CHAPTER-I
INTRODUCTION

The emergence of the Indian road system has been an evolutionary process of development spread over centuries. The process had begun in the past when the primitive tracks started developing into regular routes connecting the newly sprung settlements (CRRI, 1963). The Aryan, early settlers in the northwest of the Indian sub-continent developed many big towns of political, cultural and commercial significance in the belt stretching from northwest to the Ganga delta and the Bay of Bengal. Frequent cultural and commercial intercourse between these towns laid the foundation of the Northern Trunk Route traversing the whole length of the sub-continent from the east to the northwest. This route was magnificently developed and used at a later stage by the Mauryans in the 4th century B.C. as an aid to international trade and traffic, 'Rajapathas' (high road) and 'Banikapathas (merchant roads) were constructed and maintained (Ghosh, 1948). Both Megasthenes (Crindle, 1877), the contemporary Greek ambassador in India and Kautilya (Shamasasty, 1951), testify to the fact that the Mauryan rulers were great builders of roads. Special pains were taken to repair the roads (Murli and Krishna, 1950). Damaging of roads or blocking them in any manner was dealt with promptly and the punishment was meted out depending upon the relative importance of the roads. Roads were classified and standard widths was specified (Smith, 1908). In the Mauryan age, the Northern Trunk Route from the east to the northwest with its numerous offshoots had been completely developed. This route played a great role in the political and economic life of India from the Mauryan times onwards (Basham, 1954).

The major routes till the period of Harsh Vardhana in the 7th century were almost the same as they were during the 5th century. It is evident from Yaun Chwang’s account that during Harsh Vardhana’s rules the roads were maintained in good condition. The very fact that the pilgrim was able to move about freely all over India bears testimony to it. It appears that ancient road system remained badly neglected for centuries together after the fall of the empire of Harsh Vardhana in 7th century (Pannikar, 1922). The travel accounts of Al Beruni in the early 11th century mentioned a number of important routes starting from Kanauj, Mathura, Dhar, Bayana...
etc. The route from Kanauj passed through Prayaga and took a northern course reaching Tamralpiti from where turned to south running along sea coast to Kanchi and further went still deeper in the south (Chandra and Vah, 1953). Ibn Battuta throws some light on the roads of the 14th century during the reign of Sultan Mohamad Bin Tuglak. There was a good network of roads throughout the Sultan’s Kingdom. Many important roads run from the capital town of Delhi and Daultabad (Hussain, 1953).

Shershah, the great Afghan monarch revived the Northern Trunk Route in the middle of the 16th century. In the mediaeval times, major initiative to re-establish the road system after long neglect was made by him. But his major achievement lies in constructing the 'Sarak-i-Azam', about 1500 'kos' (Measurement of Distance in pre-Colonial India) in length, running the whole length of the country from the east to the northwest i.e. from Sonargaon (near Dacca) to the Indus connecting the important towns falling in between. It was more or less, the revival of the Royal Road or 'Raj Marg' of the Mauryans. It was so laboriously metalled with 'kankar' that it remained in a good condition for long after his time. The modern Grand Trunk Road, more or less, follows that old track (Qanungo, 1921).

The road system developed by the Mughals laid the foundation of present road system. Most of the Mughal roads were mechanized, well maintained and surfaced afterwards. The important routes during the Mughal time were: Patna-Kabul, Delhi-Surat, Delhi-Golconda, Golconda-Bijapur, Bijapur-Ujjain and Surat-Masulipatanam. A big treasure of information is contained in ‘Chahar Gulshan’ which was composed in 1759 A.D. by Rai Chatarman. Other sources are the account of foreign travelers namely Bernier, Tanernier and Mannucci. The Mughal Empire was extended over almost whole of the Indian sub-continent barring the extreme south and also included the province of Kabul in the north-west of India. The whole empire was well knit with military roads (Sarkar, 1902).

