

ROAD SAFETY AUDIT FOR SAGAR INTERSECTION TO UPPAL INTERSECTION

Y. Venu¹, V. Ranjith Kumar², Dr.M.Kameswara Rao³

¹Research Scholar (M.Tech, T.E), ²Assistant Professor, ³Professor
Malla Reddy Engineering College (Autonomous), Kompally

Abstract: --Road Accidents are increasing at a high rate all around the world day by day due to spectacular growth of the road transportation sector. Millions of people are injured and killed during years all over the world due to road accidents. The accidents in the Hyderabad and Cyberabad areas are increasing simultaneously. In order to reduce the accidents and their effects in a stretch a Post Construction Road Safety Audit is performed. This paper is an attempt to analyze the traffic safety situation of a stretch from Sagar Intersection to Uppal Intersection (Inner Ring roads) of Hyderabad and identifies the elements causing accidents in the stretch. The main purpose of this paper is to set out the safety assessment for road users in the stretch. This emphasis on the reduction of potential crashes and suggesting safety measures in the stretch.

This is an important tool for assessing accident potential of a specific design. Analysis of major accident in the recent decades has concluded that driver's errors are the major concern for the occurrence of road accident. This project represents Road Safety Audit of selected stretch from Uppal Ring road to Sagar Cross road, Hyderabad, Telangana. It will focus on evaluating the benefits of the proposed actions that have emanated from deficiencies identified through the audit process. The selected stretch of 7 km consists of various junctions and Intersection. The Audit report is prepared for the selected stretch showing various deficiencies and suggesting remedial measures.

Keywords --Deficiencies, Fatalities, Road Traffic accidents, Road safety, Road safety Audit.

I.INTRODUCTION

Rapid Rise in population along with increased and versatile land use patterns and increase in vehicle ownership have generated considerable traffic demand in the major cities in India. Road Traffic accidents have now become a great social concern in India and the situation is deteriorating. Millions of people are injured and killed during years all over the world due to road accidents. Huge amount of socio-economic cost incurred due to accidents. Accidents rates are increasing despite of many preventive measures applied to improve road conditions and traffic laws. Due to increase in vehicles and constant road width with changing environment scenario, the rates of accidents are increasing drastically. Road safety is the main concern to reduce accidents. For road user safety, the analysis of accident is primary requirement for road design.

Road safety Audit is a systematic, proactive and formal procedure for assessing accident potential and safety performance of new or existing roads. It is a formal examination of a future traffic project, or an existing road, in which an independent and qualified team looks at the project's crash potential and safety performance. RSAs can be viewed as a proactive low-cost approach to improve safety. Road Safety Audits form an important role in diagnosing the safety of the road network, both as far as existing roads and upgrading projects on the road and transport network are concerned.

Road accidents have been increasing in the world due to the rapid growth of population, motor vehicles and usage of the transportation sector. These road accidents results in the loss of lives and socioeconomic cost. In order to reduce this effects road safety has to be implemented. Road safety Audit is a best and emerging tool for improvement of road safety and the assessing accident potential in developed and developing countries.

Road safety Audit is a systematic, proactive approach for assessing accident potential and safety performance of new or existing roads. It is a formal examination of a future traffic project, or an existing road, in which an independent and qualified team looks at the project's crash potential and safety performance.

Post Construction Safety Audits are performed on existing facilities to ensure that the safety needs of road users are being served. Post construction stage audits may be performed on a road section newly opened to traffic to evaluate its performance or it can be used to identify safety deficiencies on existing roads. Intersections, roadway segments and road side features are some elements that may be examined in an audit of an existing roadway.

Safety audit stages and study points

As per IRC: SP: 88-2010 the safety audits are conducted in various stages in India. They are:

- Feasibility stage
- Preliminary stage
- Detailed stage
- Pre-opening stage

- Post construction stage.

II ROAD SAFETY CONCERN IN INDIA

Road accidents in India are high due to heterogeneous traffic conditions. The Enormous growth in population, motor vehicles and the movement of all types of vehicles on the same road in India cause congestion, delays, inadequate parking and safety issues which results in accidents. Thousands of lives are lost and millions of people are injured in India in road accidents in the past years. In order to reduce these road accidents Road Safety Audits (RSA) have been implemented by National Highway Authority of India (NHAI) on existing and on proposed new highway projects.

