

Accident Case Studies, Causes & Preventive Measures for NH 1, India

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Abstract

Rapid growth of population coupled with increased economic activities has favored in tremendous growth of motor vehicles. This is one of the primary factors responsible for road accidents. For this project stretch of NH-1 has been selected Panipat- Jalandhar Section of NH-1 from Km 96.000 to Km 387.100 is 291.1 Km long. First 116.161 km fall under Haryana while the remaining 174.939 km fall under Punjab and was upgraded to four lanes in the last decade. The project from Km 96.000 to Km 387.100 of widened/up-gradation from 4-Laning to 6-laning on NH-1 commences from 11 May 2009. The Project is awarded to M/s Soma- Isolux NH-1 Toll way Pvt Ltd as Concessionaire. Soma Enterprise Ltd is the EPC Contractor. During Construction Period there is huge increase in the number of accidents. Prior to start of up gradation (with four laning) during 2007 and 2008 the number of accident on NH-1 is only 433 & 408 respectively. Accidents during up-gradation of NH1” Monthly Accident data on NH1 from Km 96.000 to Km 387.100, for the years 2007 to 2011 is collected from NHAI, Ambala. Locations prone to accidents during construction/up-gradation activity are identified. The collected data were analyzed to evaluate the effect of influencing parameters on accident rate. The main objectives of the study are to minimize the number of accidents on the road and provide a safer journey to the road user, to identify the accident prone locations and suggest the measures for improvement, minimize accidents during the construction activity and to aware the workers about the safety aspects on the site during construction period.

Keywords

Accidents, Accident prone area, different locations, NH1, safety, median, side barricades, markings.

I. Introduction

NH1 commences from Wagah border at village named Atari and you have to cruise thirty kilometers in the core of Punjab to reach Amritsar from Atari. If you carry on drifting along NH1 you'll discover districts of Kapurthala, Jalandhar, Ludhiana, Sangrur and Patiala covering the highway; although the NH 1 does not proceed through these cities. The only town it passes through is Rajpura, when we set foot in the state of Haryana. The first district we encounter along NH1 is Ambala. Then, we move on through the districts of Kurukshetra, Karnal, Panipat and Sonapat. Kurukshetra city is very near to NH1. In Ambala district, when we go on NH 1, it takes us to Ambala Cantonment Junction, which is proximate to the Ambala City. After taking a lap to Sonapat, NH1 step into its last lap to reach NCR. This part of NH1 is developing rapidly and it seems like a dense chaos of concrete with multiple-storied buildings sprinkled all around.

We enter the NCR at the Singhu Border in North Delhi before getting through to Inter State Bus Terminal at Kashmiri Gate. Going further it becomes Ring Road and as we relocate down to south in the Delhi, it becomes NH 2, which takes us to Bangladesh Border in the east. The chunk of NH1 in Delhi is the tapered one and marred with encroachment and illegal settlements because of the imperfect strategy of the NCR. NH1 has been stretched into further four spurroads which are called as 1A, 1B, 1C, and 1D. NH-1A starts from Jalandhar and passes through Madhopur, Jammu, Banihal, Srinagar, Baramula and then it finally reaches Uri. Rest of the three stimulate routes are completely in the inner sides of Jammu and Kashmir. NH1 B starts from Batote, Doda, Kistwar and reaches Khanaval along with Symthan pass. NH1 C is from Domel to Katra. NH 1D Srinagar – Kargil – Leh

II. Importance

The Indian Government identifies that the expansion and development of efficient road network is one of the pre-requisites for gaining country's economy. Over the past few years, roads

have emerged as preferred mode of transport in India and statistics suggest that highways takes 60% of load and 80% of human traffic. The traffic on National Highways is estimated to grow at the rate of 8% to 10% per annum in the next few years.

The National Highways Authority of India (NHAI) under Ministry of Shipping, Road, Transport & Highways (MOSRT&H) has been entrusted with the development, maintenance and management of such of the National Highways. Under National Highways Development Program (NHDP) Phase-V Program, the Government has decided to transfigure some of the already existing four lane highways into six lane highways and these projects are to be executed by private entrepreneurs as BOT (Toll) on Design, Build, Finance and Operate (DBFO) pattern. Government of India has undertaken on the aspiring National Highways Development Project (NHDP) comprising development of the Golden Quadrilateral connecting the four metros of the country as well as the North-South and East-West Highways. National Highway-1 (NH-1) connects the national capital, Delhi and bordering Holy City of Amritsar. This is one of the major highways in India with high density traffic. Enhancing the existing four lane highway to six lanes between these two major cities is a bigger and an integral component of the Government of India's NHDP.