Roads under The British rule were in bad shape till the end of the 19th century. The East India Company did nothing during the early period of its rule to improve upon the shattered condition of the communications (The Imperial Gazetteer of India, 1907). There was a general lack of interest in road development and whichever roads existed they remained only badly neglected (Mac George, 1894). Only those roads which were absolutely necessary for the control of newly acquired territories were
kept open by regular reconstruction. For the first time, reforms in the matter of public road construction were inaugurated during the governor-generalship of Lord William Bentinck from 1828 onward (Chesney, 1894). However, Lord Dalhousie (1845-56) appreciated the need for improved communications. During his governor generalship, construction on numerous trunk routes was commenced. Among more important of such routes were the construction of road from Hindustan to central Asia and the bridging and metalling of the Great Deccan Road. Roads were also constructed in Pegu (Burma), Sind and the Punjab (Edward and Balfour, 1885). Perhaps, the biggest achievement in the field of road construction during the 19th century was the completion of the traditional Grand Trunk Road from Calcutta to Peshawar with a total length about 1500 miles. The introduction of railways and the institution of local bodies further influenced the road development in the country (CRRI, 1963). The development of railways resulted in the neglect of the country’s trunk road system. The roads were left completely unattended and no efforts were made to reconstruct or improve them. During and after the World War 1st, there was a tremendous pressure of motor transport on the Indian roads. The roads started deteriorating fast (MOTC, 1949).

During the post-war years there arose a great demand for better and more roads to cope with the increased vehicular traffic throughout the country. The Government of India appointed "The Road Development Committee" popularly known as the ‘Jaykar Committee’ in 1927 (RDC, 1928). It is major landmark in the history of road in India. The Committee was emphatic regarding the inadequacy of the Indian road system and urged that further development of the system was desirable for the general welfare of the country as a whole (MOTC, 1962). As a sequel to the Jaykar Committee recommendation, The Indian Road Congress came into being in April, 1934 (IRC, 1960), which convened a conference of chief engineers at Nagpur in 1943. It was the first time, at this conference, that the question of road development was considered comprehensively and in a scientific manner. A long term plan, popularly called the Nagpur Plan envisaged the construction of new roads besides the improvement of some existing ones (IRC, 1943). The plan classified the roads into four classes:

i. National Highways
ii. Provincial or State Highways

iii. District Roads

iv. Village Roads

From 1919 to 1947, the provinces remained solely responsible for the construction and maintenance of all roads. Under the new constitution of India, the national highways were made a central subject, and the central government had statutorily taken over the roads classified as national highways, vide the ‘National Highways Act, 1956’. For the execution of national highway scheme the central government created the roads wing in the department of transport, which as per suggestion of Nagpur conference was made responsible for co-ordination and control, standard and specification, setting priorities, general administration and inspection. Nagpur plan covered the period from 1943 to 1961 and laid the foundation for the functional classification of road network and criteria for road connectivity in developed and undeveloped area of our country (CRRI, 1963). This was followed by two more 20 year road development plans covering the periods 1961-81 (MOTC, 1958) and 1981-2001 popularly known as Bombay Plan and Lucknow Plan, respectively. These plans have served as sound reference framework for the central and the state governments to formulate the further road plan (IRC, 1984). The government of India changed the development strategy in 1991 by introducing a series of reforms and structural changes with a view to integrating it with the global market and economy. The areas which were traditionally the domain of the public sector were thrown open to private sector. The rationale was that while the government provides a strong policy and regulatory leadership, the private sector would bring in dynamism and efficiency of the competitive environment. In view of these developments “Road Development Plan: Vision 2021” was prepared in 2001 by the Ministry of Road Transport and Highways (MORTH), Government of India (IRC, 2001).

The National Highways Network of India

The national highways are the backbone of the road infrastructure and the major roads in India. These are main highways running through the length and breadth of the country connecting major ports, state capitals, large industrial and
tourist centers etc. National highways form the economic backbone of the country and have often facilitated development along their routes, and many new towns have sprung up along major highways. India has 70,934 km of national highways till August, 2011. Most of these are two lanes. About 10,000 km have been widened to four lanes with two lanes in each direction and some to six or eight lanes. National highways constitute about 2 per cent of entire road system in India, but carry about 40 per cent of the total road traffic as in 2010. Approximate nineteen thousand kilometers of national highways were still single-lined roads till 2010. Some sections of the network are toll roads. About 30,000 km of new highways are planned or under construction as part of the national highways development project, as in 2011 including 2,600 km of expressways currently under construction. The National Highways Development Project (NHDP) is a major effort to expand and upgrade the network of highway. The government is currently working to ensure that by December 2014 the entire national highway network consists of roads with two or more lanes. India has the distinction of having the world's second highest-altitude motor highway Leh-Manali Highway, connecting Shimla to Leh in Ladakh, Kashmir (NHAI, 2012).

