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Various Road Safety Aspects in Indian Metropolitan Cities: A case study of Hyderabad

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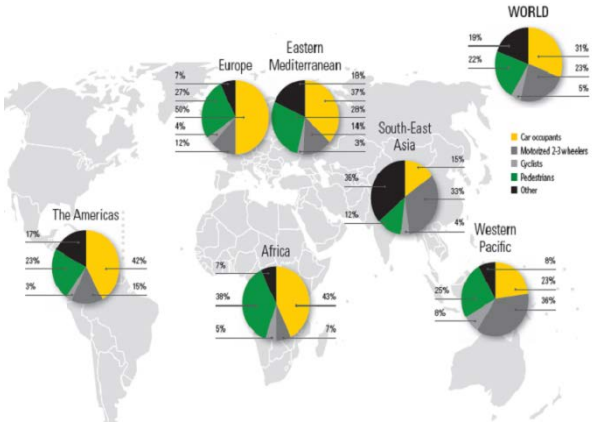
PERSPECTIVE OF ROAD ACCIDENT

- Over 1.2 million people die every year on the roads world wide and between 20-50 million suffer from non-fatal injuries
- Over 90% of the world's fatalities on the roads occur in low-income and middle-income countries, which have only 48% of the world's vehicles.
- Road traffic injuries are one of the top three causes of death for people Aged between 20 to 35 years



Source GLOBAL STATUS REPORT ON ROAD SAFETY, WHO, 2016`

- In India, transportation by road is the most widely used mode which gives maximum service to one and all.

- Among the major causes of mortality in the country, Road Traffic Accident was the **tenth cause** during the last two decades back.

ROAD ACCIDENTS SCENARIO IN INDIA

In the Year 2015: National health Front Published

Various Types of accidents - 402947 (0.40 millions)

Road accidents - 177426 (44%)

From 2005 Every Year 10% Increase in accident deaths

In 2006 - 118265

In 2010 – 161736

In 2015 - 177423

PERSPECTIVE OF ROAD ACCIDENT

- Road crashes are preventable.
- Significant number of road deaths and injuries are not a fundamental law of nature or an inevitable result of motorization
- In India Year after year the numbers and severity of accidents are on the constant rise.

PERSPECTIVE OF ROAD ACCIDENT

- Annually around 1.40 lakhs persons are getting killed on Indian roads. The severity of accidents expressed in terms of number of deaths per hundred road accidents is around 28 as of now.
- To determine the preventive measures of road accidents a detailed in-depth analysis at micro level is essential

