RESEARCH REVIEW JOURNALS
Volume-04
Issue-01
January -2019

ISSN: 2455-3085 (Online)
RESEARCH REVIEW International Journal of Multidisciplinary
www.rrjournals.com [UGC Listed Journal]

Study of Development of Road Network In Haryana

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ARTICLE DETAILS

Article History
Published Online: 20 January 2019

Keywords
Development, Road Network, Haryana, road transportation, villages and cities.

ABSTRACT

There has been significant growth in Haryana's road transport sector since the establishment of the Haryana state. As of 2001, approximately 23 000 km of roads connect Haryana to towns and towns and neighboring states. Today over 99.88% of villages have metal roads, and the density of the road stands at around 63.8 km per 100 sq. Region of kilometers. The county, however, is experiencing very higher economic growth compared with other India states. That's why the vehicles on these available roads are high in number. According to the available information for the years 2003-2004, approximately 5763 motor vehicles are accommodated over an area of 100 km2. Although, as at 31 March 2004, there were 25, 47,910 registered vehicles, there were currently 28, 53,667 on Haryana satellite roads. This shows a considerable proportion of traffic passes through the country of Haryana. This high traffic volume could cause road accidents, leading to huge economic and human resource losses if adequate transport facilities are not available. According to statistics, in 2006-07 around ten thousand vehicles in the various part of the State participated in road accidents. Unfortunately, during that time 4,291 people were killed and 8,471 injured as a result of road accidents. This study aims at promoting and supporting the regional economic development, providing connections to all parts of the region, increasing safety and facilitating the transport of both passengers and goods through decreasing delays.

1. Introduction

The existing road network includes national roads , highways and district roads, as well as other roads. The area of study covers nine Haryana state districts, cumulatively referred to in this study as the Haryana Sub-area. The study area is covered by seven national highways. NH-1, NH-71 and NH-71 Haryana State connects northern India while NH-10 connects north Rajasthan to the study area. The NH-2, NH-8 and NH-71 B highways provide links to central and southern parts of India from the study area. The NH-1 (Delhi to Ambala), NH-2 (Delhi to Palwal) and NH-8 (Delhi to Behror) national motorway currently have a four-lanes carrier with four lanes, and NH-10 (Delhi to Rohtak) has a four lanes. Furthermore the routes are two-lane NH71 (Rewari to Rohtak), NH-71A (Rohtak to Panipat), NH-71B (Rewari-Sohna-Palwal). Details of these seven National Highways (NHs) are presented in the Table 1.

Table 1: Details of National Highways in the Sub-region of Haryana

NH No.	Name of Road	Passing through Districts within Sub-region of Haryana	Length (in km) within Haryana	Current Status (No. of Lanes)	National Highway Development Program (NHDP)	Annual Average Daily Traffic (AADT) (in PCUs)
1	Delhi-Ambala Road (Sher Shah Suri Marg)	Sonipat, Panipat,	182	4	6- lanes by the year 2012	45,699
2	Delhi- Mathura Road	Faridabad,	75	4	6- lanes by the	58,743

		Palwal			year 2015	
8	Delhi- Jaipur Road	Gurgaon, Rewari	83	4	6- lanes by the year 2012	87,737
10	Delhi- Hisar-Dabwali Road	Jhajjar, Rohtak	286	2	4- lanes by the year 2013	26,996
71	Sangrur-Narwana-Rohtak-Jhajjar-Bawal Road	Rewari, Jhajjar, Rohtak	205	2	4- lanes by the year 2013	13,835
71-A	Rohtak- Gohana-Panipat Road	Rohtak, Sonipat, Panipat	72	2	4- lanes by the year 2013	17,570
71-B	Rewari- Dharuhera-Palwal	Rewari, Mewat, Sohna, Palwal	76	2	-	31,743

On the Delhi Gurgaon section of the Haryana state in current year, the annual average daily volume of NH-8 has been found to be as high as 87 737 passenger car units (PCUs) per day. Likewise, significant amounts of traffic are found in Haryana State over NH-2 and NH-1 sections. The National Highway Authority of India (NHAI) has already undertaken a number of transport development initiatives in the region, many of which are under way. A few of the key development projects that will have a significant impact on the region's transport scenario (increasing / enhancing passenger influx), are NH-1, 2 and 8, which are divided into four lane routes by 6 lane divides in various stages of the North Highway development Program (NHDP) and NH-10, 71, 71-A and 71-B transformation from two lane divs in six years. Figure 1 indicates the composition of NH vehicles. From NH traffic compositions it is important to note that approximately 75% of all vehicles are vehicles with passengers and the remaining 25% are goods vehicles.