National highways network of India is a network of highways which is managed and maintained by national agency of the central government namely National Highway Authority of India. The National Highways Authority of India (NHAI) constituted in 1988 and became operational in 1995 is the nodal agency responsible for building, upgrading and maintaining most of the national highways network (NHAI, 2003-04). It operates under the Ministry of Road Transport and Highways (MORTH). The NHAI often uses a public-private partnership model for highway development, maintenance and toll-collection (Government of India, 2004-05).

Recent Developments

During the premiership of Prime Minister Atal Behari Vajpayee, India launched a massive program of highway upgradation, the National Highways Development Project (NHDP), under which the main north-south and east-west connecting corridors, and highways connecting the four metropolitan cities have been
fully paved and widened into four-lane highways. Some sections of the busiest national highways have been converted to four or six lane expressways including: Delhi-Agra, Delhi-Jaipur, Ahmedabad-Vadodara, Mumbai-Pune, Mumbai-Surat, Bangalore-Mysore, Bangalore-Chennai, Chennai-Tada, Delhi-Meerut, Hyderabad-Vijayawada and Guntur-Vijayawada. Phase-V of the national highway development project envisage the conversion of 6,000 km golden quadrilateral highways to 6-lane highways or expressways by 2012. The National Highways Act, 1956, as amended, provides for private investment in the building and maintenance of the highways. Recently, a number of existing roads have been reclassified as national highways. Bypasses have also recently been constructed around larger towns and cities to provide uninterrupted passage for highway traffic. The hugely varied climatic, demographic, traffic and sometimes political situation in India, results in national highway being single lane in places with low traffic to six lanes in places with heavy traffic. National highways are being upgraded or are under construction (NHAI, 2012).

National Highways in Haryana

In Haryana railways and roadways are the major means of transport. On November 1, 1966 when the new State of Haryana came into being, the road length was 6,137 km (5,321 km metalled roads and 816 km unmetalled roads), which increased to 23,480 km (23,098 km metalled and 382 km unmetalled roads) in 2003-04 (Statistical Abstract Haryana, 2003-04). Total length of national highways in Haryana was 767 km in 1966-67, which increased to 1349 km in 2003-04 (Government of India, 2009). Presently, 15 national highways with a total length of 1512 km pass through different parts of the state (NHAI, 2012).
Present research work is restricted to the study of the characteristics of four selected National Highways, which pass through the length and breadth of the state. These includes:-

- National Highway-1
- National Highway-2
- National Highway-8
- National Highway-10

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<th>Sr.No.</th>
<th>NH No.</th>
<th>Route</th>
<th>Length (Km)</th>
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<tr>
<td>1</td>
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<td>From Delhi border-Kundli-Murthal-Samalkha-Panipat-Karnal-Pipli-Shahbad-Ambala-upto Punjab border</td>
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<td>2</td>
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<td>From Delhi-Faridabad-Ballabgarh- Palwal-Rundhi-Hodal-UP Border</td>
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<td>3</td>
<td>8</td>
<td>From Delhi Border-Gurgaon- Dharuhera- Bawal- Rajasthan Border</td>
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<td>4</td>
<td>10</td>
<td>From Delhi Border-Bahadurgarh-Rohtak-Maham-Hansi-Hissar-Agroha-Bodopal-Fatehabad-Sirsu-Odhan-Dabwali-Punjab border</td>
<td>313</td>
</tr>
<tr>
<td>5</td>
<td>21A</td>
<td>Pinjaur-Karapur upto H.P. Border</td>
<td>16</td>
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<td>6</td>
<td>22</td>
<td>Ambala-Panchkula-Chandi Mandir-Pinjaur-Kalka-H.P. Border</td>
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<td>64</td>
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<td>71</td>
<td>From Punjab Border-Narwana-Jind-Julana-Rohtak-Digital-Jhajjar-Gurgaon-Rewari-Rajasthan Border.</td>
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<td>71A</td>
<td>Rohtak-Gohana-Irsana-Panipat</td>
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<td>11</td>
<td>71B</td>
<td>Rewari-Dharuhera-Taoru-Sohna-Palwal</td>
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<td>72</td>
<td>Ambala-Shahzadpur-Narayangarh-Kala Amb- upto H.P. Border</td>
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<td>From U.P. Border-Yamunanagar-Mulana-Saha-Raipur-Panchkula</td>
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<td>14</td>
<td>73A</td>
<td>Yamunanagar-Jagadhri-Mustafabad-Ledi--Darpur- upto H.P. Border</td>
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<tr>
<td>15</td>
<td>NE2</td>
<td>Eastern Peripheral Expressway (Under Construction)</td>
<td>44</td>
</tr>
</tbody>
</table>

