

# Road Safety Audit of selected stretch from Sagar Intersection to Uppal Intersection

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**Abstract**— Road safety Audit is a systematic, proactive approach for assessing accident potential and safety performance of new or existing roads. It is a formal practice for 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. Road Safety Audits can be treated as a proactive low-cost access to reduce accidents and to improve road safety. This paper enables to analyze the traffic safety situation of a stretch from Sagar Intersection to Uppal Intersection (Inner Ring road service road) of Hyderabad, Telangana, India and identifies the reasons for the accidents and suggests remedial measures for decreasing the effects of accidents in the stretch. The main purpose of this document is to set out the safety assessment for road users in the stretch. The emphasis is on the reduction of potential crashes.

**Index Terms**— Fatalities, Road Traffic accidents, Road safety, Road safety Audit

## I. INTRODUCTION

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.

Road safety Audit (RSA) was originated in the UK in the year 1980 and now spread to many developed countries like USA, Australia, New Zealand, Denmark, Canada, Malaysia, China, Singapore and Japan. Developing countries like India, Pakistan, South Africa, Thailand, Egypt, Bangladesh etc., have also implemented Road Safety Audits (RSA) in several stages in the planning of Trunk Roads.

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**Table 1: AP state accident record**

Year	No of Road accidents	No. of fatalities	No of Injured
2004	39390	10621	53989
2005	38913	11098	52554
2006	42867	12606	59453
2007	45163	13791	63072
2008	46389	14529	64526
2009	45977	15203	61894
2010	44570	15696	57032
2011	42869	15100	55812

## 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 audit for an existing road in Hyderabad, Telangana and suggests some safety measures for road users to minimize accidents in that stretch.

## III. NEED FOR THE STUDY

The main objective of the study is

- To curtail unsustainable losses to health and economy.
- To identify the causes of Accidents and to suggest remedial measures to minimize them.
- To ensure road safety for the road users.
- To determine accident spots.

## IV. STUDY AREA PROFILE

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 extends up to Uppal Intersection (an intersection on NH-202) 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.

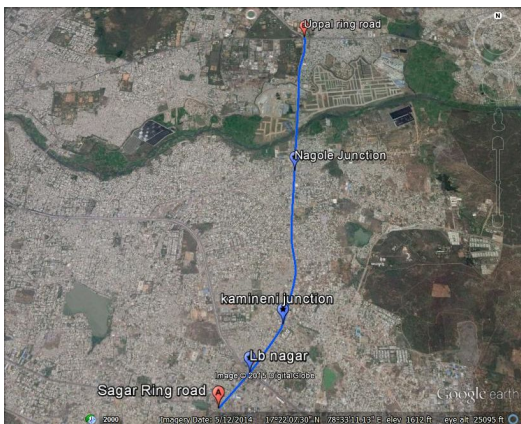


Figure: 4.1: Selected stretch for Audit.

V. NEED OF THE STUDY

The traffic in the stretch is high due to residential land use pattern and the average yearly accident rate in the stretch is about 10%. For implementation of various safety measures in the stretch a post-construction road safety audit is performed.

VI. SAFETY AUDIT FOR THE STRETCH

This post construction safety audit mainly concentrated on safety issues like road profile, road markings, road signage, width of shoulder and 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 1103 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 3: Yearly distribution of accident data from 2009-2014 September

Year	Fatal	Serious	Minor	Total
2009	22	7	70	99
2010	46	13	123	182
2011	39	9	170	218
2012	31	23	151	205
2013	39	21	132	192
2014	8	30	53	91
Total	185	103	699	987

The data from Table 3 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 4: Monthly classification of accidents

Month	Fatal	Serious	Simple
January	20	9	69
February	19	8	61
Month	16	9	58
April	18	11	69
May	14	9	53
June	17	9	53
July	11	7	52
August	14	8	56
September	15	7	67
October	14	9	51
November	12	10	61
December	15	7	49
Total	185	103	699

The data from table 4 represents the accidents are more in the month of January and April due to temperature effects.

C. Accidents classified according to time

Table 5: 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 5 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 6: 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 6 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 7: 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 8: 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.

**IX. REMEDIAL MEASURES**

Various remedial measures are to be implemented in the stretch to increase safety and to reduce accidents.

1. Rotary approaching sign board has to be installed at LB Nagar.
2. Speed limit boards are to be installed in stretch.
3. An unnecessary sign board has to be removed.
4. Movements of vehicles at unauthorized medians are to be regulated.
5. Curb height has to be increased at medians.
6. Pavement markings are to be installed.
7. Cross walks has to be installed at school zones and at intersections.
8. Unevenness in the pavement surface has to be rectified.

**CONCLUSIONS**

Following conclusions are drawn from accident analysis and based on present safety Audit.

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. Misleading sign boards in the stretch are more, which results in chance of accident.
4. Pedestrian crossings are missing at the junctions and school areas.
5. Traffic signal system with time display has more chances of causing accidents in the stretch.
6. Proper signs and markings are missing in the stretch.
7. Improper design of bus bays and absence of bus bay markings.

**RECOMMENDATIONS**

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. Shoulders should be adequate.
6. Detectable Warning Tiles are to be installed at sidewalks at pedestrian crossings.
7. Bus lay-bys are to be provided.
8. Reflectors or raised pavement markers are to be installed on pedestrian crossings.

## Road Safety Audit of selected stretch from Sagar Intersection to Uppal Intersection

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.

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