

# Road Safety Audit-During Construction

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**Abstract-** Accident reduction and accident prevention are the two main strategies in road safety work. In accident reduction, we use the knowledge of accidents that have occurred at the time of construction of road, so that similar accidents do not occur again. Accident prevention is the application of expertise in safe road/ bridge design - road /bridge geometry, as well as the materials used - when we construct new streets and roads/ bridge or redesign the existing roads/bridge, regardless of the reasons for which an individual project is undertaken. This expertise is the result of research and to a significant extent of practical experience gained through working on accident reduction. To reduce the accidents, severity of the crashes and its prevention, we are using the road safety audit.

**Keywords-** Safety Audit, construction safety, safety equipment, safe work.

## INTRODUCTION

Road Safety Audit (RSA) is a formal procedure for assessing accident potential and safety performance in the provision of new road schemes and schemes for the improvement and maintenance of existing roads. The Road Safety Audit (RSA) System was first introduced in the United Kingdom in the early 1990s and then gradually spread internationally. It is a system whereby outside experts conduct safety assessment related to road construction. Road fatality rates in India are probably among the highest and out of 1.25 million deaths worldwide every year, 8-10 per cent of all road deaths are in India. The road system and the traffic operations in India are deficient in safety management. One of the reasons for this situation is that there is very little opportunity to learn from the past mistakes. The accident records are supposed to provide the clue about deficiency in the road, vehicle and user systems to explain the causes of accidents and to develop remedial measures. This road safety management system is poor in India, with untrained police officers collecting only incomplete records of fatal accidents and always stating the road user's fault as the cause of the accident. In a road environment where the road designs, knowledge of traffic rules, traffic control and policing (enforcement) are responsible for the accident. In a deficient road and traffic environment, causes are related to poor road geometry and poor traffic control aggravated by poor traffic sense.

## OBJECTIVE

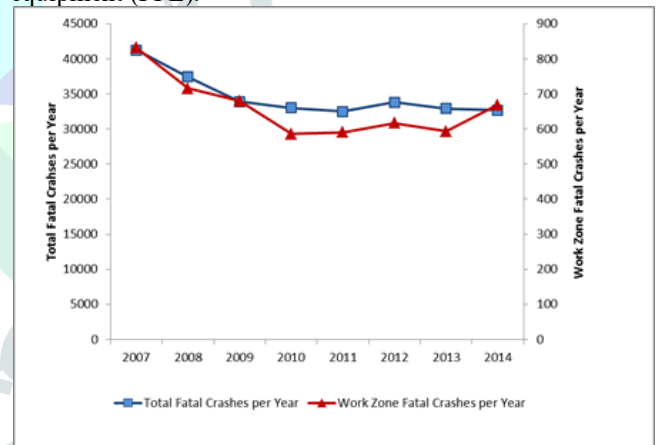
- To check whether the road user is safe or not.
- To implement the necessary changes needed on the road.
- To check Signal timing adequacy.
- To check whether parking facilities are feasible or not.
- To check whether facilities for pedestrians, two wheelers, four wheelers are sufficient or not.
- To check whether the geometric parameters follow the standards.
- To check proper safety equipment are use or not.

## NECESSITY

Safety audits and safe work practices play a key role in keeping your job site safe and ensuring the entire project stays on-track and within budget. But, considering human nature, is it even possible to have a safe job site? Some doubt this. After all, it is estimated that over the course of a year, about 1 out of every 10 construction workers are injured, some fatally. The most common job site injuries include:

- Falls
- Electrocution
- Burn
- broken bone
- Eye injury
- Repetitive motion injuries

The sad thing about many of these common injuries is that they could have easily been prevented by following safety protocols and using the proper personal protective equipment (PPE).