**Sub Total**: 1512

National Highway-1

NH-1 traverses in Northern India and links the National Capital, New Delhi to the town of Attari situated on India-Pakistan border. The total length of NH-1 is 456 km; it passes through Haryana from Singhu (Kundli) border (Delhi) to Sambhu border (Punjab) covering a distance of 180 km. It passes through five districts of the state Sonipat, Panipat, Karnal, Kurukshetra and Ambala (NHAI, 2012). This national highway is a part of Grand Trunk Road (G. T. Road). The foundation of this great Northern Trunk Route was laid by the Aryans in the remote past and further developments were made by the Mauryan kings in 4th century B.C. For centuries together this route remained neglected until it was again revived by Sher Shah Suri some time near, 1540. It was the government of Warren Hastings in the modern times which started the development of this magnificent early work (The Imperial Gazetteers of India, 1907.) National Highway Authority of India divided it into two parts, north of Delhi, called NH-1 and south of it, called NH-2. This is one of the longest and oldest highways of India (NHAI, 2012).

National Highway-2

NH-2 links the National capital New Delhi to Dankuni the outskirts of Kolkata (NHAI, 2005). It is a busy national highway that runs through the states of Delhi, Haryana, Uttar Pradesh, Bihar, Jharkhand and West Bengal. It comprises a major portion of the historical Grand Trunk Road, with a total length of 1465 km including Delhi (12 km), Haryana (74 km), Uttar Pradesh (752 km), Bihar (202 km), Jharkhand (190 km), and West Bengal (235 km). It passes through Haryana from Badarpur border (Delhi) to Karwan border (Uttar Pradesh) covering a distance of 74 km. It passes through Faridabad, Ballabhgarh, Palwal and Hodal (NHAI, 2012).

National Highway-8

NH-8 connects the Indian capital city of New Delhi with the Indian financial capital city of Mumbai. It passes through the state capitals of Gujarat and Rajasthan i.e. Gandhi Nagar and Jaipur, respectively, and some other important cities like Gurgaon, Ahmedabad, Surat and Vadodara. The total length is 1,375 km (MORTH, 2012). It passes through Haryana from Kapushera (Gurgaon) to Jai Singh Pur Khera (Rajasthan), with a distance of 101 km. This highway is part of the golden quadrilateral
project undertaken by NHAI and was the first part to be completed. The Delhi-Gurgaon expressway and national expressway-1 are the part of NH-8. Before entering downtown Mumbai, NH-8 passes through nearly all suburbs on the western line of Mumbai Suburban Railway, where it is popularly known as western express highway (NHAI, 2012).

National Highway-10

NH-10 is a national highway with length 403 km (MORTH, 2012), limited in northern India which originates from Delhi and ends in the town of Fazilka in Punjab near the Indo-Pak Border. It passes through Haryana from Tikri border (Delhi) to Mandi Dabwali border (Punjab) covering a stretch of 313 km long. Bahadurgarh, Rohtak, Hissar, Fatehabad, Sirsa, and Mandi-Dabwali are the prominent cities of Haryana on this highway (NHAI, 2012).

Passenger Facilities

A Historical Perspective

Nothing can be said about the routes laid down by the pre-historic people of India. It was during the Aryans near about, 1500 B.C. when the foundation of Northern Trunk Route traversing the whole length of the sub-continent from east to the north-west was laid, but no attention to passenger facilities was paid (Archaeological survey of India, 1947). Supply of water and shade on the highways were the concern of the government. Trees were planted, wells were dug and rest houses provided for travellers' comforts (Murti and Krishna, 1950). For the comfort of travellers the roads were provided with shady trees on both sides. Sometime fruit trees and medicinal herbs were also planted. Under the Mauryans, wells at regular interval were provided for the supply of drinking water and rest houses constructed. A strict vigilance on the highways was kept to check highway robbery. Instructions were laid down that the ‘sarai’ or rest house for travelers were to be built strong and provided with tanks (Basu, 1914). Rules for the driving of vehicles to ensure the safety of passers-by were in force. Pillars, which served as milestones and signposts, were erected at regular intervals of half a 'kos' on major roads (Smith, 1908). The main source of information on roads and roadside facilities under the Guptas dynasty are the travel account of Fa-Hien a Chinese pilgrim who visited India about 405 A.D. He
was much impressed by the security and comfort provided to the travelers (Law, 1944). State of roads and roadside facilities during the reign of Harsh Verdhana in the 7th century was described by another Chinese pilgrim, Yuan Chwang. It is evident from Yuan Chwang’s accounts that there was full security of the travellers as the pilgrim was able to move about freely all over India (Panikkar, 1922).

