Chapter No. 01:

Introduction.

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**Introduction:**

Roadways of India has helped enhance the productivity of certain areas and contributed to the evolving of a more competitive infrastructure and economy on a world level. Road transport in India or roadways transport contributes to 60 per cent freight or cargo transport and 80 per cent passenger transport of India.¹ These include roadways buses, roadways express services, transport both public and commercial systems and others. Special buses of Indian roadways equipped with automated speed enforcement systems are gaining popularity and also the attention of various state governments owing to the rising cases of road accidents due to uncontrolled speeds of the roadways transport.

The foundation of the road dates back to about 2000 years ago during the reign of the Mauryas. Sher Shah conceived the *Sadak-e-Azam* in the 16\textsuperscript{th} century, as it was then called, for military and administrative reasons and to link the remotest provinces in his empire that spread across the subcontinent. It literally bound the subcontinent for centuries and acted as a major commercial link with other parts of the country. During the British rule a slight realignment was made in the route between Kolkata and Varanasi, otherwise the road remains the same. The history of roads in India takes you back to the Indus Valley Civilization, where street paving were made for the first time in India. Around the 1\textsuperscript{st} century, the *Silk route* was made
which tremendously aided in trade across India. The medieval India saw the emergence of the **Grand Trunk Road**. The GT Road, as it is famously called, starts in *Sonargaon* near *Dhaka* in Bangladesh and ends at Peshawar in Pakistan and links some of the major cities in India from Kolkata to Amritsar.²

Road Communication plays a crucial role in promoting economic, social and cultural development of a region. Their importance has always been recognized and found from the history that once road communication is given the development of civilization, their quality and quantity have improved significantly. Thus, the road is one of the great fundamental institutions of mankind. History dates back to the dawn of recorded history and behind. Its beginnings are almost instructive with man’s first quest in search of food, water, plunder or sheer adventure. It develops with man’s advance; it retrogrades with the break-down of a social order. A people without roads would be a people without intercourse with the outside world without the attributes of civilization.³

**Importance of Road Transport:**

The transport system helps in expanding the market for goods and by doing so, it aids reaping the benefit of division of labour and thereby large-scale production. It is essential for the movement of raw materials, fuel, machinery etc., to the places of production. The more extensive and
continuous the production in any sector, the greater will be
the need for transport facilities. India has an extensive road
network and provides amenity to millions of people every
day, thus road transport is one of the important ingredients
for the social and economic development of the country.
India has the third largest road network in the world
stretching 3.32 million kilometers in length. According to
the World Bank, national highways in India constitute a
length of close to 70,748 km, which is a mere two percent of
the road network, but carry about 40 percent of the total
road traffic in India. The significance of transportation is
relative to the economy and the population of a country;
India being the world’s second fastest growing economy and
being the second largest populated, transportation plays a
crucial role in its economic development and sustainable
growth. In the transportation sector, road transport has
emerged as a dominant segment with a share of 4.8 percent
in India’s Gross Domestic Product (GDP) in 2008-09.\textsuperscript{4}
### Table No. 1.01:

**Share of Different Modes of Transport in GDP**

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<tr>
<td>As percentage of GDP (at factor cost and constant prices)</td>
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<td></td>
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<tr>
<td>Transport of which:</td>
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<td></td>
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<td></td>
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</tr>
<tr>
<td>Railways</td>
<td>1.2</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Road Transport</td>
<td>4.3</td>
<td>4.8</td>
<td>4.8</td>
<td>4.8</td>
<td>4.7</td>
<td>4.8</td>
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<tr>
<td>Water Transport</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
<tr>
<td>Air Transport</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Source: Road Transport Year Book (2007-09)

1. Road Transport contributes in growth of industries whose product requires quick marketing. Perishable products, such as fish and green vegetables are carried to various consumers quickly even in distant markets through transport.

2. Road Transport helps in increase in the demand for goods. Through transport newer customers in newer places can be easily contacted and products can be introduced to them. Today markets have become national or international only because of transport.
3. Road Transport ensures evenly distribution of commodities into the hands of the consumers throughout the period of consumption.

4. Road Transport increases competition, which in turn, reduces prices. Prices are also reduced because of the facilities offered by transport for large-scale production. Advantage of large-scale production is possible only due to transport networks.

5. Road Transport increases mobility of labour and capital. It makes people of one place migrate to other places in search of jobs. Even capital, machineries and equipment’s are imported from foreign countries through transport alone.

**Historical Development of Roads in India:**

The history of roads is as old as the history of man on earth. The pre-historic men traced out a narrow way for going out for hunting the food. The narrow way was as footpath or pathway. The pathway is considered as the first road mark laid on the surface of earth. The utility and necessity of pathway gradually developed with the introduction of wheeled carts. The pathway was widened into a roadway which was the beginning of road as a means of communication and transport. Ancient history of India reveals that long ago; Indians knew the science of road construction. The excavations at Mohenjodaro and Harappa
(Pakistan) have established that even 3500 years BC, there was a well designed network of roads, and streets were paved at that time.\(^5\)

**Aryan period:**

During the Aryan period, there are references in *Rig Veda* about 'Mahapaths' as a means of communication. About 600 years B.C., a pucca road (6.1 m to 7.3 m wide) was built in *Rajgir* (Rajagriha) of Patna district by *king Bimbisara*. This road was made of stones and is still in existence.

