point where accident occurs frequently is known as black spot or accident point. Analysis is required for improving traffic environment.The details are shown in Figure 1-4 and Table 3-6

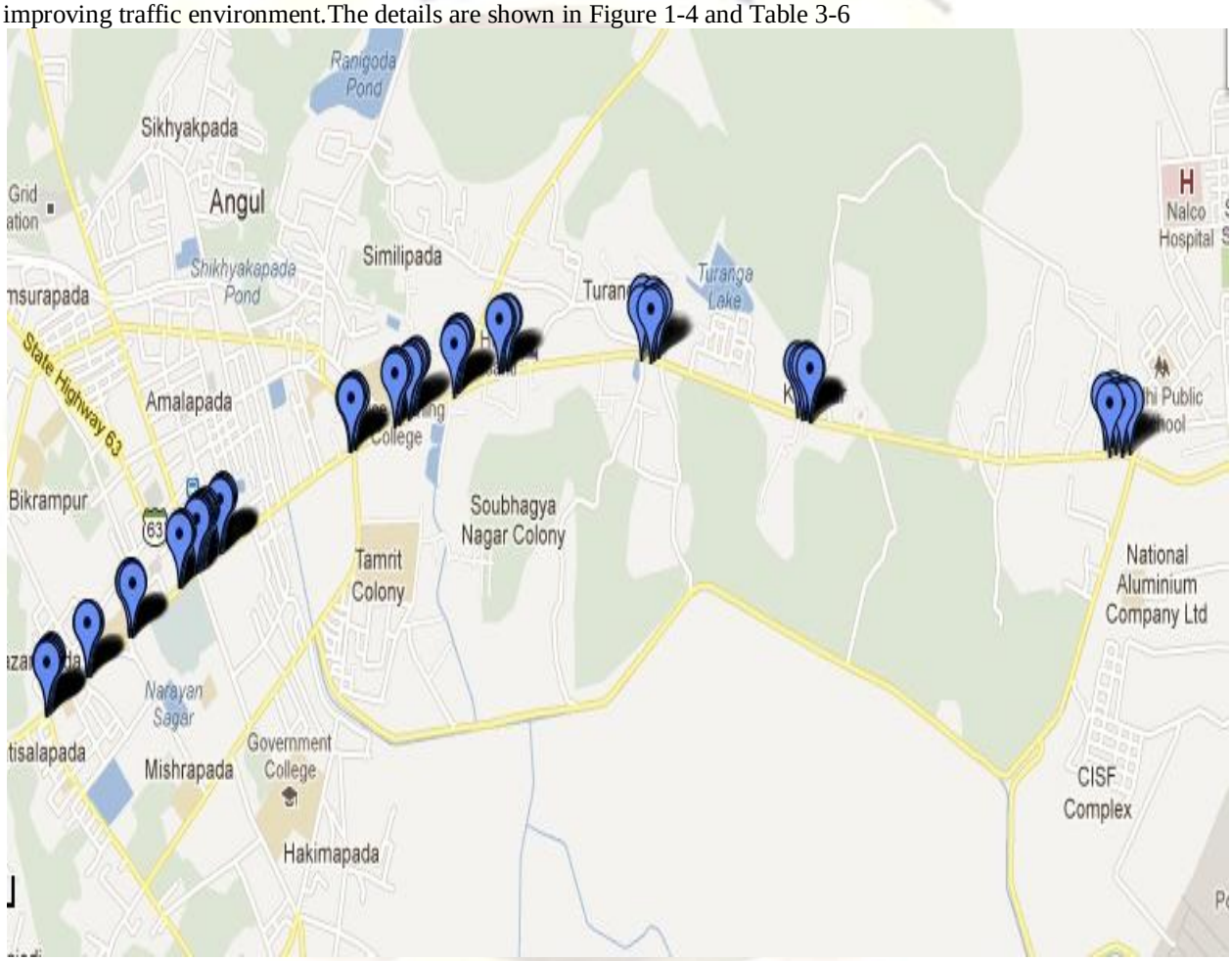


Fig 1Black Spot Points Stretch-1Source:Google Map

Table 3 Black Spot Analysis Stretch 1

ACCIDENT POINT	NOS	PROBLEMS	REMEDIES
DIVYAJYOTI TAKIES	13	X-UNSIGNALISED,10W GARRAGES,SIGHT DISTANCE OBSTRUCTION BY SHOPS	JUNCTION IMPROVEMENT,SIGHT DISTANCE VISIBILITY
BAZAR CHOWK	6	O-UNSIGNALISED,TRANSFORMER,2W SHOW ROOMS	JUNCTIONIMPROVEMENT,CLEARANCE OF OBSTRUCTION ON THESHOULDER,
BUDHI THAKURANI	8	O-UNSIGNALISED, TAXISTAND, STALLS ON THE SHOULDER	CLEARANCE OF OBSTRUCTION ON SHOULDER,SIGHT DISTANCE VISIBILITY
SBI ANGUL	6	T ,TAXISTAND,VEGETABLE MARKET	CLEARANCE OF OBSTRUCTION ON SHOULDER,SIGHT DISTANCE VISIBILITY
TRAFFIC CHOWK	15	X-SIGNALISED,CINEMA HALL,2W GARRAGE,TREES AND POLES ON SHOULDER	CLEARANCE OF OBSTRUCTION ON SHOULDER,SIGHT DISTANCE VISIBILITY
KANCHAN TALKIES	10	T,CINEMA HALL,TREES ON BLIND CORNER,TREES AND POLES ON SHOULDER, MAIN BUS STOP	CLEARANCE OF OBSTRUCTION ON SHOULDER,SIGHT DISTANCE VISIBILITY