The travel account of Al-Bruni in early 11th century throws some light on the condition of roads during this period but made no mention of passenger facilities (Chandra and Vah, 1953), while Ibn-Battuta described that the important roads were provided with tree plantations on both-sides, rest houses, postal stations and ‘bains’ (step wells, which were source of water supply for the travellers) at regular intervals in the 14th century. He also observed pillars on roadside serving the purpose of the modern milestones indicating the distances. The road from Delhi to Daultabad was bordered with willow trees in such a manner that “a man going along it feel as if he is walking through a garden” (Hussain, 1953).

Sher Shah Suri realized the importance of roads for defence, consolidation and better administration of his newly won kingdom and following the footsteps of the ancient Indian kings, he constructed many roads. In addition, he did whatever was possible to provide comfortable travel on the roads. Shady trees were planted on both sides of roads. As many as 1700 sarais were built at short distance and kos-minars (pillers) were erected. Sher Shah Suri also standardized the measures of distance. The ‘Sikandri Gaz’ commonly used by him, remained popular for a long time after his death. ‘Tarikh-I-Shershahi’ contains an account of some important roads constructed by him (Qanungo, 1921). Sher Shah Suri’s strict enforcement of law and order and his action in holding village headmen responsible for the highway robbery and murder reduce the dangers involved in travel and thereby stimulated trade (Sarkar, 1902). Under the Mughals, provincial governors and district officers were made responsible for the safety and improvement of roads, but the principal burden of protecting travellers and merchant from robbery and harassment fell on the zamindars (Landlords), who were required to appoint guards and other official to look after them. Jahangir (1605-1627) ordered zamindars to plant trees on the route between Agra and Attock on the Indus, and between Agra and Bengal. In 1641 zamindars possessing land along road between Agra and Lahore were order to erect a milestone
every kos (2 miles) and dig a well every three kos. In this way, milestones, wells, reservoirs and sarai (Inn along with highway) were provided along the roads, while attendants were employed to keep the sarai clean and habitable. These facilities and shade of the trees lessened the discomfort of long journeys, some of which lasted for months (Farooque, 1977). Under British rule there was no endeavor towards provision of passenger facilities (Edward and Balfour, 1885).

**Passenger Facilities after Independence**

The badly deteriorated condition of the Indian roads under the impact of heavy war-time traffic during Second World War (1939-1945) called for immediate attention and consequently, at the instance of the Indian Road Congress, Nagpur Plan (1943-1961) was prepared (IRC, 1943). After this two more plans i.e. Bombay Plan (1961-81) and Lucknow Plan (1981-2001) were prepared (IRC, 2001). As regard the passenger facilities, there is no mention of these in Nagpur Plan (1943-1961) as well as in Bombay Plan (1961-1981). The government was totally negligent and altogether ignored this aspect of road development. Thus, there was no systematic growth of passenger facilities even after four decades of independence. These grew rather haphazardly and spontaneously according to the necessity and requirement of time and space. It was only the Lucknow Plan (1981-2001) which gave serious consideration to this aspect of the road development. It recommended that the environmental qualities of roads and the area through which they pass must be maintained and improved. The environmental impact statement be prepared for national highway system and an action program be initiated to remedy the situation where the environment quality is unacceptable. Road safety measures must be undertaken to contain and even bring down the level of road accidents (IRC, 1984).

