

CHAPTER 21

ROADS

21.1 Road network provides the arterial network to facilitate trade, transport, social integration and economic development. It is used for the smooth conveyance of both people and goods. Transportation by road has the advantage over other means of transport because of its easy accessibility, flexibility of operations, door-to-door service and reliability. Consequently, passenger and freight movement in India over the years have increasingly shifted towards roads vis-a-vis other means of transport. In 2011-12, the road network in the country carried about 86 per cent of the total passenger movement by roads and railways put together. The corresponding figure for freight movement by roads was 64.5 per cent.

International Comparison of Road Network:

21.2 Road networks across countries can be compared in terms of road density (length of road per square km of area) so that the size effect may be neutralized. However, it is expected that smaller countries would have higher road density than those with considerably larger size. Accordingly, as on 31st March 2012, India's road density at 1.48 kms/sq. km of area was higher than that of USA (0.67km/ sq km), China (0.42 km/ sq. km) and Brazil (0.19 km/sq.km). The surfaced road length in India was 55.46 per cent of the total road length which was much lower as compared to France, Japan, Korea, UK and USA. NHs in India, which accounted for 1.58 % of the total length as on 31st March 2012, was much lower than that of the developed countries of the world. The average road length per lakh population in case of India was 402.03 kms as on 31st March 2012 whereas the length of NHs per 100 square kms of area was 2.34 kms, and the length of NHs per lakh of population was 6.35 kms.

Major Road Indicators across Select Countries, 2010					
Country	Road Density (km/sq km)	Share of Paved Road (%)	Road Length in Kilometre		
			Total	Motorways	National Highways
1	2	3	4	5	6
Brazil	0.19	13.5	15,80,964	NA	99,220 (6.28)
China	0.42	53.50(2008)	40,08,229	74,113(1.85)	64,430 (1.61)
France	1.87	100.00	10,28,446	11,466(1.11)	8,980 (0.87)
India	1.48	55.46	48,65,394	NA	76,818 (1.58)
Japan	0.89	80.11(2009)	336,578	7,803 (2.32)	50,810 (15.10)
Korea, Republic (2009)	1.05	79.30	104,983	3,776 (3.60)	13,819 (13.16)
Russian Federation	0.06 (2009)	80.06(2007)	9,83,000(2009)	N.A.	N.A.
South Africa (2001)	0.30	17.30	3,64,131	239 (0.07)	2887 (0.79)
United Kingdom	1.72	100.00	4,19,628	3,673(0.88)	49,024(11.68)
USA	0.67	100.00	65,45,326	75,479(1.15)	23,527 (0.36)
Sources: For India – Transport Research Wing, Ministry of Road Transport & Highways					
For all other countries – 'World Road Statistics 2012', International Road Federation, Geneva					
Figures in parentheses in columns 1, 2, 3 & 4 refer to the calendar year while in columns 5 and 6, It indicates the % share of the category in total road length.					

21.3 Expansion of Road Network vis-à-vis growth in Motor Vehicles: Burgeoning population and increasing vehicular penetration /traffic density are placing increasing demands on expansion of the road networks in India. The growth of road network has not kept pace with the growth in the number of registered vehicles . While the number of registered motor vehicles has grown at a CAGR of 6.4 per cent between 1951 and 2012, the growth in the road network during the same period was 4.2 per cent. In the past decade, 2002-12, total road network grew at CAGR of 3.6 % with the highest CAGR recorded by urban roads (6.4%), followed by SH and OPWD roads (3.6%), rural roads (3.3%), project roads (2.9%) and NH (2.8%). During the same period, the registered motor vehicles grew at a CAGR of 10.5%.