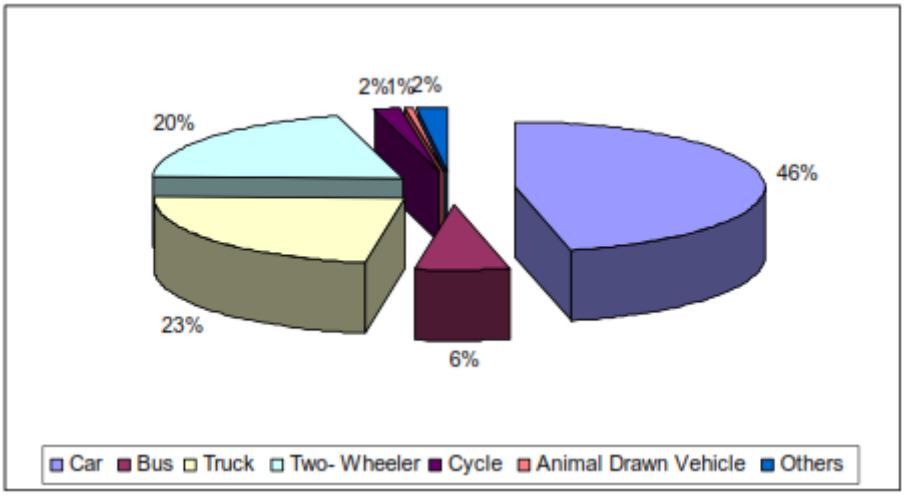

Figure 1 Traffic Composition on NHs

2. State Highways

State Highways (SH) are the major connectors between Sate Capital (Chandigarh) and District headquarters. Substantial percentages of traffic in the sub-region are being carried by the State Highways. There are twelve State Highways passing through the Haryana sub-region of NCR and details of these roads are presented in the Table 2.

Table 2: State Highways in the Sub-region of Haryana

SH No.	Name of Road	Passing through Districts within Sub-region of Haryana	Length (in km) within Sub-region of Haryana	Length (in km) within Haryana	Annual Average Daily Traffic (AADT) (in PCUs)
10	Gohana-Jind-Barwala-Agroha-Adampur-Bhadra Road	Sonipat	16.50	135.00	-
11	Meerut-Sonepat-Gohana-Assandh-Kaithal-Patiala Road	Sonipat, Panipat	86.34	175.00	36,539
13	Gurgaon-Sohna-Nuh-Alwar Road	Gurgaon, Mewat	88.25	95.00	25,011
14	Panipat-Safidon-Jind-Bhiwani-Loharu Road	Panipat	24.00	195.00	8,879
15-A	Jhajjar-Farukhnagar-Gurgaon Road	Gurgaon, Jhajjar	40.53	45.00	16,786
16	Sanauli-Panipat-Rohtak-Bhiwani Road	Panipat	18.31	62.00	39,176
16-A	Gohana-Lakhanmajra-Meham-Chang Road	Sonepat, Rohtak	52.00	68.00	11,282
18	Rohtak-Kharkhoda-Delhi Border Road	Rohtak, Sonipat	42.00	42.00	33,676
20	Murthal-Sonepat-Kharkhauda-Sampla-Jhajjar-Chhuchakwas-Jhajjar-Dadri-Loharu Road	Jhajjar, Rohtak, Sonipat	82.85	160.00	6,317
22	Bahadurgarh-Jhajjar-Kosli Road	Rewari, Jhajjar	63.72	77.00	19,172
24	Rewari-Dahina-Mahendragarh-Satnali-Loharu Road	Rewari	33.65	92.00	8,774

26	Gurgaon-Rewari-Narnaul-Singhana Road	Gurgaon, Rewari	76.64	120.00	52,180

The length of these Haryana highways is more than 60% covered by this study area. It is observed. The volume of traffic in such SHs in this area is lower than that of the traffic in NHs; however, some highways such as SH-11, SH-16, SH-26 carry a large volume. Figure 2 indicates the composition of cars on SHs.