In view of these recommendations, the central government started taking notice of this aspect of road development. The haphazard growth of shacks and service shops along the highways has already caused a visual intrusion and unhealthy and unsanitary condition. This situation calls for the immediate solution by way of properly planned wayside amenities for the highway users. Central government took the initiative and prepared various scheme for the purpose and directed the state governments and union territories vide letter no. R.W./NH-11052/3/97-DI on dated 31st December, 1997 that hence fourth in all national highway projects being funded
through the aid from the multi-lateral agencies i.e. World Bank etc. or being developed by the private sector, provisions must be made for passenger oriented wayside amenities at every 50 km of national highway. Again stressing this necessity of provision of passenger oriented wayside amenities along national highways, the governments vide its letter no. R.W./NH-34032/4/91-DO-III dated 3rd April, 1998 sent broad guidelines for the selection of sites for passenger oriented wayside amenities along national highways and directed the concerned authorities that the wayside amenities should be so planned as to allow phased development, subject to the minimum stipulated scale of facilities being provided in first instance (Government of India, 1998).

It was during this plan (Lucknow Plan, 1981-2001) that government fund was earmarked for financing these facilities. As a result of introduction of fundamental change in development strategy in 1991, the government made a series of reforms and structural changes with a view to liberalizing the economy and integrating it with the global market and economy. Inward oriented trade policy gradually yielded place to an outward looking export oriented performance. It recommended that, provision of wayside amenities with facilities like parking lots, drinking water, toilet, snack bars, dhabas, restaurants, rest rooms, petrol pumps with service and repair and communication facilities should become integral part of roads modernization. These facilities should be provided and run by the private sector that may be encouraged and supported by the government. Steps shall also be taken for providing highway police petrol, medical aid posts and arrangements for tow truck service to remove accidental vehicle from the site and provide immediate medical attention to victims. It is also recommended that, a comprehensive highway act needs to be enacted by center and the state for efficient land and traffic management including effective control on ribbon development and prevention of encroachment to cover roads under their respective jurisdiction. The highway authorities should be made responsible for encroachment (IRC, 2001). Thus, it is quite evident that the central government is quite serious about the regulating the increasing volume of traffic on national highways and providing wayside passenger facilities to the highway users since the introduction of economic reforms in 1991.
**Conceptualization**

Development of highway serves several purposes. These are the arteries through which goods are transported from surplus to deficit regions. These are the corridors of economic development as well as social and cultural change. The network of highways knit together different parts of the country. These are also important for strategic reasons. The roadside passenger facilities are in direct proportion to highway development. The more volume of vehicle, the more is growth of these facilities. The density of these facilities does affect the socio-economic and cultural aspect of the surrounding communities.

Roadside amenities are established primarily to meet the needs of long distance travellers and are aimed at reducing fatigue related crashes whilst enriching the total travel experience. Roadside amenities can reduce fatigue-related crashes in two ways. First, stopping and resting at regular intervals while driving has been shown to reduce driver fatigue, with a subsequent reduction of single vehicle and fatigue related crashes. Secondly, by providing facilities for travelers to stop clear of traffic, collisions with stopped vehicles can be minimized (Road Planning and Design Manual, 2002). Such spots will also help to alter the behavioral psychology of the drivers. There is an urgent need for extensive development of roadside amenities on roads carrying high-density traffic, especially on corridors of tourist interest. With the increase in upgradation of national and state highways network in the country, long distance travel on the roads is bound to increase tremendously. Consequently, there would be demand for more and better quality wayside amenities. The various stakeholders are required to understand the importance of providing such amenities and private entrepreneurs must come forward to finance and manage the roadside amenities along the roads in our country (Indoria, 2009). Thus, the development of highways and passenger facilities raise many questions like;

1. Why we need to develop national highways and passenger facilities?
2. What are the driving forces of the growth of passenger's wayside facilities?
3. Who is responsible for providing these roadside facilities at the national highways?
4. Whether government is liable to ensure the minimum wayside facilities?
5. What is the spatial pattern and occurrence of growth of various passengers’ facilities?
6. What are the functional characteristics of these facilities?
7. Who are the owners of these facilities?
8. Are they local people or businessmen from big cities?
9. What are the characteristics of staff employed on wayside facilities?
10. Are the users of these wayside facilities satisfied?
11. How do they affect the land values of the adjoining areas?
12. How do they affect the economic development of the surrounding area?
13. What is the impact of large number of vehicles plying on these highways and of growth of passenger facilities on physical environment of adjoining area?
14. What is their impact on socio and cultural aspects of local communities living in the vicinity?