**Mauryan period:**

During this period, roads were developed on technical basis specifications were laid down for width of roads, given to the surface of roads and the convexity of road surface was compared to the back of a tortoise. *Artha Shastra*, the well known treatise on administration, gives a good deal of information regarding roads along with specifications adopted during Mauryan period. The book of *Artha Shastra* was written in about 300 years B.C by *Kautilya*, the first prime minister of Emperor *Chandragopta Maurya*.

**Chandragopta Maurya:**

*Chandragopta Maurya* (322-298 B.C.) took keen interest in the maintenance and development of roads. He had a separate department of communications to look after the public roads. He got constructed the GT Road
connecting North-West frontier with capital Patliputra, the modern Patna. He also got fixed some sign post in the form of pillars and mile stones along the road side at regular intervals. Emperor Ashoka took special interest in the improvement of roads and provided facilities to the travelers. Such facilities were in the form of plantation of trees, digging walls and constructing rest houses at about 4.8 to 6.4 kms distance along the roads. The famous Chinese traveler Fahien had spoken very highly of the roads of that time in the record of his travel.

**Roads during the Mughal period:**

The roads were very greatly improved in India during the Mughal period. Chahar Gulshan, which was written in eighteenth century, gives information regarding 24 important roads which formed the network of roads in India during the Mughal period. The road system in those days was considered as one of the best road systems in the world. The road from Delhi to Daultabad was constructed by Mohamad Tughlag. Sher Shah Suri got constructed the longest road i.e. the road from Punjab to Bengal. The present Grand Trunk Road forms the greater part of the old Shershahi road, also called Badshahi sarak. The road from Agra to Allahabad and that from Ujjain to Bijapur were also got constructed by Muslim Emperor. Many of roads, constructed during Mughal period exist even today.
Roads during the British rule:

The economic and political shifts caused much damage in the maintenance of road transportation. Thus, with the fall Mughal Empire, the condition of roads became deteriorated. At the beginning of the British period, a number of old Mughal roads, connecting important military and business centers were metal led and some new roads were constructed by Military boards during the time of Lord William Bentinck. But the administration of roads under military boards was not a satisfactory arrangement. It was only during the administration of Lord Dalhousie that the central public works department was established to look after the construction and maintenance of roads. Later, such departments were created in other provinces also. Lord Mayo and Lord Rippon contributed a lot in the development of roads because the affairs of construction and maintenance of roads came. Later, such departments were created in other provinces also. Lord Mayo and Lord Rippon contributed a lot in the development of roads because the affairs of construction and maintenance of roads came directly under the control of Local bodies.\(^6\)

With the development of Railways in India, the road development received a serious setback. The work of road construction and maintenance was given a secondary importance and thus the roads gradually lost the interest of the government. Major roads, except those of military importance, mainly centered on the feeder roads to railways.
Thus, the outlook on road development was completely changed and they were considered to be only of local importance. According to Government of India Act of 1919, the affairs of all the roads, except those of military importance and certain other roads of national importance were transferred from the central government to the provincial governments. The provincial governments, in their turn, took over the direct responsibility of construction and maintenance of roads of provincial importance and placed the greater part of road mileage in the charge of local bodies.

After World War-1, motor transport came to the forefront which created revolution in India's transportation system. Under the continued effect of high speed motor transport, the existing roads soon get deteriorated. The local bodies, with their limited financial and meager technical resources, could not deal with the situation properly and with the increased motor traffic, the condition of roads went from bad to worse. Then the central government took the following steps towards the development of roads:

**Jayakar committee:**

In 1972, the Central Government appointed the *Jayakar* committee under the chairmanship of Dr. M.R. Jayakar to report on the condition of the existing roads and to suggest ways and means for their future development. In 1928, the Jayakar committee recommended that since the
provincial governments and the local bodies were unable to look after all the roads and therefore, the central government should look after all the important roads of national importance.

**Creation of central road fund:**

On recommendation of the Jayakar committee, the central road fund was enforced on first March, 1929. The petrol tax surcharge at the rate of two annas per gallon (2.64 paise per liters) of the petrol consumed by motor traffic was imposed to build the road development fund. Out of annual revenue, thus collected, 20 per cent was to be retained by the central government for meeting expenses on the administration purpose, research and the development of roads under its charge. The balance 80 per cent of the central road fund was to be distributed among the provinces, according to their petrol consumption, for maintenance and construction of roads.⁷

**Indian roads congress:**

In 1934, a semi-official technical body known as Indian Roads Congress (IRC) was established by the central government as per recommendation of the Jayakar committee. This body was formed of national importance for controlling standardization, specifications and recommendations regarding design and construction of roads and bridges. But the economic depression during that time delayed the road development programmes.⁸
Nagpur plan:

In 1934, a conference of the chief engineers of Central and State Government was convened by the central government at Nagpur. It is a landmark in the history of road development in India since it was the first attempt to prepare road development programme in a planned manner. That conference finalized a twenty year road development plan (1943-1963) popularly known as the Nagpur Plan. According to that plan, all roads were classified into four broad categories namely National Highways, State Highways, District Roads and Village Roads. It was also recommended that the central government should assume complete financial liability for construction and maintenance of roads classified as National Highways and the construction of roads of national importance was made the responsibility of the central government.