Crash Rate per Year

## SCOPE OF WORK

India has the second largest road network in the world with over 3 million kms of roads of which 60% are paved. These roads make a vital contribution to India's economy. On the whole, however, the facilities for the road users fall far behind acceptable standard, leading to a huge death toll resulting from road accidents. In recent times, there has been a growing concern over the road safety problem. Pre-Opening audits are a final check to ensure that the road has been built as designed and to identify any safety issues. The new road is assessed in detail, along with its connections to existing roads during the day and night. When a post-opening audit is commissioned, normally the project is of a magnitude that has also required a pre-opening audit. The post opening audit checks that issues raised in the pre-opening audit have been adequately addressed, and has a particular emphasis on how all road users are coping with the new road facility and whether any significant operational problems are being observed (above and beyond normal teething issues).

## SALIENT FEATURE OF PROJECT HIGHWAY

### Road Data Collection:

1. **Name of Project:** Design, Construction, Finance, Operation and Maintenance of two laning of Bankarphata To Lenyadri.
2. **Project Road Length:** 55km
3. **Project Cost:** 300 lack per kilometer
4. **Employer:** Shree Belhekar Infrastructure Private Limited
5. **Carriageway:** 7m
6. **Drain width:** 1.5m
7. **Toe berm:** 0.5 m
8. **Shoulder:** 1.5m
9. **Road way:** 10m

### Pavement Composition

- Bituminous Concrete: 40 mm
- DBM: 60 mm
- WMM: 250 mm
- Granular Sub Base: 200 mm
- Sub Grade: 500 mm

### Pavement Composition for Rigid Pavement

- Pavement quality concrete (M40): 300mm
- Dry lean concrete: 150mm
- Granular sub base: 200mm
- Sub grade: 500mm

### Projects Milestone

#### Milestone-I

Project milestone-I shall occur on the date falling on the 180<sup>th</sup> day from the appointed date.

#### Milestone-II

Project milestone shall occur on the date of falling on the 400<sup>th</sup> day of appointed date.

#### Milestone-III

Project milestone shall occur on the date of falling on the 600<sup>th</sup> day of appointed date.

### Details Structures, Road Junctions and Project Facilities

- Minor Bridge: 7
- Box/Slab Culverts: 26
- RCC Pipe Culverts: 81
- Major Junctions:1
- Minor Junctions:
- Toll Plaza: 0
- Buss Bays Shelters: 23
- Highway Lightings: As per site condition
- HTMS Works: As per site condition
- Tree Plantation: Maximum number of 2847nos.shall be planted along the project corridor.

## METHODOLOGY

Safety Audit can be applied/ applicable to a) New Roads  
b) Existing / constructed Roads. On new roads to be improved or built, the audit will lead to identification of accident-prone situations and on existing or already constructed roads, the audit will suggest appropriate mitigation measures to reduce the possibility of accidents.

Audit (RSU) basically comprises of three (3) Stages:

- Stage 1 - Road Safety Audit during design and planning
- Stage 2 - Audit during Construction
- Stage 3 - Audit after the completion of the Road project

**Stage 1** (design and planning) has been completed in most of the reaches, an audit in real terms is not possible. However, the designers can best identify the shortage in the designs and the reasons thereof. Hence the requirement of 'Noncompliance report for rural roads design' should be completed by the PIUs/PICs.

**Stage 2** is generally carried out during construction as transitory measure on high volume highways / roads in urban area, and is not essential for low volume. However, the PIUs/PIC's (as it requires continuous monitoring, considered to be beyond the scope of PMC) may carry out such an audit based on IRC SP 55-2001.

**Stage 3** is carried out in completed stage of the road project and PIUs/PIC's who are at site, should carrying out the same for the all completed road reaches as per the Format provided for 'Non-observance Report for Rural Roads after Completion'.

### Audit during Construction

**1. Have a Plan.** Each road construction project should have a transportation management plan. The plan should consist of a temporary traffic control plan to protect workers by safely conducting traffic around or through the work zone. You should also have a traffic control plan for inside the work zone that manages the flow of heavy equipment, construction vehicles and on-foot workers.