This paper is aimed to evaluate road safety concern for an existing road in Hyderabad, Telangana. For evaluating road safety in the stretch a Post construction safety audit is performed.

III. NEED FOR THE STUDY

The main objective of the study is

- 1.To curtail unsustainable losses to health and economy.
- 2.To identify the causes of Accidents and to ensure safety for road users.
- 3.To check consistency of the road features.
- 4.To identify problems in the routine maintenance procedures.

Objectives of a Road Safety Audit:

The objectives of the road safety auditing process are:

- To minimize the severity and crash risk of road traffic crashes that may be influenced by the road facility or adjacent environment;
- To create and maintain an awareness of safe design practice during all stages of a road project
- To identify and report on the crash potential and safety problems of a road project;
- To ensure that road elements with an increased risk potential are removed or that measures are identified to reduce the risk.
- To avoid the possibility of the scheme giving rise to accidents elsewhere in the road network; and
- To enable all kinds of users of the new or modified road to perceive clearly how to use it safely.

IV. STUDY AREA

The Stretch selected for the study is the points on two major National highways in Hyderabad. The two distinct points in the study area are Sagar Intersection (an

intersection on NH-19) and Uppal Intersection (an intersection on NH-163) in Hyderabad, Telangana, India.

These two points are connected by an Inner ring road service and intersecting other National highway NH-9 at LB Nagar. The length of stretch is 7 Kms.

The study area consists of signalized At-grade intersections, various T & Y Junctions and a rotary.

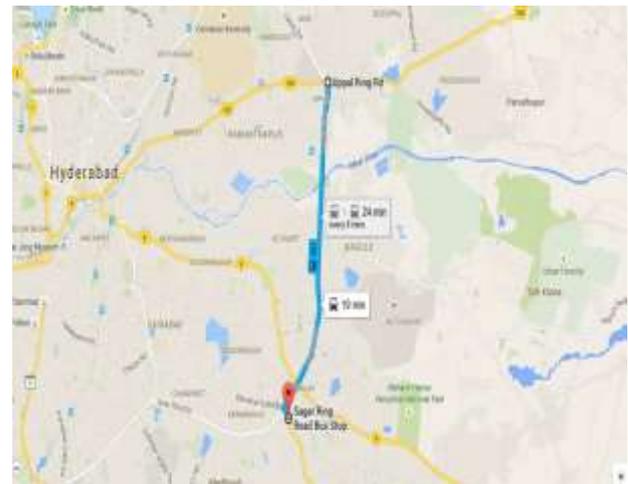


Figure 4.1: Selected stretch for Audit

V. Scope of study

The scope of this thesis is to carry out a road safety audit in a selected stretch to evaluate different road safety auditing techniques on the road selected. Throughout the implementation and reporting at this study, the present safety situation of Inner ring road (IRR) service road, Hyderabad will be evaluated.

- To identify and report on the crash potential and safety problems of a road project;
- To ensure that road elements with an increased risk potential are removed or that measures are identified to reduce the risk.
- To minimize the severity and crash risk of road traffic crashes that may be influenced by the road facility or adjacent environment;
- To complement a program of accident black spot treatment
- To specifically address safety, rather than relying completely on routine maintenance
- To identify problems in routine maintenance procedures

The main motto of Post-construction safety Audit is

- To check a road or a network for consistency, to make sure that a road user does not encounter unexpected road safety issues.

VI. SAFETY AUDIT FOR THE STRETCH

This post construction safety audit mainly concentrated on safety issues like roadprofile, road markings, road signage, width of shoulderand lightings throughout the stretch for the safety of road users as per IRC:SP :88:2010.

VII. DATA COLLECTION AND INVENTORIES

Following data of the corridor were collected:

- A. Road Inventory and Surrounding Land use type.
- B. Accident data from police stations

A. Road Inventory and Surrounding Land use type

Road inventory surveys are carried out to identify road profile like road width, No. of lanes, shoulder width, road alignment.People living nearby study area corridor use their personal vehicles for making trips.The land use pattern surrounding the study area is Residential, Commercial, Industrial and Institutional type. The land use pattern data is obtained from Municipal office.