Roads during the post independence period:

After independence, the government of India started taking much interest towards the development of roads in the country. The Nagpur plan targets were mostly achieved by 1960 through the first and second five year. The various steps taken by the Government of India towards the development of roads in the country after independence are described here:

- **Central Road Research Institute:** In 1950, Central Road Research Institute (CRRI) was started at New
Delhi. This institute is considered as one of the *National laboratories of the Council of Scientific and Industrial Research in India*. This institute is mainly engaged in applied research and offers technical advice to state governments on various problems concerning to roads.

- **National Highway Act:** In 1956, the National Highway Act was passed. According to this act, the responsibility of development and maintenance of National Highways was given provisionally to the central government.

- **Road Development Plan** (1961-81): In 1958, the next Twenty Years Road Development Plan (1961-81) was finalized at the meeting of Chief engineers of states. This is popularly known as the *Chief Engineer's Plan*. In this plan, due consideration was given to the future developments on various fields of our country.

**Roadways in India:**

The country's road network consists of national highways, State highways, major district roads, other district roads and village roads. Out of the total length of national highways, about 30 per cent length is single lane / intermediate lane, about 53 per cent is two lane standard and the remaining 17 per cent is four land or more standard. Though national highways comprise only about 2 per cent of the total length of roads, they account for about
40 per cent of the total traffic. The classifications of Indian roads are as follows:\(^9\)

1. **National Highways:** These roads are supposed to link the capital cities of different states, industrial centers; they should also lead to the borders of the country, connect the ports and roads of other countries situated on the border. The responsibility for their construction, extension and maintenance rests with the Central Government.

2. **State Highways:** These roads connect all the important centers of trade, industries and commerce within a State and also of those of other states or national highways. The responsibility for their construction and maintenance lies with the State Government.

3. **District Roads:** District roads connect important markets and centers of industries and they also lead to the railway stations. They also join State or National Highways. Their maintenance is responsibility of the district boards.

4. **Village Roads:** These roads provide communication in the countryside linking one village with the other or a group of villages. These are usually un-metalled or kutcha roads. Their construction and maintenance is the responsibility of the villages concerned.
5. **Border Roads:** The Border Roads Organization was created in 1960 to accelerate the economic development of the North and North Eastern border areas by making them accessible through the development of arterial roads.

**Roads Network in India:**

India’s road network of 3.34 million km is the second-largest in the world. Out of this, national highways account for 65,569 km, state highways for 1.3 lakh km, and major district roads, rural and urban roads collectively account for 3.14 million km, as per statistics with the Ministry of Road Transport and Highways. According to the ministry, roads remain the most important means of transport, accounting for 85 per cent and 65 per cent of passenger and freight traffic, respectively, in India. Broadly, the road network in India is divided into the primary system comprising national highways and the secondary system made up of state highways and major district roads. In addition, the network comprises expressways as well as rural and other roads.

National highways account for a mere 2 per cent of the total road length, but carry 40 per cent of the total road traffic. Between 2006 and 2009, the national highway network increased by 4,000 km and the state highway network increased by 170,000 km. Of the total length of the national highway network, about 27 per cent is single-laned or intermediate-laned, 54 per cent is two-laned and 19 per
cent per cent is four-laned. The Ministry of Road Transport and Highways is planning to seek credit worth USD 2.96 billion from the World Bank for the conversion of single-laned, intermediate-laned and two-laned roads covering a total length of about 3,770 km. The project is scheduled for completion in 2014. The state highways and major district roads carry 40 per cent of total road traffic and constitute 13 per cent of India’s total road length. The 11th Five-Year Plan (2007–2012) has projected an investment requirement of USD 8,613.95 million for the development of rural roads under the Pradhan Mantri Gram Sadak Yojana.\(^\text{10}\)

India has more than 3.3 million km of road network, making it one of the largest in the world of which rural roads i.e. 2.65 million. In 2000 Average Distance - 2 km from a village but, wide variation across states/districts. However, the quality of the roads is inappropriate and cannot meet the needs of efficient and fast moving transportation. The total road length in India has increased significantly from 0.399 million kms as in 1951 to 3.38 million kms as in 2004. The surfaced road lengths have also increased from 0.157 million kms to around 1.604 million kms in the same period. Surface length constitutes 47.3 per cent of total road length in 2004. National Highways that are the prime arterial route span about 57,737 km. throughout the country and cater to about 45 per cent of the total road transport demand. The entire network is classified into five distinct categories from the
viewpoint of management and administration is - National Highways (NH), State Highways (SH), District Roads (DR), Village Roads (VR), Border Roads (BR).\textsuperscript{11}