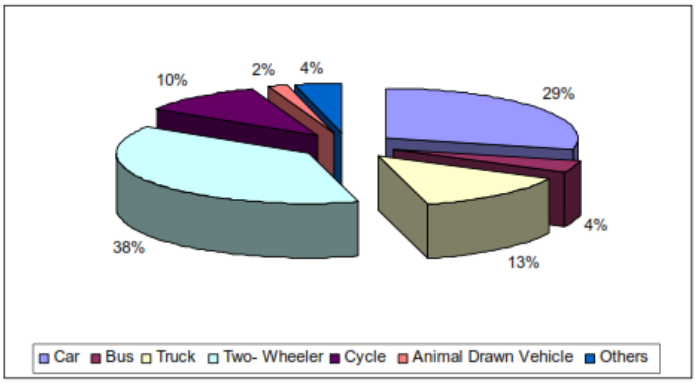

Figure 2 Traffic Compositions on SHs

For the traffic compositions for SHs and MDRs, it is important to note that nearly 80% of all vehicles are passenger vehicles, while the remainders are freight vehicles. The traffic compositions of MDRs also show that some 77% of all vehicles are passenger vehicles, and the other 23% are goods vehicles. Cars have a significant share of passenger cars, followed by two wheels. It means that the public transport sector in the NCR prefers to use its own private vehicles. The truck has a major share among goods carried by vehicles. There is a lower number of heavy industries in the NCR. Large proportions of goods transported as freight are also agricultural products, and are usually transported by lorries and trucks.

3. Level of Service on the Existing Road Network

Service level describes operational conditions in a traffic stream and how drivers / passengers perceive them. In terms of speed and time, freedom of maneuver, traffic interruption, comfort, convenience , and safety, these conditions are generally described. Six service rates are typically known, from A to F, with the best working conditions (free flow) at the service level A, while the worst is at the service level F (crash flow). In the studies network, the current lane configuration varies with 2-4 lanes. Most links within the Haryana sub-region of the national highways are currently operating at LOS-E and LOS-F. The LOS category of certain links may soon be upgraded to a higher level when the capacity increase of the links is completed as detailed in the next section. Most State roads run on low service rates within the study area network and need capacity increases. Links Panipat-Safidon-Jind-BhiwaniLoharuRoad(SH-14),Murthal-Sonepat-Kharkhauda-Sampla-Jhajjar-Chhuchakwas-Jhajjar-DadriLoharuRoad(SH-20) and Rewari-Dahina-Mahendragarh-Satnali-Loharu Road (SH-24) are operating at LOS-A. Major District Roads, Mehraul-Gurgaon-Faridabad Road (MDR-137) and Hodal-Punahana-Nagina Road (MDR-131) are operating at LOS F and LOS D respectively.

4. Condition of the roads and safety aspect

NH-10: It starts in Bahadurgarh and ends on a Rohtak bypass in the sub-region of Haryana, the Bahadurgarh-Rohtak section of the NH-10. It crosses several towns, including Bahadurgarh, Jakhoda, Asauda, Sampla, Ismaila, Kharawar, Kheri and Rohtak. The 63,49 km long road currently has two roads. In this street section there is a 2-lane bypass of the city of Sampla. There are small and large industrial facilities and some plain farmland along the stretch. It is fair to see the pavement condition. The intensity of NH-10 traffic (safe and efficient traffic) has increased and thus requires an increase of traffic capacity. The highway is a major arterial road, serving an significant amount of passenger transport from various areas, such as Haryana, Punjab, Rajasthan and Delhi, and has a high intensity of transport.

NH-71: It begins at Rohtak and ends at Bawal, in the subregion of the State of Haryana, namely, in the Rohtak-Bawal section of NH-71. The road crosses settlements such as Rohtak, Jhajjar, Rewari and Bawal. The road currently has two routes with an average speed of 40 km / h. The majot bottle necks and trigger delays in this stretch of road is Congested Rewari town and level crossings.

NH-8: This project starts in Gurgaon and ends in the subregion of the state of Bawal of Haryana. It is one of the most busy highways in the country linking several educational, industrial and tourist center regions, namely Delhi, Gurgaon, Daruhera, Bawal, etc. The stretch is now eight paths in Delhi-Gurgaon, and the stretch of Gurgaon-bawal is four paths divided and the whole stretch is white. Small and big industrial facilities are located along the stretch of land with agricultural land. There has been an rise in the traffic intensity (heavy vehicles) of the NH-8 and hence it is important to increase the ability of the existing road for safe and efficient traffic movement. The highway is a main arterial path, serving a large volume of passenger transport from different parts such as Delhi, Jaipur, Mumbai etc. The situation is very good for this stretch of road; however in Delhi-Gurgaon, there are frequent

crashes. This stretch of road has a design speed of about 80 km / h.