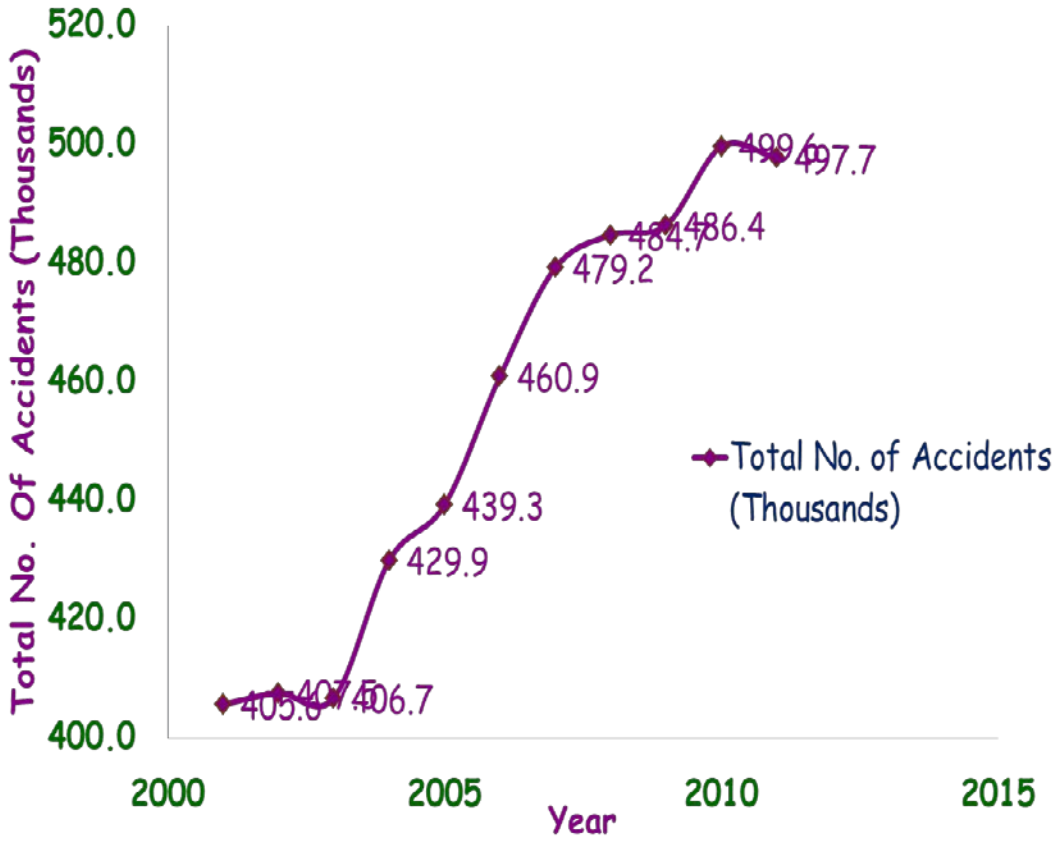
Flipside of summer showers

MIGHTY FALL: *Motorists plying on the Lower Tank Bund road on Tuesday had a miserable time as many skidded off the road surface due to thick slush.*

Team-BHP.com

PERSPECTIVE OF ROAD ACCIDENT IN HMA

- Macro view of the accidents scenario efforts are made and presented here for the city of Hyderabad. Hyderabad metropolitan area (HMA) is divided into two areas Hyderabad and Cyberabad.



PERSPECTIVE OF ROAD ACCIDENT IN HMA

a) Further severity of accidents reported in Hyderabad is around 15 annually whereas this figure is around 32 annually in Cyberabad.

b) This goes to say that the speeds of vehicles in Cyberabad area are significantly higher. The cause of road crashes are listed:

   i. Road users(drivers & pedestrians)