Objectives

The main objectives of the present study are:

1. To analyse the spatial pattern and process of the development of passengers oriented wayside facilities along selected national highways in Haryana
2. To describe the functional characteristics of passengers oriented wayside facilities
3. To assess the satisfaction level of highway users
4. To examine the impact of passenger oriented wayside facilities on local communities and surrounding areas

Hypotheses

Following hypotheses are to be tested in the study:

- The more the density of passengers on a national highway the more passengers’ oriented wayside facilities are expected to be developed on either side.
- The number of services and their qualities mainly depend on economic and social environment of the region. Therefore, quality and number of services are expected to be better along highways that passing through economically and socially developed regions.
• Most of the passengers oriented wayside facilities and services require large investment so they are expected to be owned by elite section or businessmen of big urban centers like Delhi and Chandigarh.

• Because highway provides cheap and efficient mode of transport therefore, the competition for land may increase the land values in the adjoining area.

• These facilities like food-joints, filling-stations, recreational centers, rest houses, shopping complexes and the like provide jobs opportunity to the local people. Therefore, it is expected that there will be occupational shift in the area. It may change from agriculture to secondary or territory activities.

• Emergence of food joints along highways which require large amount of water are expected to negative affect on the level and quality of ground water of adjoining areas.

• Highway provides efficient mode of transport used by large number of passengers of different background. It is expected that there will be encouragement to burglary, theft, murder, drug trafficking and the like.

Characteristics of the Study Area

The state of Haryana came into existence on November 1, 1966. It touches Himachal Pradesh in the north, Delhi and Uttar Pradesh in the east, Rajasthan in the south and Punjab in the west. It encircles Delhi from three sides. It is located between $27^0 39'0"$ to $30^0 55' 5"$ north latitudes and $74^0 27' 8"$ and $77^0 36' 5"$ east longitude. The state occupies the $17^{th}$ position in the land area and ranks $16^{th}$ in the population among the states of the country. The state has 42,212 sq. km. area.

Relief and Drainage

The altitudes of the Haryana state vary from 250 metres to 1500 metres above sea level. It is a plain area except the Siwalik Hills in the north and the Aravalli hills in the south. The whole Haryana can be divided into four distinct zones viz: The Siwaliks and foot hills of Himalyas, the plains, The Aravalli hills and the semi-arid and sandy plain of southwest. The plain region of the state can be further sub-divided into eastern and western regions on the basis of aridity by 50cms isohyets. The western plain has a dry climate, steppe vegetation and sand dunes of various types. The eastern plain extends from 50cms isohyets up to Yamuna River. The entire plain area has a fertile, light and loamy soil. The northern hilly region of the state belongs
to Siwalik system of recent origin. It consists of coarse grains pebbles and clay. The Aravalli range is a narrow ridge spreading about 90 km into Haryana, in the northeast and southwest direction up to Delhi.

Though the region is apparently rich in rivers, its greater part suffers from a lack of perennial rivers and a very inequitable distribution of the drainage channels. The Yamuna, The Sarswati, The Ghaggar The Markanda, The Sahibi are the main rivers. The Yamuna is the only perennial river and has its source in the snowy region of Himalayas. The Markanda, The Ghaggar, The Sahibi and the like are the seasonal rivers (Singh, 1997). A network of canals has been developed to fulfill the requirements of irrigation. Prominent among them are western Yamuna canal, Narwana branch, Agra canal and Sutlej-Yamuna Link canal (SYL).

**Soils**

Soil is alluvial in the plains. It varies from sandy loam, silt loam to red clay. In the river terraces, the soil is excessively drained due to the presence of boulders. Plains including the sandy plain are parts of the Indo-Gangatic Plain of recent to Pleistocene age. In northern Haryana, the Yamuna and the Ghaggar rivers bring down alluvial deposits. Soil in these areas varies from sandy to clay loam. In the Central plain, the soil is deep alluvial with marked variations in physical and chemical characteristics.