NH-2: The project begins in Gurgaon and ends in the Bawal state of Haryana sub-region. It is one of the busiest highways of the country connecting many areas, such as Delhi, Gurgaon, Daruhera, Bawal, and others. The stretch in Delhi-Gurgaon is now 8 paths, and the stretch is four paths, and the whole stretch of Gurgaon-bawal is white. The region with agricultural land is dominated by small and large industrial facilities. Traffic intensity (heavy cars) of the NH-8 has been increased and it is therefore important that the existing road is able to move safely and efficiently. The road is a major arterial road that transports a large number of passengers from various areas, like Delhi, Jaipur, Mumbai, and so on. For this stretch of road, the situation is very good but frequent crashes occur in Delhi-Gurgaon. The design speed is about 80 km / h for this stretch of the road.

5. Implications of the Forecasts

The following implications from these growth forecasts are highlighted:

- ♣ The roads in the Haryana Sub-region will become more congested, as the overall area becomes more highly urbanized.
- ♣ Avoid encouraging significant increases in car journey trip lengths as accessibility increases, as this result in simply more traffic.
- ♣ Need to improve and introduce significant amounts of public transport infrastructure and services, and introduce demand management techniques to reduce car use.
- ♣ Need to encourage shift of medium and long haul freight traffic onto the railways, and maximize their efficiency.
- ♣ Need to encourage and provide land use close to work, to minimize the need to travel.
- ♣ Changes to the ways in which tolls are currently charges may need to be considered, e.g. it may be necessary to charge different toll levels at different locations.

In the future there may be different characteristics in terms of changing PCUs factors for different vehicle types (as vehicle efficiency increases); there may be changed travel patterns (e.g. more inter-peak travel outside the peak times); freight movements will increasingly move towards Justin-Time delivery mechanisms.

6. Road Development Program in NCR

Existing and planned Expressways in the NCR area include:

- ♣NCR Regional Plan proposes to develop the existing Ring Road, Outer Ring Road and the five radial roads (NHs) up to the NCR towns as expressways (i.e. NH1 Delhi to Kundli, NH2 Delhi to Ballabgarh, NH8 Delhi to Gurgaon, NH10 Delhi to Bahadurgah and NH24 Delhi to Ghaziabad).
- ♣ The NCR Regional Plan also proposes that all NCR towns should be connected with each other through the Peripheral Expressway consisting of Kundli – Manesar – Palwal (KMP) Western Peripheral Expressway and the Kundli – Ghaziabad – Palwal (KGP) Eastern Peripheral Expressway (Faridabad – Noida – Ghaziabad Corridor and Ghaziabad – Kundli Corridor). These are to be implemented as a priority in the first phase.
- ♣ The NCR Regional Plan also proposes that all the Metro and Regional Centres to be connected with perimeter roads of expressway standard to act as a bypass for through traffic.
- ♣ Yamuna Expressway (Delhi – Agra): Yamuna expressway will relieve NH-2 which is already congested and runs through the heart of cities like Faridabad, Ballabgarh and Palwal. It will reduce the travel time between New Delhi and Agra and help in industrial and urban development of the region also.

7. Conclusion

One of the primary basic facilities that has to be built and sustained in order for the growing population and economy to accommodate has been the road transport network which has never been more important than in the Indian subcontinent during and after the British regime. During this time the increase in the number of city sites and reduction of rural isolations have been helped by the extension of the road , rail and airline networks in the country. The emergence of these networks has resulted in the population's unprecedented freedom of movement and is closely connected with continued economic and urban centers growth. The development process of urban centers has essentially been determined to be directed. In other words, a city is born and primarily grows in a desirable way. The transport corridors of that urban center mainly affect these directions. The development of city centers is especially influenced by inter- and intra-urban transport. This is therefore an important aspect in examining the relationship between the structure of off-road transport networks and the development in an area of urban centres. The study's main aims are to identify the development of road transport and its impact on the development of Rohtak's urban centers. Due to its central position in Haryana, the selected area is distinctive. But all the issues above were of primary concern for the government after the establishment of the Haryana state. Many Haryana state growth and development crash programs and policies were adopted. The second objective of this study is, therefore, to determine the level of development of road transport relative to other aspects, such as area and population. Population growth is related to urbanization in India. Because of this major population concentration, urban centers are found in order to become focal points and nodal centers, attracting the surrounding population. The connectivity of towns with other surrounding settlements affects its population growth. The shape and pattern of the city is always directed by the main routes of the city. In order to analyze the interrelationship between road transport network and urban processes with a special focus on urban land use of Rohtak city is also a prime objective of present study. The other objective of the study is related with connectivity and accessibility of urban centres, their level of development and their interrelationship with road transport.

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