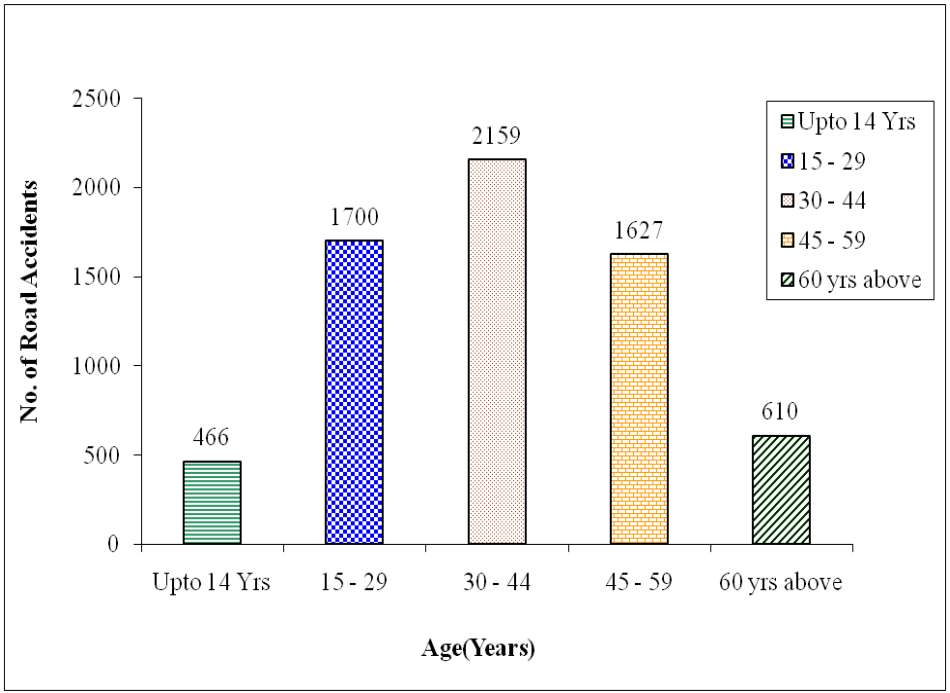
   ii. Vehicle factors

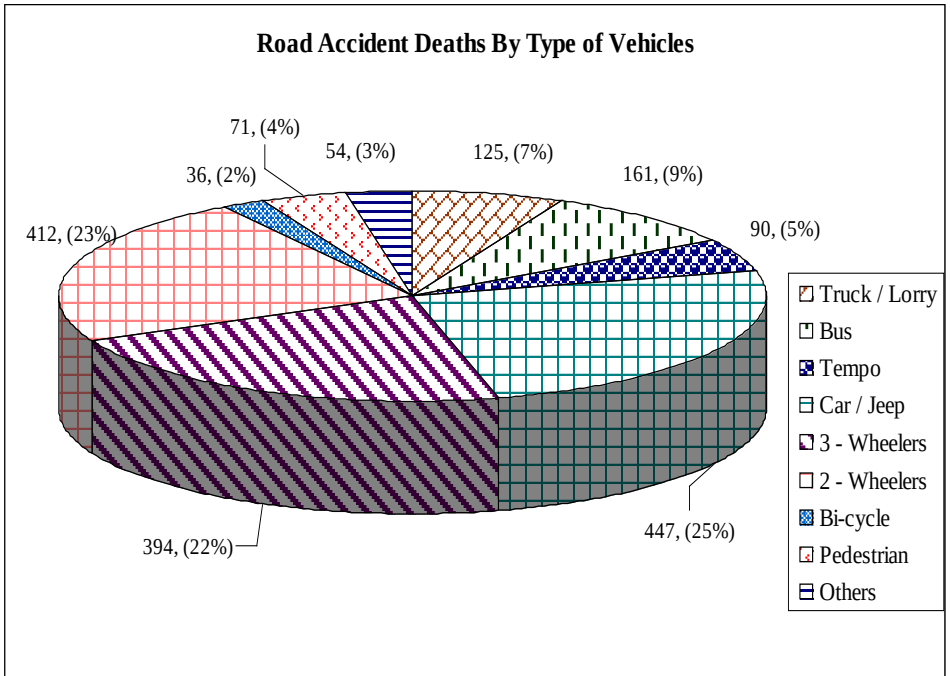
   iii. Traffic Control Devices

c) Road geometrics like shoulder width & condition, pavement width & condition plays a prominent role for the cause of road crashes.

PERSPECTIVE OF ROAD ACCIDENT IN HMA

- There is an urgent need to improve road safety in Hyderabad.
- Most of the crashes are predominant in age group of 30 – 44 during 2016.
- Two-wheelers, three wheelers, cyclist and pedestrian who comprise the most unprotected road users, accounting for 40% of all fatalities





CRASH PATTERN IN HMA

Crash collision occurs at lane departure and at intersections.

Classified as :

a) swipe

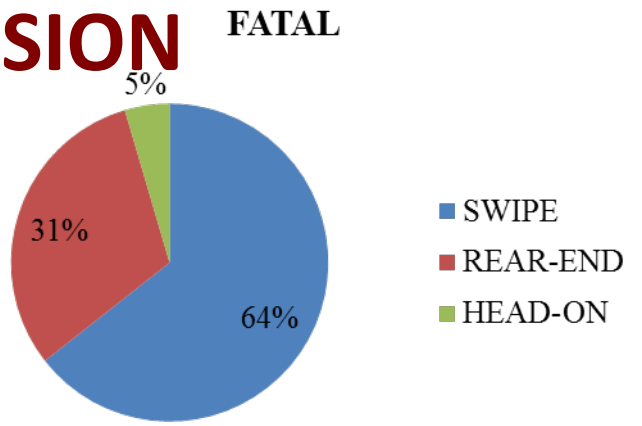
b) rear-end

c) head on collisions

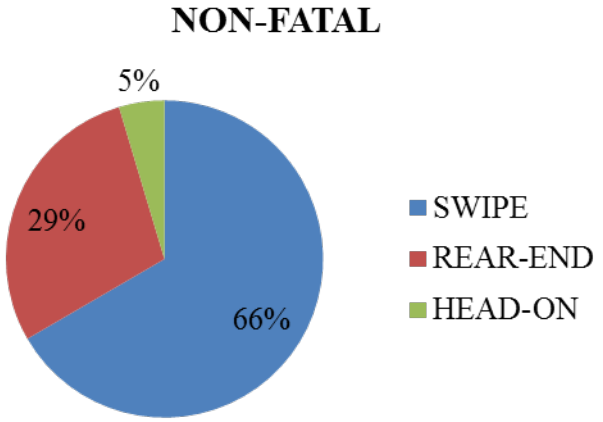
CRASH PATTERN IN HMA – COLLISION

It observed that swipe type of collision is more significant for Hyderabad city.