III. Objectives of Study

Under NHDP Phase-V Program, A Concession Agreement has been stepped on 9th May, 2008 between the National Highways Authority of India, as the "Authority" and Soma-Isolux NH One tollway Private Limited, as the "Concessionaire" for the Project of Six laning of PanipatJalandhar Section of NH-1 from 96.000 to Km 387.100 (length 291.1 Km) in the States of Haryana and Punjab, to be implemented as BOT (Toll) on DBFO Pattern.

M/s. Louis Berger Group, Inc. is appointed as Independent Engineer. M/s. Soma Enterprises Pvt. Ltd. is EPC Contractor. EPC Contract, valued Rs. 37798.6, Million is executed on 11 December 2008. Date of Completion (Date of Completion) of

the Project is 08 November 2011. For construction purpose the Project Road is divided in to five following Reaches.

- Reach 1 From Km. 96.000 to Km. 146.000 (in Haryana)
- Reach 2 From Km. 146.000 to Km. 212.161 (in Haryana)
- Reach 3 From Km. 212.161 to Km 267.600 (in Punjab)
- Reach 4 From Km. 267.600 to Km. 329.000 (in Punjab)
- Reach 5 From Km. 329.000 to Km. 387.100 (in Punjab)
- The main objectives of the study are to minimize the number of accidents on the road and provide a safer journey to the road users. To study the characteristics and causes of road accident. To identify the accident prone locations and suggest the improvement measures for improvement. To remove remedies during the construction activity and provide safety equipment to the workers. To aware the workers about the safety aspects on the site during construction period.

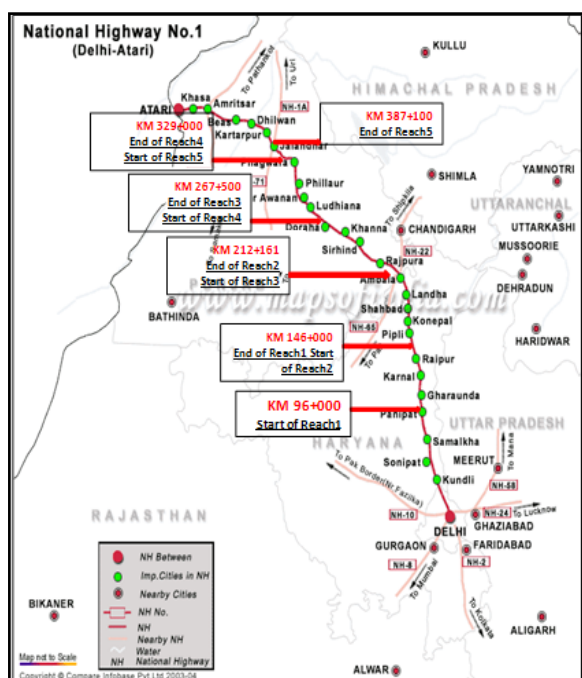


Fig. 1 : Site Map Six Laning of Panipat - Jalandhar Section of NH-1

IV. Construction Zones

This zone prepares the driver for an alert behavior and is an essential part of any traffic control system. The Traffic Control Zone can be divided into various sub-zones:

- Advance Warning Zone
- Approach Transition Zone
- Working Zone, and
- Terminal Transition Zone

Table 1. length of various zones

Average Approach Speed	Length of Advance Warning Zone	Length of Approach Transition Zone	Length of Working Zone
(km/h)	(m)	(m)	(m)
50 or less	100	50	Varies
51-80	100-300	50-100	
81-100	300-500	100-200	
Over 100	1000	200-300	

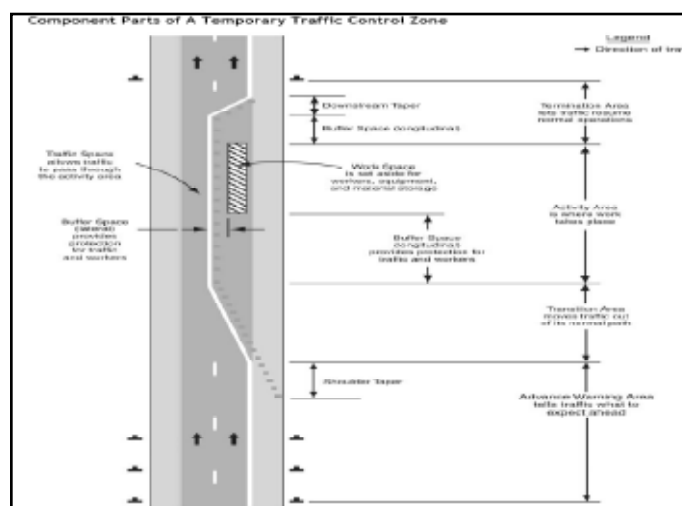


Fig. 2 : Components of a construction Work Zone

V. Accident Data During Construction On NH-1 And Its Analysis

The chainage wise, monthly accident data of NH-1 (Km 96.000 to Km 387.100) is collected from National Highway Authority of India, Ambala for the year 2007-2011. From the accident data it is observed that total numbers of accidents are 433 in 2007, 408 in 2008, 638 in 2009, 1472 in 2010 and 686 in 2011 on the stretch of national highway no. 1. It can be concluded from the figures that the number of accidents increases during the construction period (after May 2009).