**Natural Vegetation**

Due to over exploitation and urbanization the natural forest in the state is on decrease. The forests are converted into cultivated land. It is reported that previously total forest area was 1360 square km or 30.8 per cent of the total geographical area. Haryana is basically an agricultural state and most of the land is under cultivation. Therefore tree-covered area has been reduced to 8 per cent of the geographical area. The forests in the southwestern regions are of tropical thorn type while in the central zones, which are hot and semidry, the tropical dry deciduous scrap types are found. The hill forests in the Siwaliks are concentrated in the districts of Ambala and Yamuna Nagar.
Fig. 1.1

Source: State Natural Resources Data Management System (NRDMS) Centre, HSCST, Chandigarh, 2001
Climate

The climate of Haryana is tropical semiarid Monsoon brings rain from July to September and from October to June; the weather remains dry except for a few showers received from western disturbances. Rainfall is generally decreases from north to west. The sub-montane tract receives on an average, above 75cm of rainfall annually while in the extreme southwest it decreases to less than 40cm. There are great variations in the temperature. During summer season it rises above 40°C (Singh, 1997).

Population

Haryana is a small state with total area of 42,212 sq. km. In 2011 its population was 2,53,53,081 persons (male: 1,35,05,130 and female: 1,18,47,951). It is densely populated state with 573 persons per sq. km. Density of population is low in western part as compare to the eastern khadar belt. This is due to comparatively better carrying capacity of soil, efficient network of transport and development of industry in eastern part. Haryana has very low sex ratio i.e. 877. The state has 76.64 per cent literacy rate. There is marked difference in the literacy rate of males and females. It is 85.38 per cent and 66.77 per cent, respectively. Though economically it is a leading state but because of predominantly agricultural economy and rural population, literacy rate is low. This is because there is no functional value of literacy in agriculture. About 65.21 per cent of its inhabitants are living in rural areas as compare to 34.79 per cent in urban centers. It is one of the fastest growing states with a growth rate of population of 19.90 per cent. Migration from other states to carry industrial and agriculture operations is one of the factors for high growth apart from low literacy of females and their low social status (Census of India, 2011).

Agriculture

The regional economy is dominated by agriculture, which together with the allied activities forms the most important source of employment and revenue. The importance of agriculture in the economy of region can be visualized by the fact that 65.25 per cent of the people reside in villages. There are two main cropping seasons:
The *Kharif* (May-June to September- October) and the *Rabi* (October- November to April-May). The major *Kharif* crops are *bajra*, maize, *jawar*, cotton, paddy and sugarcane. Among the *Rabi* crops wheat gram, barley, and mustard are notable. (Singh, 1997)

**Industrial Economy**

The region is deficient in minerals resources, especially the two basic minerals-coal and iron, and being largely agricultural, lacks the basic ingredients for the development of large-scale industries. In fact before independence industrial development was rather on a modest scale. There were only 1,270 registered factories in 1966, which had employed 71,016 workers. In 2003, the number increased to 9,047 and 5, 52, 924 respectively (Statistical Abstract of Haryana, 2003-04 p 371). Presently, Haryana produces wide spectrum of industrial goods. It is the largest producer of passenger cars, tractors, motorcycles, bicycles, refrigerators, scientific instruments etc. The state has more than 400 big industrial units having foreign collaboration (Statistical Abstract of Haryana, 2002-03). The specialized industrial centers in the state includes Ambala (scientific instruments), Yamunanagar (metal ware and timber industry), Kurukshetra and Tarawari (rice), Karnal (agriculture implements), Panipat (Handloom and Textiles), Panchkula (machine tools), Sonipat (bicycles), Faridabad (tractors and refrigerators), Gurgaon (automobiles and IT industry), Rewari (brassware and television), Bahadurgarh (sanitary ware) and Narnaul (marbles) (Statistical Abstract of Haryana, 2003-04, p 38).

However, the present study is aimed at analyzing the growth process, spatial pattern, characteristics, impacts and satisfaction level of uses with respect to passenger oriented wayside facilities located along the selected national highways 1, 2, 8 and 10 in Haryana.

**Organization of the Study**

The present study is organized into seven chapters. Chapter one deals with introduction of the study, conceptualization, objectives, hypotheses, and characteristics of study area and organization of the study. Chapter second describes
research methodology of the study, which includes research design, database, and selection of samples of passenger oriented wayside facilities. Third chapter discusses review of literature. Fourth chapter analyses growth process and spatial pattern of passenger oriented wayside facilities. Characteristics of passenger oriented wayside facilities are discussed in chapter fifth. Chapter sixth study the satisfaction level of highway users with respect to passenger facilities and the impact of the development of the passenger oriented wayside facilities on local area and communities living in its surroundings with respect to physical, socio-cultural and economic effects. Chapter seven discusses the conclusions and suggestions of the study.