**Compound Annual Growth Rates of Registered Motor Vehicles
and Road Length 1951 to 2012**

CAGR (in %) of Road Networks and Total Registered Motor Vehicles -1951 to 2012							
Period	Roads						Total Registered Motor Vehicles
	NHs	OPWD	Rural	Urban	Project	Total	
2012/1951	2.2	3.2	4.4	-	-	4.2	6.4
1961/1951	1.9	4	-0.5	-	-	2.7	8.1
1971/1961	0	2.6	6	4.5	-	5.7	10.9
1981/1971	2.9	4.5	5.9	5.5	3.5	5.0	11.2
1991/1981	0.6	2.1	7.2	4.3	1.2	4.6	14.8
2001/1991	5.5	3.1	4.6	3.0	0.6	3.8	9.9
2012/2002	2.8	3.6	3.3	6.4	2.9	3.6	10.5

21.4 Growth in Road Length : The total road length of the country increased significantly from 3.99 lakh kms as on 31st March, 1951 to 48.65 lakh kms as on 31st March 2012, growing at a Compound Annual Growth Rate (CAGR) of 4.2%. During the period 1951 to 2012, rural roads recorded the highest CAGR of 4.4% amongst the various categories of roads, the urban roads recorded a CAGR of 4.6% during 1961 to 2012 and the project roads grew at a CAGR of 2.0% during 1971 to 2012. In the past decade, 2002-03 to 2011-12, the length of urban roads recorded the fastest growth with a CAGR of 6.4%, followed by State Highways (SH) and other PWD (OPWD) roads (3.6%), rural roads (3.3%), project roads (2.9%) and NH (2.8%). The largest share in the road network as on 31st March 2012 was that of rural roads (58.33%). OPWD Roads accounted for the second highest share (21.01%), followed by Urban Roads (9.54%), Project Roads (6.15%), SHs (3.38%) and NHs (1.58%). The five states with the largest road networks (excluding Jawahar Rozgar Yojana roads), viz. Uttar Pradesh, Maharashtra, West Bengal, Karnataka and Assam, accounted for about 42.9 % of the total road length of the country.

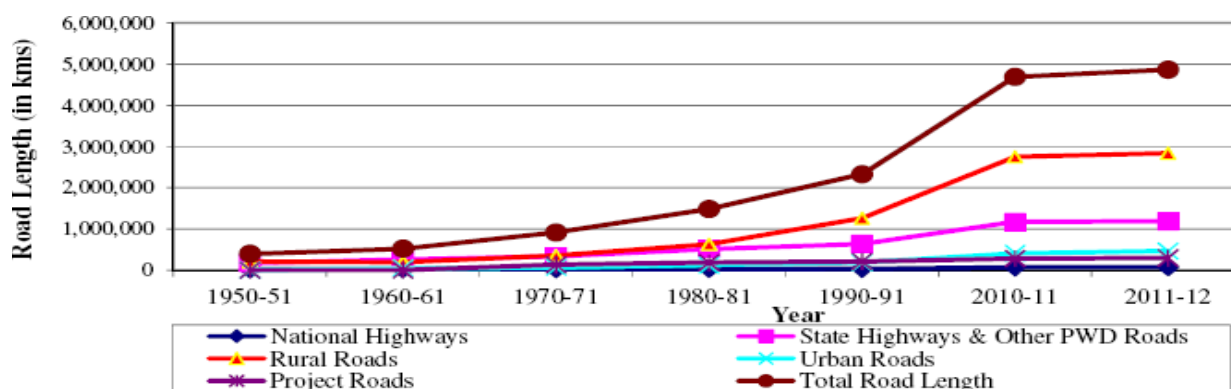
21.5 Category wise Growth in Road Length : The length of National Highways rose from 19,811 kilometres as on 31 March 1951 to 76,818 kilometres as on 31 March 2012 reflecting a compound annual growth rate (CAGR) of 2.2 per cent during the period. During the same period, the

combined network of State Highways and Other Public Works Department (PWD) posted a seven-fold expansion in length. The combined length of State Highways and Other PWD roads stood at 11.86 lakh kilometres as on 31 March 2012. The highest CAGR of 4.4 per cent during 1951 to 2012 was registered by rural roads comprising Panchayati roads, and roads constructed under Jawahar Rozgar Yojana (JRY) and Pradhan Mantri Gram Sadak Yojana (PMGSY). The length of rural roads increased to about 14 times from 2.06 lakh kilometres in 1951 to 28.38 lakh kilometres in 2012. Urban roads grew by a CAGR of 4.6 per cent between 1961 and 2012. Their length stood at 4.64 lakh kilometres as on 31 March 2012. The length of Project roads grew by CAGR of 2 per cent during 1971 and 2012 and was 2.99 lakh kilometres as on 31 March 2012.

