



## ANALYSIS OF ROAD SAFETY AUDIT CASE STUDY- GURUGRAM ROADS

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**Abstract:** India, holds first rank out of total of one hundred and ninety nine countries against accidental deaths pertaining to road accidents. This is as per 2018 data of World Road Statistics India contribute around eleven percent of the total accidental deaths of the world. Haryana, which is a part of northern India is nowhere behind in of road accident and it holds seventh rank in from year (2014-2018). Gurugram district is ranked first and holds maximum deaths.

Gurugram, is the fastest growing city and is also very intensely and densely populated and many national and multi-national companies are establishing their offices on daily basis. Due to this there is a vast increase in traffic on the roads of Gurugram and is leading towards frequent accidents.

We have undertaken this study to identify the risk associated with road safety on Ambedkar Chowk as it is one of the most populated and busiest area. The conclusion will provide the comprehensive measures and solution for improving the road safety.

### I. INTRODUCTION

Road safety concept is of great importance when it comes to proper planning, accurate design, construction expertise and operation and maintenance of road infrastructure. It is required to be established for proper working and performance of road safety features which includes devices and their installation it covers both product and services (method and location of installation).

Road safety audit is important as:

- For reviewing the various safety deficiencies and designs in a cost effective way at right stage Road Safety Audit is a proven methodology.
- To assess accident potential and safety performance for the improving and maintaining existing roads. And design and construction of new roads.
- To assess the accident potential.
- By independent assessment of schemes by persons who are independent of the original design team, risk objectivity is ensured.
- When we plan, design highways and start and finish and maintenance is done road safety should be integral part of all stages.

### II. ROAD TRAFFIC ACCIDENT REPORTS

According to MORTH Report 2018, Minor injuries hold major part and it is nearing to thirty six percent, the next is fatal accident which is nearing to thirty percent, serious injuries nearing to twenty seven percent. There is another category of non-injury accidents which holds seven percent.

On further analysis of the above report it can be inferred that the State and National Highways comprises of nearly 5 percent of the road network however the accident sharing is nearly 55 percent the major understandable reason is speed of the vehicles either the vehicles are not designed to work on that speed or highways are not designed for the speed, more vehicles, black spots etc.

### III. CAUSES OF ROAD ACCIDENTS

From the above analysis it is evident that the road accidents are a function of many reasons and the two important factors are here under:

- Road environment: The data part was covered in the previous sections and road safety aspects will be covered in the later part of the research document.
- Human Negligence /error: Neglecting traffic rules, Improper driving license and improper or non-usage of seatbelts and other safety gadgets provided by the manufacturer.

#### IV. OBJECTIVE

The road stretch between Huda City Centre to Ambedkar Chowk (Sec 38) (Netaji Subhash Marg) of National Highway -8 road has been identified for road safety audits it is termed all time one of the busiest road network of the sub-continent. Gurugram tops the list in Road accidents in 2019 it is worth mentioning that Haryana is constantly maintain it rank (7<sup>th</sup> and 8<sup>th</sup>) for the highest no of accidents between year 2014 to 2018.

The objectives are to:

- Establish the road traffic accidents trend and characteristics.
- Establish the performance of the installed road safety measures.
- Access driver's knowledge for the use of road safety devices that are installed.
- Observing the vehicular speeds and traffic on the highway.

#### V. SITE INVESTIGATION AND ANALYSIS

Site data had been collected keeping in mind the following:

1. Operation of vehicles on a road
2. Safety aspects of road
3. How does it affects the road users?

During data sampling following were covered pedestrians, cyclist, motorbikes, heavy vehicles such as trucks and other vehicles used for general public such as buses etc. This analysis will highlight the shortcomings for road safety and will also suggest the recommendations for improving safety.

This road comprises of flyover and major junctions catering a large portion of city traffic volume thus making this road more vulnerable & highly overcrowding mainly near station points. There is no proper pedestrian crossing along the road, no proper road markings, signage are few & footpath is almost broken at every location, moreover auto stand parking is being done on the footpath as shown in fig below.



Fig: 1 Google Image of site location: Ambedkar Chowk

Table 1 Site Photographs of potential unsafe zones



**VI. SUMMARY OF POTENTIAL SAFETY ENHANCEMENTS**

Table 2 Safety Issues and Proposals

Safety category	Safety Issue	Safety Enhancement
Signage	<p>No Signage plan to show direction of roads.</p> <p>No Signage plan to give details of direction, merging/diverging traffic, speed limit.</p> <p>Height of footpath is more.</p> <p>Reassurance sign not provided.</p> <p>No signage plan like assurance signage, direction signage, merging diverging traffic signage is provided.</p> <p>At Intersection wrong signage of median opening given</p> <p>Speed limit signage, merging diverging signage at flyover approach and access roads is not there.</p>	<p>Consider adding additional guide signage and street name signs at major intersections along the corridor, to reduce motorist confusion.</p> <p>Re-evaluate all guide signage along the corridor</p> <p>Consider adding signage for all wayside furniture's and facilities.</p>
Pavement Markings	<p>Faded or no markings for :</p> <p>Pedestrian crossing</p> <p>Junctions way guide markings</p> <p>No stop line</p> <p>Shoulder marking are covered with mud</p>	<p>Consolidate pedestrian crossings with a signalized intersection</p> <p>Restripe pavement markings for bus stops, pedestrian crossings.</p> <p>Provide "Lane Ends" or "Form Single Lane" signage ahead of the stop sign.</p>

Safety category	Safety Issue	Safety Enhancement
Pedestrian Accommodations	Footpaths either encroached or in bad condition to be used by pedestrians. <b>Pedestrian crossing blocked at median portion by electric poles.</b> Plantation on footpath area obstructs the pedestrian movement.  Cables are left uncovered on footpath  Manhole covers are either damaged, open or not in level with footpath surface causing accidents.	Note pedestrian desire lines when determining placement of crosswalks.  Provide overhead signal indications at pedestrian crossings for added visibility and compliance.  At mid-block locations, consider the use of pedestrian hybrid beacons.  Consider proper covering of cables
Encroachments	Unauthorized parking at left term arm this affects visibility and pathway for cars.	Consider removing of unauthorized parking.
Surface Conditions	Poor pavement at left turn arm Footpath damaged condition. Drain vent was blocked Water pool is formed on merging road section at island side due to damage pavement.	Consider for pavement improvement measures like patch work repair and footpath damage repair.  Consider removal of debris Consider design of drainage system

## VII. CONCLUSION

It is recommended that during road design and construction safety should be considered as the one of the major factor and it shall further be observed and strengthened during operation & maintenance of the highway.

The Results have been summarized in tabular form:

Table 3 Recommendations: Accident circumstances and possible countermeasures

Accident circumstances	Possible Countermeasures
Pedestrian/vehicle conflicts	pedestrian/vehicle segregation (sidewalks or wide shoulders)
	raised pedestrian crossings speed control devices)
Loss of control	road markings, delineation, speed control devices guardrails
Darkness	reflective signs, reflective road markings delineation
Poor visibility	improve sightlines, realignment conspicuity
Poor driving behavior/ lane discipline	Education, road markings enforcement median barriers
Collision with roadside obstacles	better delineation, guardrails frangible posts
Skidding	restoring surface texture
Turning movements	turn prohibition, channelization/turning lanes acceleration/deceleration lanes
Overtaking	prohibition/lane markings, advance warning
Light/heavy vehicle conflicts	bus bays/lay bys, climbing lanes
Parked vehicles	parking controls, parking provision
Roadside stalls	service roads/wide shoulders
Excessive Speeding	speed limits, enforcement, speed control devices

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