Swipe and rear-end collisions are significant for non-fatal type of crashes.



Effect		Significance
Vehicles		0.095
Collision	Swipe-end	0.154
	Rear-end	0.060
	Head-on	0



CRASH PATTERN IN HMA

Characteristics		Type of Collision					
		Head-on Collision		Rear-end Collision		Sideswipe collision	
		Count	%	Count	%	Count	%
Severity of Crash	Non-Injury	7	4.8%	17	4.6%	11	22.9%
	Minor injury	24	16.3%	94	25.4%	20	41.7%
	Grievous Injury	43	29.3%	180	48.6%	12	25.0%
	Fatal Injury	73	49.7%	79	21.4%	5	10.4%
Causes	Drunken Driving	2	1.4%	15	4.1%	1	2.1%
	Drowsing	1	0.7%	2	0.5%	0	0.0%
	Over speeding	102	69.4%	291	78.6%	39	81.2%
	Vehicle out of control	19	12.9%	27	7.3%	4	8.3%
	Fault of two-wheeler/pedestrian	22	15.0%	32	8.6%	2	4.2%
	Defect in condition of vehicle condition	1	0.7%	3	0.8%	2	4.2%
Road Condition	Straight Road	128	87.1%	318	85.9%	40	83.3%
	Slight Curve	8	5.4%	30	8.1%	5	10.4%
	Sharp Curve	0	0.0%	0	0.0%	1	2.1%
	Major Junction	11	7.5%	22	5.9%	2	4.2%
Vehicle Responsible	Lightweight	100	68.0%	213	57.6%	23	47.9%
	Heavyweight	47	32.0%	157	42.4%	25	52.1%
Season	Summer	44	29.9%	122	33.0%	14	29.2%
	Rainy	37	25.2%	69	18.6%	21	43.8%
	Winter	66	44.9%	179	48.4%	13	27.1%
Day/Night	Day	72	49.0%	199	53.8%	26	54.2%
	Night	75	51.0%	171	46.2%	22	45.8%

CRASH PATTERN IN HMA

A few case studies for crash analysis for HMA exhibits that the log-likelihood measure values for total collisions, head-on, rear-end and Sideswipe are significant at 5% level of significance.

Pearson Chi-Square Tests Results for severity & type of collision

Type of Collision	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Head on Severity	.101[a]	1	.751	Not significant	
Rear end on Severity	6.458[a]	1	.11	Significant	
Swipe on Severity	17.504[a]	1	.000	Significant	

CRASH PATTERN IN HMA – HELMET WEARING

Characteristics of Helmet wearing among motorcycle drivers in Hyderabad - Survey conducted During Dec 2016 at Study Locations

	Helmet	
	Not Wearing(%)	Wearing(%)
Driver Characteristics	67	32.3
Gender		
Male	54.8	25.3
Female	45.9	54.1
Age Group		
< 25 Years	79.8	20.2
25 – 50 Years	66.4	33.6
> 50 Years	68.1	31.9
Engine Size		
100 – 150 cc	58.2	35.8
> 150 cc	72.1	27.9

CRASH PATTERN IN HMA – HELMET WEARING

Characteristics of Helmet wearing among motorcycle drivers in Hyderabad

	Helmet	
	Not Wearing (%)	Wearing(%)
Day of Week		
Weekday	63	37
Weekend	69.1	30.9
Time of day	71.1	28.9
Morning		
Afternoon	66.1	37.9
Evening	69.3	30.7
Road Type		
Arterial Road	69.8	30.2
Sub Arterial road	53.7	27.4

CRASH PATTERN IN HMA – HELMET WEARING

Characteristics	Odds Ratio	95% CI	p –Value
Drivers	4.20	4.38	<0.001
Male gender			
Age			<0.001
50+	1.0		
25 – 50	1.15	1.05, 1.26	
<25	2.60	2.34, 2.89	
Road Type	1.0		<0.001
Arterial	0.89	0.82, 1.34	
Sub Arterial	1.41	1.34, 1.49	
Day	1.39	1.31, 1.41	<0.001
Time of Day			
Morning	1.0		
Noon	1.44	1.37, 1.51	
Evening	1.86	1.73, 1.99	
Engine Size	1.24	1.19, 1.29	<0.001

- 90% of motorcycle riders and passengers in two medium-sized cities in Hyderabad believed safety helmets are protective.
- However, 70.5% of the Drivers did not wear a helmet at all, rest of the drivers and 14.2% of passengers did wear a helmet.
- We also observed that the rate of helmet non-use was highest on secondary streets compared to principal arteries

Why compulsory helmet rule not being implemented in city?