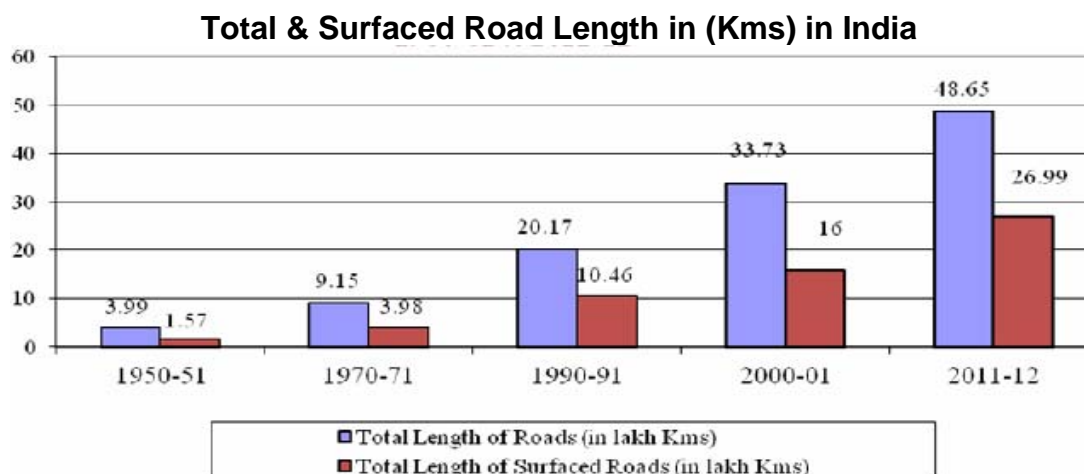
Road Network by Categories (in kilometres) -1951 to 2012								
Road Category	1951	1961	1971	1981	1991	2001	2011	2012
National Highways	19,811 (4.95)	23,798 (4.54)	23,838 (2.61)	31,671 (2.13)	33,650 (1.45)	57,737 (1.71)	70,934 (1.52)	76,818 (1.58)
State Highways	^	^	56,765 (6.20)	94,359 (6.35)	1,27,311 (5.47)	1,32,100 (3.92)	1,63,898 (3.50)	1,64,360 (3.38)
OPWD Roads	1,73,723 (43.44)	257,125 (49.02)	2,76,833 (30.26)	4,21,895 (28.40)	5,09,435 (21.89)	7,36,001 (21.82)	9,98,895 (21.36)	10,22,287 (21.01)
Rural Roads	2,06,408 (51.61)	197,194 (37.60)	3,54,530 (38.75)	6,28,865 (42.34)	12,60,430 (54.15)	19,72,016 (58.46)	27,49,804 (58.80)	28,38,220 (58.33)
Urban Roads	0 (0.00)	46,361 (8.84)	72,120 (7.88)	123,120 (8.29)	1,86,799 (8.03)	2,52,001 (7.47)	4,11,679 (8.80)	4,64,294 (9.54)
Project Roads	0 (0.00)	0 (0.00)	1,30,893 (14.31)	1,85,511 (12.49)	2,09,737 (9.01)	2,23,665 (6.63)	2,81,628 (6.02)	2,99,415 (6.15)
Total	3,99,942	5,24,478	9,14,979	14,85,421	23,27,362	46,90,342	46,76,838	48,65,394

Note: Figures within parentheses indicate per cent to total road length in each road category.
^ Included in OPWD roads

Growth in Road Length by categories: 1951:2012



21.6 Along with the increase in the total road length, the **surfaced road** length too increased. The latter grew from 1.57 lakh kms as on 21st March 1951 to 26.99 lakh kms as on 31st March 2012. Surfaced roads formed 39.4% of the total road length as on 31st March, 1951. Their share increased to 55.5% as on 31st March, 2012.