B. Accident data from police Stations

Road accident data is collected from two police stations in the stretch i.e. from LB Nagar and Uppal police station under various sections of IPC 338,337,304a.

VIII. ANALYSIS AND INTERPRETATION OF ACCIDENT DATA

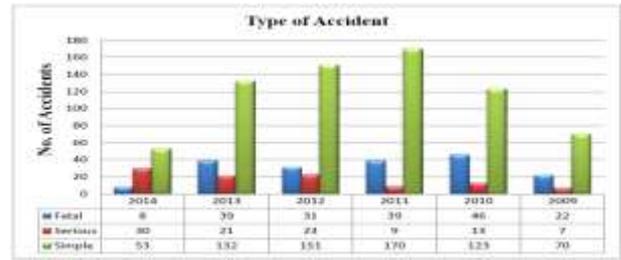
A total of 987 accident cases were registered in the police stations from the year 2009 – September 2014 in the stretch. The accident data is analyzed in the following groups.

Classification of accidents according to

- A. Year
- B. Month
- C. Time
- D. Nature of Accident
- E. Cause of Accident.
- F. Accident spots in the stretch

A. Yearly Variation of Accidents (2009-2014)

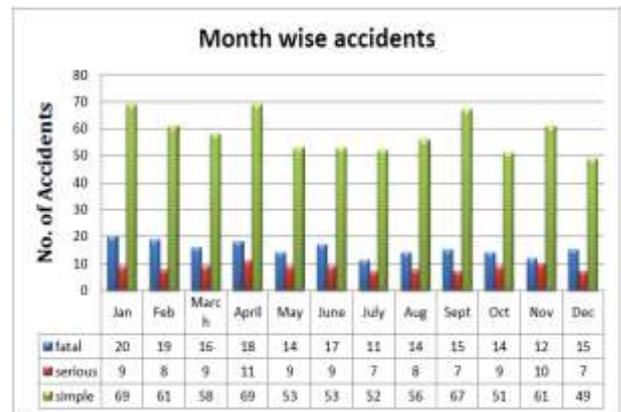
Table II: Yearly Distribution of Accident Data



The data from Table II represents the accidents in the stretch from the year 2009-2014 September. There is an increase in the rate of accidents for the year 2009 to 2011 and decreased from the year 2011-2014 September. The decrease in the rate of accidents from a couple of years in the stretch is mainly due to the installation of traffic signals and road signs.

B. Monthly variation of Accidents

Table III: Monthly Classification of Accidents



The data from table III represents the accidents are more in the month of January and April due to temperature effects.

C. Accidents classified according to Time

Table IV: Accidents as Per Time

Time	Fatal	Serious	Simple
0:00-1:00	13	2	22
1:00-2:00	4	1	17
2:00-3:00	8	2	11
3:00-4:00	3	2	8
4:00-5:00	1	1	8
5:00-6:00	2	2	15
6:00-7:00	8	2	17
7:00-8:00	7	3	24
8:00-9:00	5	7	28
9:00-10:00	5	3	35
10:00-11:00	8	3	35
11:00-12:00	8	3	32
12:00-13:00	9	5	34
13:00-14:00	5	8	28
14:00-15:00	11	6	33

15:00-16:00	5	3	31
16:00-17:00	11	3	27
17:00-18:00	9	5	36
18:00-19:00	5	7	50
19:00-20:00	8	8	45
20:00-21:00	15	6	45
21:00-22:00	10	8	44
22:00-23:00	13	7	38
23:00-24:00	12	6	36

The data from table IV represents the rate of fatal accidents. These are high during night time due to poor lighting system and visibility. The fatal accidents are more from 20:00 - 1:00.

D. Nature of Accidents

Table V: Nature of Accidents

Collision type	Fatal	Serious	Simple
Head on	12	6	10
Rear End	36	26	174
Hit pedestrians	29	7	41
Hit fixed objects	24	9	118
Hit pedal cyclist	10	8	32
Right angle collision	9	5	25
Side swipe	40	24	223
Others	25	18	74

The data from table V represents the Rear end collision and side swipe collisions are more common in Hyderabad due to heterogeneous and mixed traffic conditions. 57% of simple accidents are due to rear end and sideswipe collisions.