**2. Properly Control Traffic.** The work zone should consist of an headways warning area with warning signs alerting motorists of upcoming changes in driving conditions, a transition area using traffic control devices for lane closures and traffic pattern shifts, a clunk area, the work area and a disposed area to allow traffic to resume back to normal and a sign indicating that the work zone has ended. All traffic control devices whether it's cones, barrels, barriers or signs should comply with the Federal Highway Administration's along with any state agency requirements.



**3. Create Separate Work Areas.** Road construction work zones are engaged areas usually with several work activities taking place at the same time. To avoid accidents, use cones, barrels and barriers to clearly delineate specific areas of the work zone such as material storage, areas where heavy equipment is being used, vehicle parking and safe areas for workers on step to move about in



**4. Wear Proper Safety Equipment.** Proper safety equipment should be fordone by all personnel inside the work zone. Personal protective equipment (PPE)



including hard hats, steel-toed boots, highly visible clothing and, depending on the noise levels, hearing protection. All highly visible clothing whether it's a vest, jacket or shirt should be bright fluorescent orange or lime/yellow and also have visible reflective material especially if working at night.



**5. Be Aware of Your Surroundings.** Regardless of what your job duties impose in the work zone you should always be mindful of what's going on around you. Avoid walking behind any vehicles that may be supporting up or into the swing radius of heavy equipment. Whenever possible, face traffic while inside the work zone or have a spotter available when you have to have your back turned. Spotters should also be used to monitor the movement of vehicles and heavy equipment inside the work area in addition to monitoring traffic in order to alert workers to any possible dangers.

**6. Avoid Blind Spots.** There are any number of vehicles and heavy equipment moving about inside the work zone including dump trucks, compactors, pavement planers, excavators, pavers and rollers. Operators should ensure that all mirrors and visual aid devices are attached and operating properly including back up alarms and lights. If you are on foot and working adjacent these machines while in operation remember that the driver has a limited line of sight. Always stay in visual contact with the driver. A good rule of thumb to understand is that if you can't see them then they probably don't see you.

**7. Have a Competent Person on Hand.** An eligible person should be onsite whenever work is being performed. A eligible person is someone who is "competent of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, harmful or dangerous to workers, and who has authorization to take immediate corrective measures to eliminate them." An eligible person is needed to conduct hazard assessments and regular inspections of the worksite. An eligible person is also needed to select the appropriate class of PPE to be used by workers and to approve the appropriate types of traffic control devices. Workers should report any unsafe hazards or equipment to the competent person assigned to the work zone so they can be corrected immediately.



**8. Start Each Workday with a Safety Meeting.** In addition to ensuring that all workers at the jobsite have the proper training required it is also a good idea to have a

quick safety meeting before work starts. Since conditions can change greatly from day to day in the work zone workers should be briefed on the work activity scheduled each day and notified of all likely hazards. This is also a good time to ensure that all workers have and are wearing the proper PPE required for the work start done that day.

**9. Have a Site-Specific Safety Program.** Every road construction project is different and each work area has its own unique hazards and challenges so creating a safety program geared specifically for the site can go a long way in preventing accidents. The site-specific safety program includes identifying all hazards and plans to control and mitigate them, schedules to routinely inspect all equipment and material, a plan for first aid and emergency medical care in the event of an accident and safety training schedules for all workers and employees.

**10. Stay Hydrated.** Workers performing road construction are susceptible to overexertion and heat-related illnesses. Asphalt absorbs 95% of the sun's rays and asphalt temperatures can easily be 30° F or greater than the surrounding air temperature. Employees should drink plenty of water or liquids high in electrolytes like sports drinks or coconut water. Employees should also get out of the heat and sun as much as possible especially on extremely hot days to avoid heatstroke, dehydration and heat exhaustion.

## CONCLUSION

This paper presented road safety audit that highlight issues during construction of road. It examines the road safety in ration to moderate safety equipment. It suggests the various recommendations for safety purpose. Minimize the risk of accident occurring at the time of construction of road.

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