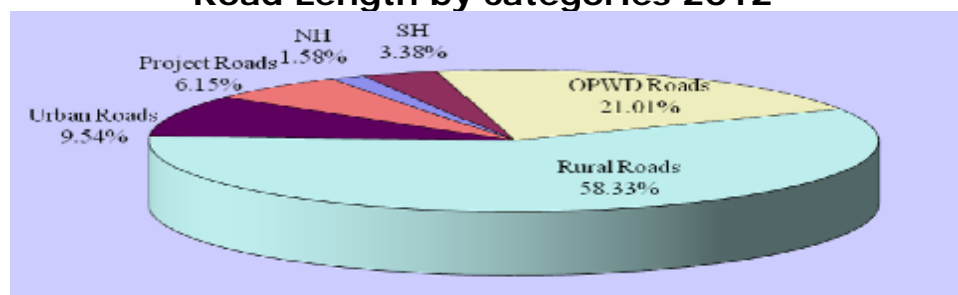
21.7 Uttar Pradesh recorded the highest road length of 403,102 kms as on 31st March, 2012 which was 10.2 % of the total road length, excluding Jawahar Rozgar Yojana roads. The five states with the largest road networks, viz. Uttar Pradesh, Maharashtra, West Bengal, Karnataka and Assam, accounted for about 42.9 % of the total road length of the country.

21.8 **Annual Increase in Road length in various categories** : About 2 lakh Km(1.89 lakh Km) of roads were constructed over the one year period i.e. 2011-12. About half of the addition was in rural roads category (88,416 Km) and more than a quarter in the category of Urban roads (52,615Km).

21.9 Road Network in Terms of Broad Categories :

Rural roads with 58 % share in the total road length continue to constitute the major share . National Highways, though constitute small proportion of total road length, run across the length and breadth of the country and carry significant amount (40%) of road traffic. State Highways & other PWD roads constitute secondary system of road transportation in the country.