E. Cause of Accidents

Table VI: Cause of Accidents

Cause of Accident	No. of accidents	% of Accidents
Negligence and rash driving	642	65
Mechanical failure of Vehicles	25	2.53
Pedestrians	30	3.0
Drunk & drive	178	18.0
Animal on roads	10	1.0
Others	102	10.33

The accidents caused in the stretch are mainly due to human errors. 65% of accidents are caused due to human negligence.

F. Accident spots in the stretch

Table VII: Accidents Spots in the Stretch

Place	Fatal	Serious	Simple
-------	-------	---------	--------

Near Sagar X Road	23	13	95
Near LB Nagar rotary	49	25	210
Near Kamineni Intersection	15	12	61
At Rajeev Gandhi Nagar	13	3	58
Near Alkapuri Junction	21	20	81
At Snehapuri Junction	9	8	24
Nagole Intersection	22	11	82
Nagole Bridge	7	3	34
Near Uppal	17	6	63

There are several accident spots in the stretch. Traffic Police have identified some of the accident prone points and installed sign boards for the safety of road users.

XI. OBSERVATIONS

Various deficiencies and elements causing the accidents were observed during the survey.

- 1) Misleading sign boards in the stretch are more, which results in chance of accident.
- 2) Pedestrian crossings are missing at the junctions and school areas.
- 3) Traffic signal system with time display has more chances of causing accidents in the stretch.
- 4) Proper signs and markings are missing in the stretch.
- 5) Improper design of bus bays and absence of bus bay markings.
- 6) Kilometer and hectometer stones were missing in the stretch.
- 7) Water accumulates on roads during rainy seasons causing congestions and resulting in accidents.
- 8) Inadequate Curb height at medians and pavement edges were observed.
- 9) Damaged flexes were hanged to hoarding boards were observed.

X. CONCLUSIONS

Following conclusions were drawn from present study and accident data.

- 1) The accidents in the stretch are more during day time than nights.
- 2) Rear end type and side swipe collisions are more when compared with others.
- 3) Overall accidents in the stretch are more during daytime than in nights.
- 4) Accidents caused due to human negligence are more in the stretch.
- 5) The accidents are more from 18:00- 00:00 in the stretch.
- 6) The accident rate has increased from 2009-2011 and decreased from 2012 -2014 due to the

application of traffic signaling system in major junctions in the stretch.

XI. RECOMMENDATIONS

Road Safety Audits are being considered as more and more important and widely used tools/applications to increase the road and the road environment safety. These surveys should be done for short intervals to observe changes in the road structure and equipment as well as the road environment.

The following countermeasures are to be implemented in the stretch to reduce the accident level and to increase the safety concern.

- 1) Curb height has to be increased at medians and at pavement edges.
- 2) Worn signs should be renewed or removed.
- 3) Warning signs should be installed at required sections of the route.
- 4) Markings & signs should be installed wherever it is necessary.
- 5) Detectable Warning Tiles are to be installed at sidewalks at pedestrian crossings.
- 6) Bus lay-bys are to be provided.
- 7) Reflectors or raised pavement markers (Road Studs) are to be installed on pedestrian crossings.
- 8) Movements of vehicles at unauthorized medians are to be regulated.
- 9) Damaged Hoardings are to be removed.

REFERENCES

- [1] IRC: SP 88-2010, "Manual for the road Safety Audit", Indian Road Congress, New Delhi.
- [2] Road safety Audits and Inspections by statens vegvesen (Manual V720E).
- [3] MIROS Road Safety Audit Report MRSA 01/2012.
- [4] International Journal of Science and Modern Engineering (IJISME) ISSN: 2319-6386, Volume-1, Issue-6, May 2013.
- [5] Road safety Audit Guidelines by Massachusetts Department of Transportation, Highway Division.
- [6] Road Traffic Management Corporation South Africa "Road Safety Audit Manual" 2012.
- [7] Hiderbrand, E. And Wilson, F., "Road Safety Audit Guidelines", UNB Transportation Group, 1999.
- [8] Eugene M. Wilson "Application of Road Safety Audit To Urban Streets".
- [9] Devang G Patel, F.S. Umrigar, C.B. Mishra, Amit A Vankar "Road Safety Audit of Selected Stretch from Umreth Junction to Vasad Junction" IJISME ISSN: 2319-6386, Volume-1, Issue-6, May 2013.