Among the different categories of roads, National Highways constitute around 2 per cent, State Highways 4 per cent while 94 per cent of the entire network comprises DR, VR and BR. Out of these, PWD Roads are 21 per cent, Urban Roads 7 per cent and the rest of the road length in India is accounted for by the rural roads. Development and maintenance of National Highways is under the purview of the Centre, all other categories of roads come under the purview of the respective States and UT. National Highways constitute only 2 per cent of the entire road network; they carry about 40 per cent of the freight and passengers. The National Highways cover near about every state of India. They are the vital lifelines of the economy making possible trade and commerce. The National Highways besides connecting the major cites of important towns and commercial hubs. There are 259 National Highways on the basis of their route numbers. However, the construction and up keeping of roads is one of the country's most continuous and expensive tasks. Driven by the ambition to connect the various regions of the country with high quality motor able roads, the Ministry of Surface Transport so far has laid down a stretch of 65,559 km of national highways in the country distributed over various states.
The National Highways have a length of 65,569 km and run across the length and breadth of India facilitating medium and long distance inter-city passenger & freight traffic. Though they comprise about 2 per cent of the road network, they carry about 40 per cent of the road based traffic. State Highways and Major District Roads constitute the secondary system of road infrastructure of India. The State Highways provide linkages with the National Highways, district headquarters, important towns, tourist centers and minor ports and carry the traffic along major centers within the State. Their total length is about 137,711 km. Major District Roads run within the district, connecting areas of production with markets, rural areas to the district headquarters and to State/National Highways. By acting as the link between the rural and urban areas, the State Highways and Major District Roads contribute significantly to the development of the rural economy and industrial growth of India. It is assessed that the secondary system carries about 40 per cent of the total road traffic and comprises about 20 per cent of the total road length.\textsuperscript{12}

The scheme announced by the Government in 1995 was a much-needed step and recognized the importance of a proper road network. In it, Rs.200 crore was allocated as commencement capital to the National Highway Authority of India to enable it to construct subways, bridges etc. Roads are definitely a cost efficient and popular mode of transport. It stretches across the length and breadth of a country and
can be used by different sections of society. It helps in the movement of men and material from one mode to another. It forges national unity and is instrumental in the nation’s socio economic development. It acts as a support system to other means of transport like railways, shipping, airways etc. Hence a well developed roadway is vital for promoting commercial interest of the country. India has one of the largest road networks in the world, aggregating to about 33 lakh kilometers at present. Though the National Highways, which is the responsibility of Central Government, has length of roads, carries over 40 percent of the total traffic across the length and breadth of the country.

**Table No. 1.02:**

**Status of Roads in India.**

<table>
<thead>
<tr>
<th>Sr.</th>
<th>Particulars of Roads</th>
<th>K.M.</th>
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<tbody>
<tr>
<td>1</td>
<td>National Highways/Expressways</td>
<td>65,590 km</td>
</tr>
<tr>
<td>2</td>
<td>State Highways</td>
<td>1,28,000 km</td>
</tr>
<tr>
<td>3</td>
<td>Major and other District Roads</td>
<td>4,70,000 km</td>
</tr>
<tr>
<td>4</td>
<td>Rural Roads</td>
<td>26,50,000 km</td>
</tr>
</tbody>
</table>

**Basic facts about the Indian Road Network:**

India has the third largest road network in the world. The density of India's highway network is higher than that of the United States. Given below are some interesting facts about India Roads.
Table No. 1.03:
Basic facts about the Indian Road Network.

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<tr>
<td>Total length of Roads in India -</td>
<td>3.314 million kilometers</td>
</tr>
<tr>
<td>Total Length of National Highways in India -</td>
<td>66,754 Kms</td>
</tr>
<tr>
<td>Length of India's State Highways -</td>
<td>128,000</td>
</tr>
<tr>
<td>Longest National Highway in India -</td>
<td>NH 7 (2369 kms)</td>
</tr>
<tr>
<td>Density of highway network -</td>
<td>0.66 km per sqkm of land</td>
</tr>
<tr>
<td>Density of highway network -</td>
<td>0.66 km per sqkm of land</td>
</tr>
<tr>
<td>Density of highway network -</td>
<td>0.66 km per sqkm of land</td>
</tr>
<tr>
<td>Density of highway network -</td>
<td>0.66 km per sqkm of land</td>
</tr>
<tr>
<td>Total Length of Express Highways in India -</td>
<td>562 Kms</td>
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</table>

Source: [http://www.prokerala.com](http://www.prokerala.com)

With a total length of over 3.314 million kilometers of roadways, India has the third largest road network in the world. Since a well established road network is crucial for the economic and industrial development of a country, the government of India is taking every step to modernize the roads in India. India's National highways and State Highways are the backbone of economic development. Roads in India handle almost 80 per cent of passenger traffic.
and about 65 per cent of freight movement happening in the country.

Map No. 1.01: Indian National Highways.
Government’s Policy and Promotion for Road Development:

The government provides various incentives for private and foreign sector investment in the roads sector. 100 per cent foreign direct investment (FDI) under the automatic route is allowed for support services to land transport such as operation of highway bridges, toll roads, and vehicular tunnels; services incidental to transport such as cargo handling is incidental to land transport; construction and maintenance of roads, bridges; and construction and maintenance of roads and highways offered on build-operate-transfer (BOT) basis, including collection of toll.