As Many As 130 Two-Wheeler Drivers Died Last Year, Most Due To Not Wearing Helmet

Mahesh Buddi | TNN

Hyderabad: The Hyderabad traffic police launch 'drives' amid much fanfare, but once the media glare is off they ignore the very rules they frame. A case in point is the helmet rule.

An analysis of post-mortem reports of 130 two-wheeler accident victims in Hyderabad shows that nearly 76% (98) deaths occurred due to injuries sustained in the head. According to the Hyderabad traffic police, the average speed on city roads is not more than 40 kmph. This implies that precious lives could have been saved had the traffic police strictly enforced the helmet rule strictly.

The Hyderabad traffic police had launched the helmet rule with gusto in 2005, but now the rule has been conveniently put in the cold storage citing 'political pressure'. Citing public apathy, the Hyderabad police shy away from enforcing the helmet rule. However, their counterparts in Cyberabad continue to implement the law strictly.

LUCKY ESCAPE: A file picture of two youths sans helmet jump to save their lives after a car rammed into their bike in city

The enforcement of the helmet rule started way back in 2005 when Tejdeep Kaur Menon was the Hyderabad traffic police chief. Subsequently, her successors, including the present city police commissioner A K Khan, tried to enforce the rule strictly, but failed miserably.

That non-implementation of the helmet rule could be one of the main reasons for the death of two-wheeler riders in road accidents is clear from accident data. In 2011, 2,630 road accidents were recorded in Hyderabad. Of these, 1,200 accidents involved two-wheeler riders and 130 of them lost their lives. Talking to the media about a recent road accident involving a girl student near M J Market, Hyderabad police commissioner A K Khan said, "In other metros, citizens have no qualms adhering to the helmet rule. Somehow, Hyderabadis have never been happy about the rule. They find hundreds of excuses not to wear a helmet."

Currently, the helmet rule is being strictly implemented in several cities, including Delhi, Mumbai, Nagpur, Chennai and Bangalore, across the country. When contacted, additional CP (Traffic) C V Anand gave a poor excuse: the helmet rule is not being enforced in the city due to 'public apathy', he said.

"There is a strong resentment among city drivers about wearing helmets. In the past, the rule was enforced and then put on hold. So instead of hurriedly announcing about the enforcement, we have started creating awareness among people through campaigns at schools, colleges and Facebook," Anand told TOI in an argument that sounded hollow.

However, the real reason behind the non-implementation of the helmet rule was revealed by another senior police officer. "Based on the request from some city MLAs prior to the 2009 elections, the then chief minister Y S Rajasekhara Reddy gave instructions to the Hyderabad police to stop enforcing the helmet rule. Since then, we have been lenient on riders not wearing the headgear. Now, the helmet usage is not more than 30%," the officer added. There is no explanation about this police apathy even in the new political regime.

While the Hyderabad police continue to ignore the helmet rule, their counterparts in Cyberabad claim to be enforcing it strictly. Deputy commissioner of police (DCP), Cyberabad, S Chandrasekhar Reddy said they were enforcing the helmet rule under section 129/177 of the MV Act. "As per the MV Act, both the rider and pillion-rider need to wear the helmet. But, currently we are issuing Rs 100 fine only if the rider drives without wearing a helmet," the DCP claimed.