RAZ HOTEL	16	X-SIGNALISED,PAVED SHOULDER WITH NO MARKING,TRANSFORMER ON BLIND CORNER,ON STREET PARKING OF VEHICLES	CLEARANCE OF OBSTRUCTION ON SHOULDER,SIGHT DISTANCE VISIBILITY
POLICE TRAINING CENTER	20	PAVED SHOULDER WITH NO MARKING,ON STREET PARKING	INSTALLATION OF SPEED BREAKERS,MARKING
CALTEX	11	T,PETROL PUMP,TRANSFORMER ON BLIND CORNER,SIGHT DISTANCE OBSTRUCTION	JUNCTION IMPROVEMENT, CLEARANCE OF OBSTRUCTION ON SHOULDER
FCI	7	ON STREET PARKING,MOTOR GARRAGES	CLEARANCE OF OBSTRUCTION ON SHOULDER
DURGA HOTEL	7	ON STREET PARKING,HOTEL VERANDAH SHOULDER	CLEARANCE OF OBSTRUCTION ON SHOULDER
TURANGA	21	ON STREET PARKING,VILLAGE AREA ON BOTH SIDE, BAD SHOULDER,TREES AND POLES ON SHOULDER	INSTALLATION OF SPEED BREAKERS, CLEARANCE OF OBSTRUCTION ON SHOULDER
KANDSOR	43	T,VILLAGE AREA ON BOTH SIDE,SHOOL,SHRUBS ON SHOULDERS,TREES AND POLES ON SHOULDER,STEEP GRADIENT	INSTALLATION OF SPEED BREAKERS, CLEARANCE OF OBSTRUCTION ON SHOULDER
KARGIL SAHID PETROL PUMP	15	BAD SHOULDER,FRONT AREA OF PETROL PUMP DAMAGED	SHOULDER MAINTAINACE,PETOL PUMP FRONT SHOULD BE REPAIRED
SBI KANDSOR	20	PETROL PUMP,TAXI STAND.TREES AND POLES ON THE SHOULDER	CLEARANCE OF OBSTRUCTION ON SHOULDER