Highway-widening projects qualify for the 10-year tax break under Section 80 IA of the Income Tax (IT) Act. Other policy initiatives for attracting private investment are government to provide capital grant up to 40 per cent of project cost to enhance viability on a case-to-case basis, 100 per cent tax exemption for five years and 30 per cent relief for next five years, which may be availed of in 20 years and concession period allowed up to 30 years.

FDI in construction activities (including roads and highways) sector from April 2000 to July 2011 in India was USD 9.3 billion. This amounted to 6.4 per cent of the total FDI inflows, according to data released by Department of Industrial Policy and Promotion (DIPP), which formulates the FDI policy and is part of the Ministry of Commerce &
Industry. With the government permitting 100 per cent FDI in the roads sector, most foreign investors in the Indian roads sector have formed consortiums with Indian companies to participate in the development of road projects in the country. As a result, construction companies are now being rewarded with large order books and portfolios of BOT projects.13

In addition to the policy benefits, the government has announced several incentives to attract private sector participation. These include government to bear the cost of the project feasibility study, land for the right of way and way side amenities, shifting of utilities, environment clearance, cutting of trees, etc; duty free import of high capacity and modern road construction equipments; declaration of the road sector as an industry; easier external commercial borrowing norms; right to retain toll; increase in the overseas borrowing amount of infrastructure sectors to USD 500 million from USD 100 million; and full exemption from basic customs duty to bio-asphalt and specified machinery for application in the construction of national highways.

The ministry has also framed a ‘Special Accelerated Road Development Programme in North Eastern Region’ for improving road connectivity to remote places in this region. The estimated cost of the proposal is USD 2.53 billion. The Union Budget 2012–13 proposed an increase of allocation of
the Ministry of Road Transport and Highways by 14 per cent to Rs. 25,360 crore. Further, the World Bank has approved a USD 975 million loan for developing the first phase of the eastern arm of the USD 17.21 billion Dedicated Freight Corridor Project in India. The Dedicated Freight Corridor Corporation of India Ltd. has tied up with the Japanese Bank of Industrial Cooperation for USD 14.56 billion funding as loan for the first phase and it is likely to be commissioned in 2016.

The World Bank and the Government of India have also signed a USD 350 million loan to accelerate the development of road network through the Second Karnataka State Highway Improvement Project. The Government of Karnataka has demarcated about 25,000 km of the most important traffic corridors and designated them as the state’s core road network. Also, a USD 301.38 million-worth project, ending 2016, for construction, upgradation and improvement of 433 km-long road in six north-east states, assisted by the Asian Development Bank, has been approved by the Cabinet Committee on Economic Affairs. The Ministry of Road Transport and Highways had planned to award road projects covering 10,000 km of highways in 2011–12. About 80 per cent of these road projects will be distributed on the BOT basis. The Prime Minister Gram Sadak Yojana (PMGSY) is a scheme for development of rural roads in India. The Construction of Rural Roads Project (CRRP) is another initiative focused on rural development.\textsuperscript{14}
The growth potential of the roads sector is tremendous in India with a fast-growing economy and a rising need for world-class infrastructure for better road connectivity. According to the ministry’s data, traffic on roads is growing at a rate of up to 10 per cent per annum, while vehicular population growth is nearly 12 per cent per annum. This spells out the need for fast growth of the roads network in the near future. The Government of India plans to construct 35,000 km of highways by 2014 under the National Highway Development Programme at an investment of USD 60 billion. Moreover, according to the Planning Commission’s revised estimates, funds worth USD 58 billion are likely to be invested in the road sector in the 11th Plan. The ministry has also recommended a total expressway network of about 18,637 km in the country for the unhindered, high-speed and safe movement of traffic. Construction work on the country’s expressways will be initiated in three phases and is scheduled for completion in 2022. All this is also likely to result in increased opportunities for private players, as more projects will be awarded under the PPP mode.

**India Roads Congress (IRC):**

The India Roads Congress (IRC) is the oldest and most important representative technical body of highway engineers in India. The growth of highway engineering as a profession owes much to the IRC which has completed
seventy three years of its existence. It can be claimed that the development of roads in the country has been significantly influenced by the wise counsels given by the IRC and has progressed according to the policies enunciated by it. The origin of the IRC can be traced back to the Indian Road Development committee (Jayakar Committee) appointed by the Government of India in 1927. One of the recommendations of this committee was that road conferences should be held periodically to discuss among other things, questions relating to road construction and maintenance. The Central Government, after consulting the state Governments, convened an inaugural meeting of highway engineers at New Delhi in December, 1934. The IRC has now about 13,500 members comprising of engineers of all ranks from Central and State Governments, Engineering Services of Army, Border Roads Organization, Road Research Institutes, Engineering Colleges, Local Bodies and private enterprises. The IRC provides a National forum for sharing of knowledge and pooling of experience on the entire range of subjects dealing with the construction and maintenance of roads and bridges, including technology, equipment, research, planning, finance, taxation, organization and all connected policy issues. In more specific terms, the objectives of the IRC are:  