CRASH PATTERN IN HMA – BLACK SPOT IDENTIFICATION

Crash – prone locations on roads

commonly termed as accident black spots can be identified

The most effective way to reduce road accident is to better understand the causative road accidents hence to prevent the occurrence of

road accidents

Methods are

- Severity Approach
- Clustering Techniques
- Sampling Method
- Empirical Bayesian Approach

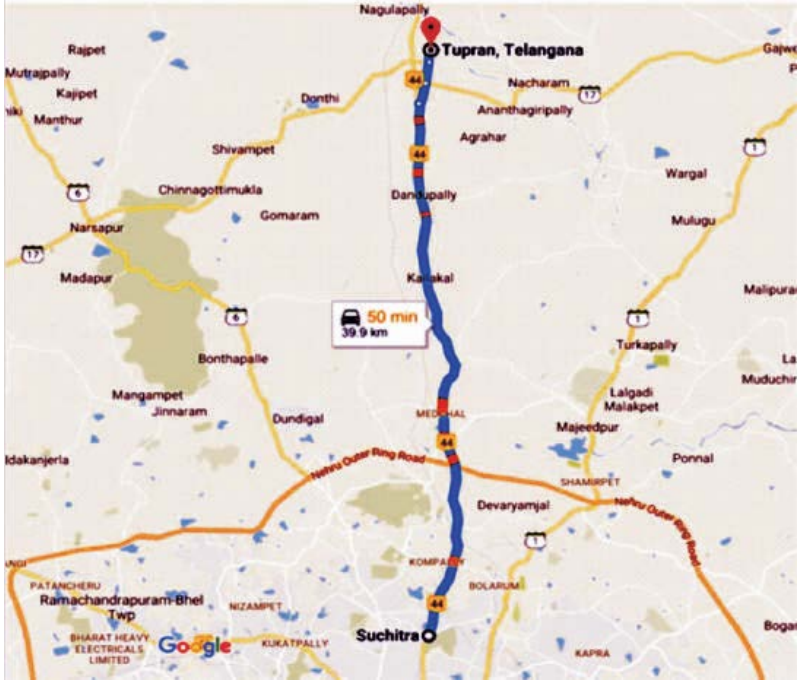
CRASH PATTERN IN HMA – BLACK SPOT IDENTIFICATION

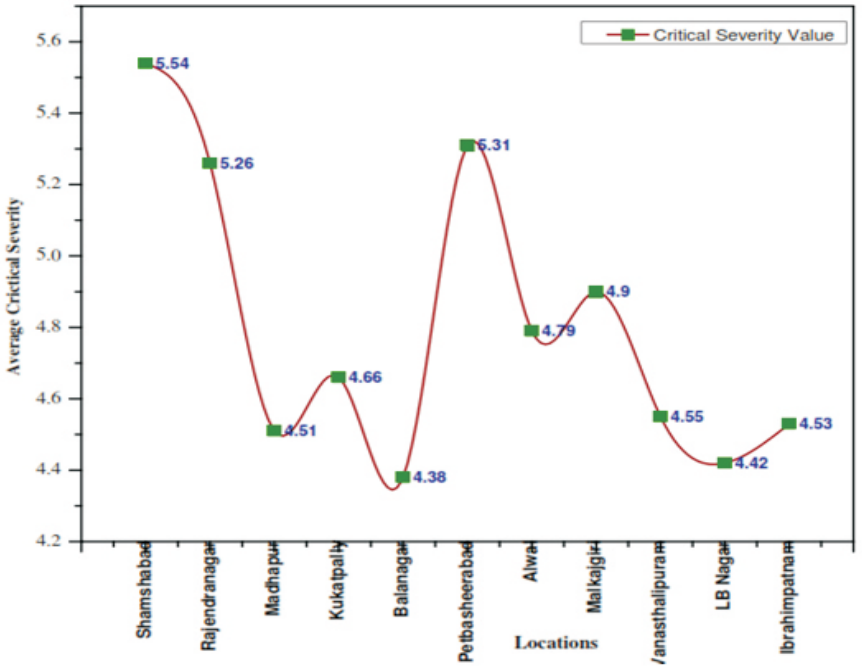
S. No.	Area	Stretch of the Road
1	Lunger House	Tolichowki
2	Lunger House	Golconda
3	Masab Tank	Road No. 12 Banjara Hills
4	Jubilee Hills Checkpost	Road No. 65 Banjara Hills
5	Sarathi Studio	Sanjeev Reddy Nagar
6	K.B.R. Park	Jubilee Hills Checkpost
7	Bowenpally	Diamond Point
8	Tadband	Bowenpally
9	S.R. Nagar	ESI Hospital
10	Dilsuknagar	Moosarambagh
11	Moosarambagh	Nalgonda X Road
12	Prakashnagar	Rasoolpura X Road
13	ESI Hospital	Erragadda
14	Delight Hotel	Secunderabad Railway Station
15	Chanchalguda	Nalgonda X Roads
16	Telugu Talli	V.V. Statue
17	Boats Club	Sanjeevalah Park
18	Trimulgherry	Trimulgherry Village
19	Trimulgherry	Bollaram
20	Tarnaka	Habsiguda X Roads