The road accidents can be analyzed on several characteristics. The following characteristics are used in this dissertation work:

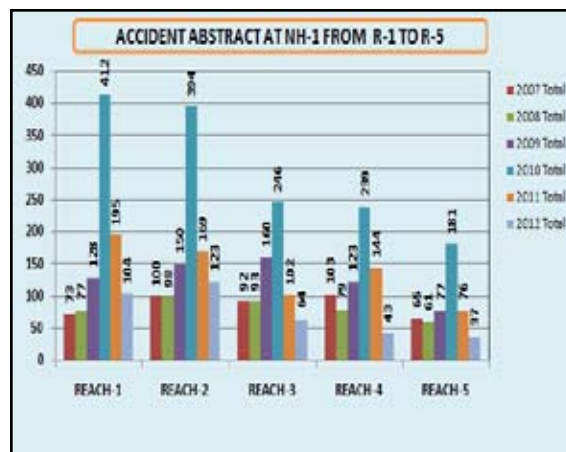


Fig.3 : Reach wise accident data on NH-1 during 2007-2011(May)

- According to cause of accident
- According to the nature of accident
- According to the type of injury
- According to the type of vehicles involved in accident
- According to time of accident

VI. Identification of Accident Prone Area

Accident data collected is analyzed. From the analysis it is observed that number of accidents increase considerably at some locations in the project during up gradation. These locations are identified and the nature and cause of accidents in general are studied. A summary of these accident prone locations is presented in Table 4.2.

Figures showing different accident prone areas by visiting sites



Fig 4 : Toll Plaza at Km 110, Poor Safety



Fig. 5 : .At Km 143.500 LHS No lane marking, Poor Sight Distance

Table 2. Major Accident prone areas.

Location	Chainage		2007	2008	2009	2010	2011
	From	To	Total	Total	Total	Total	Total
1	97.00	98.00	0	0	4	11	5
2	99.00	100.00	1	1	2	11	7
3	108.00	109.00	0	0	1	15	5
4	109.00	110.00	0	0	2	11	6
5	111.00	112.00	2	0	4	8	10
6	130.00	131.00	4	1	2	5	9

7	137.00	138.00	1	5	3	11	8
8	138.00	139.00	3	2	4	16	12
9	142.00	143.00	1	2	4	14	11
10	144.00	145.00	2	3	3	10	8
11	186.00	187.00	2	1	6	4	10
12	324.00	325.00	2	0	6	10	8
13	325.00	326.00	2	2	6	12	9
14	326.00	327.00	2	1	2	12	9
15	327.00	328.00	0	1	7	9	13

VII. Conclusion

The following are the main conclusions drawn from the study :-

- The road accident data for the years 2007-2011 for the stretch of NH-1(Km 96.000 to Km 387.100) was collected from NHA and Soma-Isolux, the agency involved in widening of NH1
- During 2010 when construction activity was in full swing on the stretch, accidents in reach 1 & 2 (Haryana portion) were more than 2.5 times and accidents in reach 3 to 5 (Punjab portion) were more than 2.0 times than the number of accidents in the previous year for the same stretch.
- On the basis of available data it is observed that 80 % cause of the road accident on the stretch is due over speeding.
- On the basis of nature of accidents it is observed that Head on collision accident is more in day time (49%) as compared to night time (42%).
- Out of total 5% accidents are fatal, 30% involve serious injuries and 49% accidents results in no injury.
- In general major cause of accidents on identified 15 sections, are over speeding, poor traffic management, diversion not prepared as per IRC- SP 55-2001, poor safety arrangement and improper channelization/arrangement for traffic at toll locations.

VIII. Preventive Measures

- The site In-charge should organize a safety program on site within a week time after commencement of work to aware the workers about safety during construction work on site.
- To provide the personal protective equipment to all workers on site, workers without safety jackets, helmets & shoes should not be allowed on the site.
- 85th percentile speed of vehicles on road. The speed limits should be clearly and adequately indicated and enforced on the road.
- Safety measures as recommended by IRC-SP-55-2001 should be put in place in the working zones. The diversion in the construction Zone should be properly provided with signage and markings
- Proper light for workers working at night with generators and flood lights.
- Provide proper first aid kit at working site.

IX. Scope Of My Study

Implementation of remedial measures given in my study in all the upcoming similar projects can reduce number of accidents.

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