- To promote and encourage the science and practice of building, operation and maintenance of roads.
- To provide a channel for the expression of collective opinion of its members regarding roads.
• To promote the use of standard specifications and to propose specifications.
• To advise regarding education, experiment and research connected with roads.
• To hold periodical meetings to discuss technical questions regarding roads and thus disseminate technical knowledge of experiences amongst highway engineers
• To suggest legislation for the development, improvement and protections of roads.
• To suggest improved methods of administration, planning, design, construction, operation, use and maintenance of roads.
• To establish, furnish and maintain libraries and museums for furthering the science of road making.
• To publish, or arrange for the publication of proceedings, journals, periodicals, and other literature for the promotion of the objectives of the IRC

**National Highway Development Project (NHDP):**

The status of implementation of a total length of 32,939 km of National Highways identified by the National Highways Authority of India (NHAI), under various phases of National Highways Development Project (NHDP) is indicated in the table given below:17
Table No. 1.04:
National Highway Development Project.

<table>
<thead>
<tr>
<th>Corridors</th>
<th>Total Length (in km)</th>
<th>Length Completed (in km)</th>
<th>Length Under implementation (in km)</th>
<th>Balance for award (in km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Golden Quadrilateral</td>
<td>5846</td>
<td>5824</td>
<td>22</td>
<td>NIL</td>
</tr>
<tr>
<td>North-South &amp; East-West</td>
<td>7300</td>
<td>5683</td>
<td>1038</td>
<td>421</td>
</tr>
<tr>
<td>Port Connectivity</td>
<td>380</td>
<td>314</td>
<td>66</td>
<td>NIL</td>
</tr>
<tr>
<td>NHDP Phase-III</td>
<td>12109</td>
<td>2294</td>
<td>5805</td>
<td>4010</td>
</tr>
</tbody>
</table>

Source: Department of Road Transport & Highways

- Under NHDP Phase III, up-gradation of 12,109 km of National Highways has been approved. It is expected to be completed by December 2013.

- NHDP Phase IV envisages up-gradation of about 20,000 km of National Highways to 2-lane with paved shoulders on public private partnership (PPP) basis. The expected date of completion is December 2015.

- Under NHDP Phase V, 6-laning of 6500 km of existing 4-lane National Highways has been approved (on Design Build Finance and Operate (DBFO) basis). 443 km has been complete till December 2010. The phase is expected to be completed by December 2012.
• NHDP Phase VI envisages development of 1000 km fully accessed controlled expressways under public private partnership (PPP) model following DBPO approach. The expected date of completion of the phase is December 2015.

Road Networks in Maharashtra:

Maharashtra has the largest network of highways in India with 18 national highways. The main national highways in Maharashtra are: NH 3, NH 50, NH 69, NH 7, NH 17, NH 211, NH 204, NH 4, NH 8, NH 9, NH 13, NH 16, NH 4B, NH 6, and NH 222. The vastness of highways in this state by the fact that the total length of highways in the state of Maharashtra exceeds 3700 kms; whereas the total road network exceeds 2.65 lakh km. Almost 98 per cent villages are connected via the highways and modern roads in Maharashtra. National Highways 3, 4, 6, 8, 9, 13, 16 and 17 link Mumbai to the neighboring states of Andhra Pradesh, Gujarat, Madhya Pradesh, Karnataka, Delhi and the rest of the country. The other major cities inside Maharashtra are also interlinked via these highways.¹⁸
Map No. 1.02:
Maharashtra Road Map.

Source: http://www.mapsofindia.com

Major Highways in Maharashtra:

- **Mumbai-Pune Expressway:** Mumbai-Pune Expressway in Maharashtra is the best and the most important expressway, which links financial capital Mumbai to the cultural capital of the state, Pune. It is surrounded by the scenic beauty and hill stations, which makes your trip a pleasurable experience. The distance from Andheri in Mumbai to Deccan in Pune is around 168 km.
• **Nagpur-Aurangabad-Mumbai Highway:** Nagpur-Aurangabad-Mumbai Highway connects two major Maharashtra cities Nagpur & Aurangabad with the capital Mumbai. Travelling through NH6 makes it possible to save around 65 km distance and the total travel time reduces to one-and-half hours approximately.

• **Eastern Express Highway:** Eastern Express Highway is about 24km long; part of NH3, it is a major road of Mumbai metropolitan area. Eastern Express Highway is a six-lane highway with as many as 12 flyovers. Extending from CST Mumbai to Thane, it becomes Dr Ambedkar Road beyond Sion in central Mumbai. It is an extremely busy road with loads of rush hour traffic.

• **Sion Panvel Expressway:** Sion Panvel Expressway is a 25 km long under construction road in Mumbai metropolitan area, which connects Sion in central Mumbai to Panvel in the eastern suburban area via Navi Mumbai. An important and one of the busiest roads in the Mumbai, it links the financial capital to the National Highway 4. It is a much wider (12 lane) highway and you can take it from BARC Junction Sion till Kalamboli Junction Panvel suburban area.