Road Length by categories 2012



21.10 All NHs are surfaced. As on 31st March 2012, two-lane NHs constituted the largest share of NHs, i.e. 53.01% of the total length of NHs, followed by four lanes and above (24.86%) and the single/intermediate lane NHs (22.13%). Uttar Pradesh accounted for the largest share (10.2%) of the total length of NHs as on 31st March 2012, followed by Rajasthan (9.3%), Madhya Pradesh (6.6%), Tamil Nadu (6.4%) and Andhra (5.9%). These five States accounted for about 38.4% of the total road length of NHs. As on 31st March, 2012, around 99.1% of SHs was surfaced. Out of total length of surfaced SHs, Bituminous Top (BT) and Cement Concrete (CC) roads accounted for 98.98%; and the remaining were Water Bound Macadam (WBM). The State/UT-wise break-up of SHs shows that Maharashtra accounted for the largest share (19.8 %) as on 31st March 2012, followed by Karnataka (12.6%), Gujarat (11.2%), Tamil Nadu (6.6 %) and Andhra Pradesh (6.5%). These five States accounted for about 56.7% of the total length of SHs. OPWD roads, consists of district roads, rural roads, developed and maintained by Public Works Department of the State/UTs. These roads serve as the main roads for intra district movements. Around 89.4% of OPWD roads were surfaced as on 31st March, 2012. BT and CC roads constituted 90.8% of the total length of surfaced roads under OPWD. Maharashtra had the highest length of OPWD roads as on 31st March, 2012. Uttar Pradesh had the second highest, followed by Rajasthan, Andhra Pradesh and Gujarat. Rural Roads consist of Panchayati Raj roads (Zilla Parishad roads, Village Panchayat roads and Community Development/Panchayat Samiti roads) and roads constructed under Jawahar Rozgar Yojana (JRY) and Pradhan Mantri Gram Sadak Yojana (PMGSY). The total length of Rural Roads as on 31st March, 2012, was 28,38,220 kms. Out of this, 15,87,787 kms of Panchyati Raj Roads were reported by various departments of Panchayati Raj (Zilla Parishad Roads, Village Panchayat Roads and Community Development/Panchayat Samiti Roads), 3,50,433kms of PMGSY Roads by National Rural Road Development Agency (NRRDA), Ministry of Rural Development and the remaining nine lakh kms of roads were as constructed under JRY. As on 31st March 2012, amongst the States/UTs, Assam had the highest length of Rural Roads, followed by Odisha, West Bengal, Andhra Pradesh and Karnataka. Urban Roads consist of Municipal Roads, roads constructed under Military Engineering Services (MES), Railways Roads, Major Port Roads and Minor Port Roads. Within the category of Urban Roads, municipal roads accounted for the highest share of 90.61%, followed by railways roads (5.30%), MES roads (3.84%), major ports roads (0.19%), minor ports roads (0.06%). In terms of absolute length, West Bengal had the highest length of Urban Roads, followed by Uttar Pradesh, Karnataka, Delhi and Tamil Nadu. Project roads include roads built by State/UT Forest Departments, Irrigation Departments, Electricity Departments, Sugarcane Departments, Coal Departments, Steel Authority of India Limited (SAIL), National Mineral Development Corporation (NMDC) and Border Roads Organisation (BRO). Out of the total length of Project Roads as on 31st March, 2012, Forest Department Roads accounted for the highest share of 52.23%, followed by Irrigation Department Roads (29.52%), BRO Roads (8.46%) and remaining constituted 9.79%.

Government Initiatives:

21.11 Ministry of Road Transport & Highways, and apex organization under the Central Government, is entrusted with the task of formulating and administering, in consultation with other Central Ministries/Departments, State Governments/UT administrations, organizations and individuals, policies for Road Transport, National Highways and Transport Research with a view to increasing the mobility and efficiency of the road transport system in the country.

The National Highways development Project (NHDP)

21.12 The largest highway project ever undertaken in the country is being implemented by the **National Highways authority of India (NHAI)**.

21.13 National Highway Development Project (NHDP) is targeted at the Golden Quadrilateral i.e. Delhi, Kolkata, Chennai & Mumbai (length 5846 Km) and North South i.e. Kashmir to Kanyakumari (4000Km) and East west Corridors i.e. Silchar to Porbandar (3300 Km).

21.14 As per National Highways Authority of India, out of the 5846 Km length of Golden Quadrilateral, the task for 6/4 laning has been completed for entire stretch as on 31st October 2014 & out of 7142 Km of NS-EW corridors, task of 6/4 laning has been completed for 6325 Km. Taking together allocation to NHAI under various phases of NHDP (till NHDP Phase VII) out of 48,476 km road length, 21,567 Kms have already been 4/6 laned and work for 12,555 Km is under implementation whereas contract for 14,354 Kms is to be awarded.

21.15 **Source of Information on Road Statistics : Transport Research Wing , Ministry of Road Transport & Highways**, brings out various annual publications like Basic Road Statistics of India, Road Transport Year Book & Road Accidents in India. The publications contain information on Road length, national highways, state highways, other Public Work Departments roads, rural roads, urban roads, project roads etc including state wise break up . Information on expenditure is also available in the publications available on the website of the Ministry of Road Transport & Highways.

Acknowledgement : The information available in **Basic Road Statistics of India, 2011-12**, Ministry of Road Transport & Highways , has been used extensively in the Chapter. Information on Progress of NHDP has been taken from website of NHAI.