

ROAD SAFETY ISSUES OF HILL ROADS IN INDIA – EXPERIENCES OF ROAD SAFETY AUDITING

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Abstract

Road Safety in hilly terrain is a big challenge because of restricted geometrics and the aspirations of the travelers in high speed vehicles. The share of accidents of hill states in India is around 4 percent of the total road accidents per annum. Again in the states like Uttarakhand and Mizoram situated in steep hills the severity rate of accidents is very high, Uttarakhand accident severity is almost twice that of National average of 29. Mizoram has registered a severity rate of above 100. This is mainly due to steep hills with roads located on deep and steep valley slopes. As a part of the ADB funded projects Road Safety Audit was undertaken on a few of the project roads. This paper attempts to illustrate the safety issues of the roads located in the hills of India.

Key Word: Hill Roads, Deep valleys, Narrow shoulders

1.0 INTRODUCTION

There are eleven hill states in India. All of them are located in the northern part of India as shown in figure-1. Some of these states are having partly plain terrain. Mizoram, Arunachal Pradesh and Himachal Pradesh are more or less completely hilly while majority of the districts (10 out of 13) in Uttarakhand are located in hills. The experiences presented in this paper relate to states like Mizoram, Uttarakhand, Manipur, Tripura and Assam. The major issues are very sharp curves, steep slopes, unprotected trees, absence of the delineators at culverts, roadside drains, unprotected cause ways at cross drains. The traffic signs are posted at a relatively higher level. An attempt is made to illustrate these issues through photos taken during the process of safety audit.

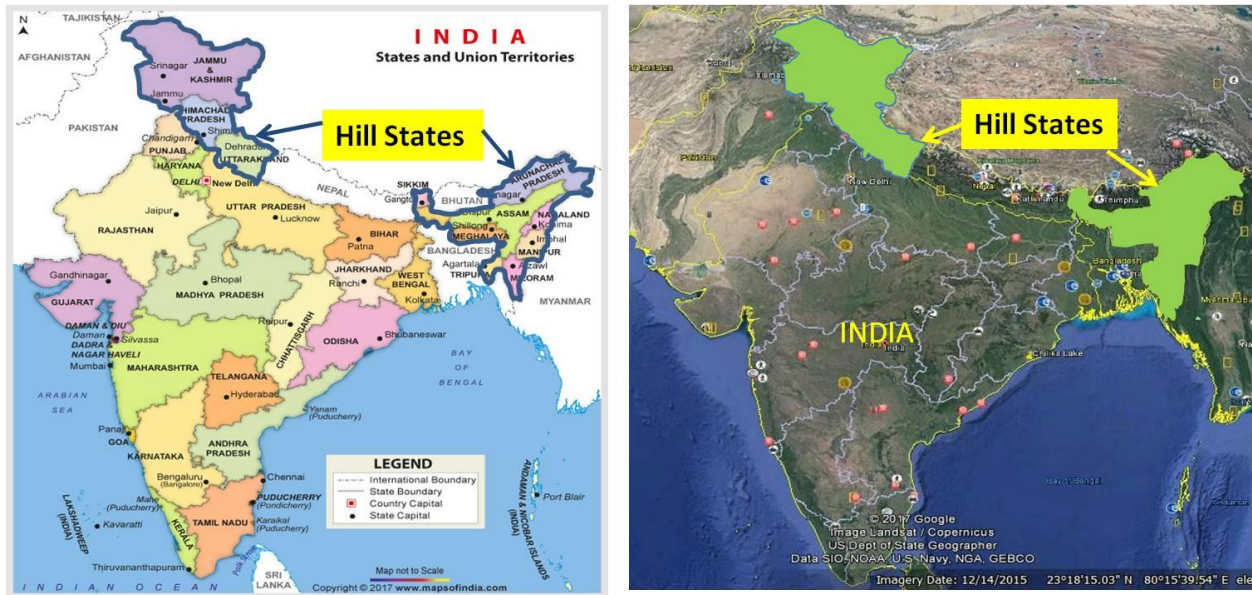


FIGURE-1: Geographical Location of Hill States in India.

2.0 STEEP VALLEY SLOPES

By virtue of the terrain it is not easily possible to provide recognizable shoulders. Many of the places the edge of the carriageway is almost at the brims of the hill slopes. In some situations it is not even possible to post W-Beam crash barriers to protect the vehicles from running down the slope. Photos below show some of these situations.



a) Steep Valley Slope having no space to post Barrier



b) Vertical Retaining Wall to Support the Road



a) Blind Curve Followed by Steep Slope/Gorge



b) Blind Curve Followed by Steep Slope/Gorge

3.0 BLIND CURVES

In steep hills blind curves are very common requiring appropriate signs and indicators to the oncoming vehicles. At these blind curves, in some locations, it is observed that the warning signs are posted very close to the start of the curve at unusual heights and speed limit signs are not supporting the safe operation and control of the vehicles both in the dark hours or even in day light. Some of the cases are illustrated in the photos below.



a) Hair-Pin Bend Sign posted at the Apex of the Curve



b) Un-Conventional Sign posted to warn about Hair-Pin Bend



a) Warning signs are posted very close to the sharp blind curve at higher level



b) Warning signs are posted very close to the sharp blind curve at higher level

4.0 ROAD SIDE TREES

Unshielded road side trees are very serious hazards. They need to be delineated prominently for night time driving.



a) Unprotected/Undelineated Trees can be Severe hazards



b) Unprotected/Undelineated Trees can be Severe hazards

5.0 DELINEATION OF FIXED OBJECTS

Road side fixed objects like parapet walls of culverts and out crops of rocks can be very hazardous and they need to be delineated and traffic should be guided through them.



a) Delineation of the Culvert head walls and trees is essential



b) Out Crops of Rocks can cause crashes on hill roads.

6.0 PROPER CROSS DRAINS NEEDED

Improper construction and maintenance of cross drain works can be potential accident spots as they can erode the road surface and sometimes can wash away the vehicles. Some examples are shown in the photographs below.



a) Absence of Drain can Erode the Road



B) Blocked Drain can Erode the Road

7.0 ROAD SIDE IRRIGATION CANALS

Irrigation canals spill the water and damage the road leading to accidents to the vehicles. Proper regulation and controls need to be exercised. Photos below show some examples.



a) Road Side Irrigation Channels need to be controlled from spilling the water and eroding the road



b) Road Side Irrigation Channels need to be controlled from spilling the water and eroding the road

7.0 CONCLUSIONS

Experiences of Road Safety Audit of hill roads are presented above. From the experiences basic issues of safety are

- Sharp curves ,
- Unprotected steep slopes,
- Road side objects and trees,
- Inadequate and improper drains,
- Parallelly running irrigation canals

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