• **Western Express Highway:** Western Express Highway, an eight to ten lane arterial road of Mumbai
is a 26km long highway from Bandra suburban area in the south Mumbai to the Mira-Dahisar in the north Mumbai. It important road for the commuters of Mumbai, it becomes NH8 in north to reach Delhi. It also passes through the Sahar International Airport.

- **Yedshi-Latur-Nanded Highway:** Part of the Marathwada Integrated Road Development Project, Yedshi-Latur-Nanded Highway is a 240km long expressway in the state of Maharashtra linking two major cities Latur and Nanded and further with National Highway 9. The highway has a potential to further save more than 1.5 hrs of travel time between the city of Latur and Mumbai, under the new four lane expansion plan.
Map No. 1.03:
Highway Map of India.

Source: http://www.travelindia-guide.com

Maharashtra State Road Development Corporation:
MSRDC is a corporation established and fully owned by the Government of Maharashtra through a resolution on 9th July, 1996 and has been incorporated as a limited company under the Companies Act 1956 on 2nd August 1996. MSRDC mainly deals with the properties and assets
comprising movables and immovable including land, road projects, flyover projects, toll collection rights and works under construction which vested with the State Government and were under the control of the Public Works Department. These have been subsequently transferred to MSRDC. Roads are arteries of a nation. Roads and bridges obliterate distance and connect people while they spur economic progress. MSRDC has been driven by a focused set of objectives as follows;

- To improve and develop integrated transport infrastructure such as roads, expressways, bridges, flyovers, MRTS, ports, rail projects, airports etc.
- To raise resources for the identified projects.
- To follow transparent and competitive bidding procedures to ensure quality works at the most economic cost.
- To encourage private sector participation in transport infrastructure.
- MSRDC strives hard to deliver exceptional, strategic and integrated infrastructure services to the State of Maharashtra. MSRDC encourages the use of state of the art construction technology to reduce construction period. Decentralized decision-making, constructive co-ordination with the private sector, technical support from professional consultants and FIDIC system of contracts with work-specific amendments provide added advantage to MSRDC’s lean organization structure.
• MSRDC envisions itself as the nation’s chosen infrastructure expert and strategic advisor on transport-infrastructure.

**Major functions of the Corporation are:**

- To promote and operate - road projects.
- To plan, investigate, design, construct and manage identified road projects and their area development.
- To enter into a contract in respects of the works and any other matters transferred to the Corporation along with assets and liabilities.
- To invite tenders, bids, offers and enter into contracts for the purposes of all the activities of the corporation.
- To promote participation of any person or body or association of individuals, whether incorporated or not, in planning, investigation, designing, construction and management of transport projects and area development.
- To undertake schemes or works, either jointly with other corporate bodies or institutions, or with Government or local authorities, or on agency basis in furtherance of the purposes for which the Corporation is established and all matters connected therewith.
- To undertake schemes or works, either jointly with other corporate bodies or institutions, or with Government or local authorities, or on agency basis in furtherance of the purposes for which the Corporation is established and all matters connected therewith.
To undertake any other project and other activities entrusted by the State Government in furtherance of the objectives for which the Corporation is established.

Road Infrastructure in India:

Roads are a major mode of transportation in India today, as they carry almost 90 per cent of the country's passenger traffic and about 65 per cent of its freight. The density of India's 80,000 km-long national highway (NH) network is 0.66 km of highway per square kilometre of land. It is encompassed by over 200 toll plazas, about half of which are handled by various highway developers and the rest by National Highway Authority of India (NHAI).

The Government plays a vital role in developing the road network in the country. It provides various incentives for private and foreign sector investment in the roads sector apart from allowing 100 per cent foreign direct investment (FDI) under the automatic route for support services to land transport such as operation of highway bridges, toll roads, and vehicular tunnels. Such services also include services incidental to transport such as cargo handling, construction and maintenance of roads, bridges; and construction and maintenance of roads and highways offered on build-operate-transfer (BOT) basis, including collection of toll.

Road development does not only talk about urban space, but is also very important for the growth of rural
India. Budget 2013-14 has provided a renewed thrust to rural India. The allocation to rural development is higher by nearly 50 per cent with a focus on improving road infrastructure. Rural income should witness a rise in the coming years with road construction activity picking up. The rapid expansion and strengthening is also very imperative because of increasing motorisation. The number of vehicles has been growing at an average pace of around 10 per cent per annum. In addition to it, the share of road traffic in total traffic has grown from 13.8 per cent of freight traffic and 15.4 per cent of passenger traffic in 1950-51 to an estimated 62.9 per cent of freight traffic and 90.2 per cent of passenger traffic by the end of 2009-10. Thus, road transport is a segment that needs continuous up-gradation and regulation for both present and future traffic and for better energy efficiency, less pollution and enhanced road safety.\(^\text{19}\)

Foreign direct investment (FDI) received in construction development sector from April 2000 to January 2013 stood at US$ 21.95 billion, according to Department of Industrial Policy and Promotion (DIPP). The Indian Highways Management Company Ltd (IHMCL), a firm set up to implement the inter-operable electronic tolling system across the NH network, will be undertaking the job for the first time. The company is jointly owned by highway developers, financial institutions and the NHAI.
**Private Sector Participation:**