CRASH PATTERN IN HMA – BLACK SPOT IDENTIFICATION

Study location from chainage 368+000 to 474+000

National Highway 44 (NH 44) Suchitra X-road to Tupran





CRASH PATTERN IN HMA – AUDIT

Improper shoulder & Deteriorated Road Conditions

CRASH PATTERN IN HMA – AUDIT

Pedestrians walking on National highway – NH - 44

CRASH PATTERN IN HMA – AUDIT

Vehicles parked along highway

CRASH PATTERN IN HMA – AUDIT

Improper signboard visibility

CONCLUSIONS

- measures at micro level and policy measures at macro level to reduce the damages due road accidents in HMA. Broadly the following actions are needed:
- Detailed studies to be under taken for micro analysis of accidents in Hyderabad and Cyberabad areas; Provision of pedestrian facilities globally in the city;
- Enforcement drive of wearing helmets by two-wheeler riders and seatbelt by the occupants in cars and buses;
- Drive against drunken driving;
- Investigation of accident prone spots to identify the black spots and the reasons for the accident at those spots.

CONCLUSIONS

Some of the spots are:

- Intersections (controls and regulations)
- Mid bocks requiring Improved street lighting and delineations ;
- Promoting Road Safety Auditing and evolving preventive measures for minimizing the damages of accidents.
- Implementing speed controls and regulation in a systematic manner.

REFERENCES

Anitha Jacob & M.V.L.R. Anjaneyalu (2013), "Development of crash prediction models for two-lane rural highways using regression analysis", volume 6, pp 59-70.

Dahee Hong, Young Kyun LEE et al.(2005), "Development of traffic accident prediction models by traffic and road characteristics in urban areas", volume 5, pp 2046-2061.

Fikri M.Abu-Zidan, Hani O-Eid (2014), "Factors affecting injury severity of vehicle occupants following road traffic collision", volume 46, issue 1, pp 136-141.

Kumar M., and Ramesh A., (2014), "Estimation of influence on type of collision for road accidents using logit models in cyberabad-hyderabad-india", International Journal of Civil and Structural Engineering, Vol.1, No.2, pp.61-65.

Lakshmi M and Divakaran, Sreelatha T, (2013), "Accident Prediction Models for Urban Unsignalised Intersections", International Journal of Innovative Research in Science, Engineering and Technology, Vol. 2 (1).

Proper Pedestrian cross walk –pavement marking

- Proper lane marking
- Road safety education – school- TV- Cinema – awareness
- Strict Enforcement as per MV Act
- Creation of proper infrastructure
- Road sense
- Proper parking facilities
- Driver Behaviour

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REFERENCES

Ministry of Road Transport Highways 2013.

NSSR Murthy & R. Srinivasa Rao (2015), "Development of model for road accidents based on intersection parameters using regression models", volume 5, issue 1.

National Crime Records Bureau 2013.

Neelima Chakrabarty, Kamini Gupta & Ankit Bhatnagar, (2013), "A Survey on Awareness of Traffic Safety among Drivers in Delhi, India", The SIJ Transactions on Industrial, Financial & Business Management (IFBM), Vol. 1(2), pp 106-110.

Olushina Olawale Awe, Mumini Idowu Adarabioyo (2011), "Multivariate regression techniques for analyzing auto-crash variables in Nigeria", volume 1, pp 2224-3186.

Oyedepo Olugbenga J, Makinde Oluyemisi O (2010), "Accident prediction models for Akure-ondo carriageway Ondo state southwest Nigeria : using Multiple Linear Regression", volume 4, issue 2, pp 30-49.

Williams Ackaah, Mohammed Salifu (2011),"crash prediction model for two-lane rural highways in the Ashanti region of Ghana ", volume 35, issue 1, pp 34-40.

World Health Organization (WHO).

Thank You!