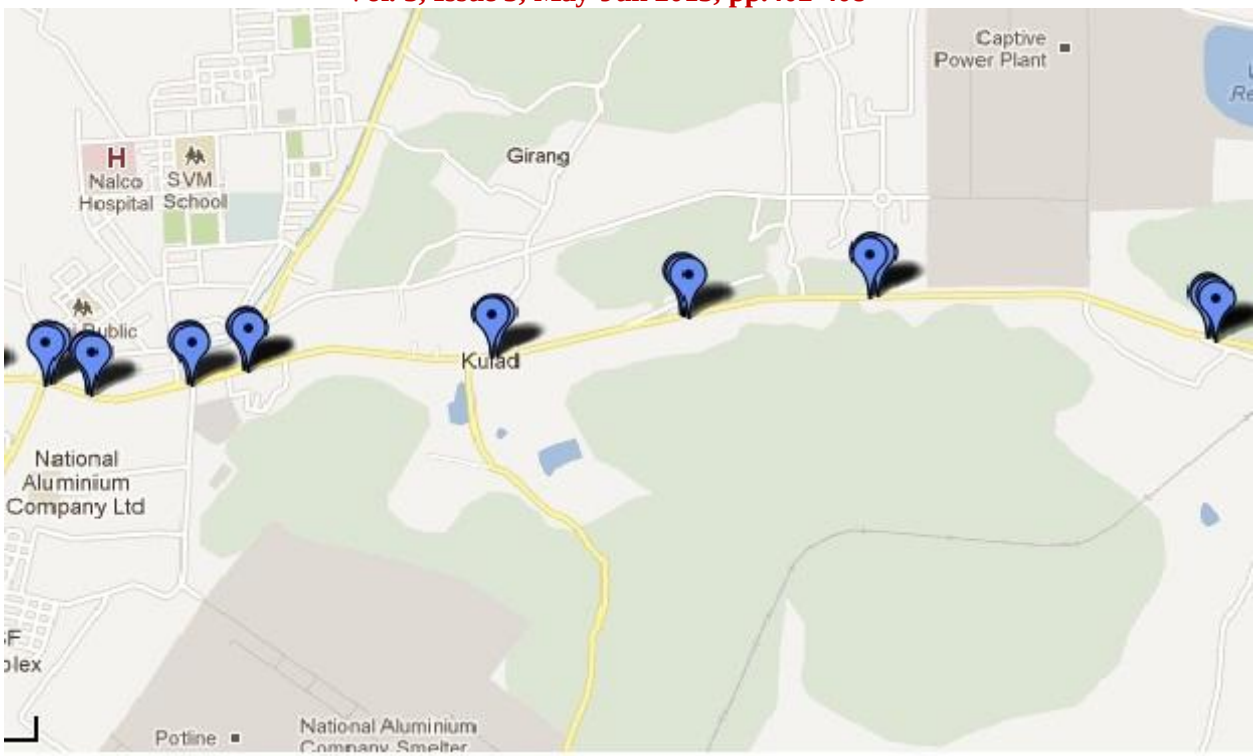


Fig 2 Black Spot Points Stretch-2

Table 4 Black Spot Analysis Stretch 2

ACCIDENT POINT	NOS	PROBLEMS	REMEDIES
NALCO GATE	10	T,VEGETABLE AND BETLE SHOP ON SHOULDER,BUS STOP	CLEARANCE OF ROAD SIDE,SPEED RESTRICTION
NALCO MARKET	14	VEHICLE PARKING ON SHOULDER,TREES AND POLES ON SHOULDER	CLEARANCE OF ROAD SIDE
TULSI DHABA	8	MEAT AND FISH SHOP ON THE SHOULDER,OLD TREES ON THE SHOULDER	DISCOURAGEMENT OF FISH AND MEAT SHOP ON THE SHOULDER,TREES SHOULDE BE REMOVED
SMELTER GATE	15	O,MEDIAN WITHOUT SIGN ON THE ROAD,TEMPLE ON THE SHOULDER,TREES ON THE SHOULDER	MEDIANS TO BE PAINTED, OBSTACLE ON THE ROAD SHOULD BE REMOVED
FCI CHHAK	10	T,WINE OUTLET,UNPAINTED MEDIAN,TREES ON SHOULDER	MEDIAN TO BE PAINTED,JUNCTION IMPROVEMENT
KULAD CHHAK	6	T,UNPAINTED MEDIAN,	JUNCTION IMPROVEMENT,
KULAD	14	VILLAGE AREA ON BOTH SIDE, GODOWN,PLANTS ON SHOULDER	SPEED RESTICTION,SHOULDER IMPROVEMENT