Private sector participation is increasing with the rising trend of awarding projects on toll and annuity basis. For instance, during March 2010, about 10 mega highway projects, spanning 5,000 km, have been identified, which will be awarded to private developers over the next two years. These projects are worth USD 9.3 billion and will be based on a revenue-sharing model. Traditionally, the road projects were financed only out the budgetary grants and were controlled by the Government. The road system has attracted very limited private sector participation in the past. While the traffic has been constantly increasing at a rapid pace, the traditional system of financing road projects through budgetary allocation has proved to be inadequate. It was in this context that the necessity for exploring the innovative means of financing the highly capital intensive road projects was felt.

The beginning of a significant private sector participation in road projects was made with the launching of India's largest road project - National Highways Development Project (NHDP). To encourage private sector participation, several initiatives have been taken by the government, which includes:

- Declaration of the road sector as an industry.
- Provision of capital subsidy up to 40 per cent of the project cost to make projects commercially viable.
- 100 per cent tax exemption in any consecutive 10 years out of the first 20 years of a project.
- Provision of encumbrance free sites for work, i.e. the Government shall meet all the expanses relating to land and other pre-construction activities.
- Foreign Direct Investment up to 100 per cent in road sector.
- Easier external commercial borrowing norms
- Higher concession period, (up to 30 years)
- Right to collect and retain toll

**Research and Development (R&D) in Road Development:**

The main thrust of research and development in the roads sector is to build a sustainable road infrastructure comparable to the best roads in the world. The various components of this strategy are improvement in design, modernization of construction techniques, introduction of improved material conforming to latest trends, evolving better and appropriate specifications, encouraging development and use of new technologies etc. The dissemination of these matters is done through the publication of new guidelines, code of practices, instructions, compilation of state-of-the-art reports and presentations etc. The research schemes sponsored by the Department are generally 'applied' in nature, which, once completed, would enable them to be adopted by user agencies/departments in their work in the field. The areas covered are roads, road transport, bridge, traffic and
transportation techniques etc. The Department takes the help of various research institutions, academic institutions and universities to implement the schemes.

**Problems Faced By Road Transport in India:**

Road transport of the country is facing a number of problems. Some of these problems are discussed below:\(^2\)

1. Most of the Indian roads are un-surfaced (42.65\%) and are not suitable for use of vehicular traffic. The poor maintenance of the roads aggravates the problem especially in the rainy season. According to one estimate there is about per year loss of Rs. 200 crores on the wear and tear of the vehicles due to poor quality of roads. Even the National Highways suffer from the deficiencies of inadequate capacity, weak pavement, poor riding quality, distressed bridges, unbridged level crossings, congested cities (lack of by-pass roads), lack of wayside amenities and safety measures.

2. One major problem on the Indian roads is the mixing of traffic. Same road is used by high speed cars, trucks, two wheelers, tractors, animal driven carts, cyclists and even by animals. Even highways are not free from this malady. This increases traffic time, congestion and pollution and road accidents.

3. There are multiple check-posts, toll tax and octoroon duties collection points on the roads which bring down
the speed of the traffic, waste time and cause irritation to transporters. Rate of road taxes vary from state to state and inter-state permits are difficult to obtain.

4. Way side amenities like repair shops, first aid centres, telephones, clean toilets, restaurants, rest places are lacking along the Indian roads. There is very little attention on road safety and traffic laws are wilfully violated.

5. There is very little participation of private sector in road development in India because of long gestation period and low-returns. The legislative framework for private investment in roads is also not satisfactory. The road engineering and construction are yet to gear themselves up to meet the challenges of the future.

6. There has been no stability in policy relating to highway development in the country. It has changed with the change of government. There are a number of agencies which look after the construction and maintenance of different types of roads. Since there is no co-ordination between these agencies their decisions are often conflicting and contradictory.

7. There is shortage of funds for the construction and maintenance of roads. Instead of giving high priority to this task the percentage allocation has decreased over
the years. While percentage share of plan allocation was 6.9 per cent in the First Five Year plan it has come down to less than three percent in the Eighth Plan.

**The Road Ahead:**

India has 600-700 km of access-controlled expressways and is working continuously to build more high-quality, access-controlled expressways for faster connectivity between cities and towns. The Government is making sure that new roads and routes are well equipped with Intelligent Transportation Systems including round-the-clock CCTV surveillance for monitoring real-time traffic data and ensuring safety and security of users. A recent study has stated 18,637 km of expressways need be built by the end of the 13th Five-Year Plan period, i.e. 2022. Infrastructure development (for expressway projects alone), on such a massive scale would require about Rs. 450,000 crore (US$ 82.56 billion), according to the study. Meanwhile, the Government, under National Highway Development Program (NHDP)-VI, has already given the green signal for constructing four expressways of more than 1,000 km length at a financial outlay of Rs. 16,680 crore (US$ 3.06 billion). The administration is contemplating on PPP models for these new developments.\(^{22}\)
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