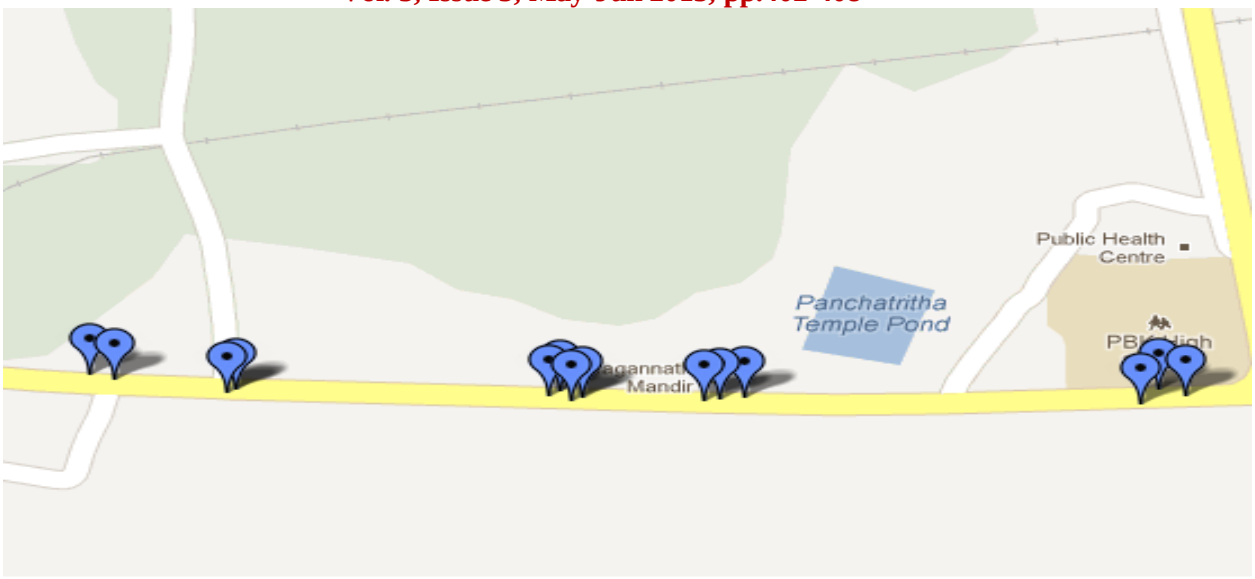


Fig 3 Black Spot Points Stretch-3

Table 5 Black Spot Analysis Stretch

ACCIDENT POINT	NOS	PROBLEMS	REMEDIES
BONDA	10	Y,STEEP GRADIENT	SPEED RESTICTION,JUNCTION IMPROVEMENT
BANARPAL HATA	15	TREES ON SHOULDER,EDGEDROP	ROAD MAINTAINANCE,SHOULDER MAINTAINANCE
JAGANATH TEMPLE	6	BAD SHOULDER	SHOULDER MAINTAINANCE

Fig 4Black Spot Points Stretch 4

Table 6 Black Spot Analysis Stretch 4

ACCIDENT POINT	NOS	PROBLEMS	REMEDIES
BANARPAL CHOWK	24	T,ON ROAD BUS STOP,AUTO AND TAXI STAND,TREES ON EDGE,SHOP VERANDAH ON SHOULDER,SHOULDER PONDING	SEPARATE BUS STOP,SHOULDER OBSTRUCTION CLEARANCE AND MAINTAINANCE,JUNCTION IMPROVEMENT
GANESH BAZAR	11	PETROL PUMP,BETEL AND	ROAD SIDE

		TEASHOP ON SHOULDER,SHOULDER PONDING BY DRAIN WATER,HEAVY MACHINARY GARRAGE	CLEARANCE,MAINTAINANCE OF SHOULDER
ASHA TAKIES	5	CINEMA HALL,SHOULDER DROP OFF,OLD GIRTH TREE BRANCHES	VISIBILITY BY CUTTING OLD TREE BRANCHES,SHOULDER MAINTAINANCE
SANTRI CHHAK	21	MOTOR SHOW ROOM,DHABAS,SHOUDER PONDING BY DRAIN	OFF STREET PARKING FACILITY,SHOULDER MAINTAINANCE
NUAHATA	44	DHABA,VILLAGE AREA BOTH SIDE,CHICKEN CENTER,MEAT AND TEASHOP ON SHOULDER,CURVE SIGHT DISTANCE OBSTRUCTED BY OLD AND DEAD TREES	CURVE SIGHT DISTANCE VISIBILITY.SHOULDER MAINTAINACE,SPEED RESTRICTION,OFF STREET PARKING FACILITY
JORGADIA	32	DITCHES ON SHOULDER,CURVES SIGHT DISTANCE OBSTRUCTED BY TREES,SHOULDER COVERED BY GRASS AND SHURBS,MOTOR GARRAGE,STEEP VERTICAL CURVE	SHOULDER MAINTAINANCE,SIGHT DISTANCE VISIBILITY NEAR CURVES,OFF STREET FACILITY

F.CONCLUSIONS AND RECOMMENDATIONS

(1)Stretch IV has the highest no of accidents which accounts for 34.1% of total accidents .The accident rate can be decreased by road side clearance, proper maintenance of shoulders, lighting, and junction improvement. Speed limit should be brought down by providing humps near accident spots. Sight distance near curves should be obstruction free.

(2)Stretch I has the second highest no of accidents accounts for 32.5% of total accident. The accident rate can be reduced by providing signalized junction, junction improvement, shoulder clearance, installation of humps, shifting of poles , removal of trees near the edge of pavement etc.

(3)No of accidents in stretch II accounts for 29.6% of total accidents. The accident rate can be minimized by clearing-off shoulders, reducing speed limit, junction improvement, providing signals on the median, removing structures on the shoulder.

(4)Stretch III has minimum no of accidents accounts for 3.7% of total accidents. speed limit reduction near junction should be reduced to prevent accidents.

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Author Details
A.N.Dehuri(P.G scholar)2013
NIT Rourkela(Transportation)