

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 or last mile connectivity and reliability. Consequently, passenger and freight movement in India, over the years, have increasingly shifted towards roads vis-a-vis other means of transport.

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. As on 31st March 2013, India's road density at 1.59 kms/sq.km of area, was higher than that of Japan (0.90 km/ sq km), USA (0.67 km/ sq km), China (0.44 km/ sq. km), Brazil (0.19 km/sq.km) and Russian Federation (0.08 km/ sq km). The average road length per lakh population, in case of India, was 427.59 kms as on 31st March 2013 and the paved/surfaced road length in India was 60.61 per cent of the total road length, which was much lower as compared to United Kingdom, Korea, Russia and China.

21.3 National Highways (NHs) in India accounted for 1.51 % of the total length as on 31st March 2013, much lower than that of the developed countries of the world. As on 31st March, 2013, the length of NHs per 100 square kms of area was 2.41 kms, while the length of NHs per lakh of population was 6.47 kms.

Major Road Indicators across Select Countries, 2012						
Country	Road Density (km/sq km)	Share of Paved Road (%)	Road Length in Kilometer			
			Total Highways	Motorways	National Highways	
1	2	3	4	5	6	
Brazil	0.19	13.9	15,84,104	NA	100183 (6.32)	
China	0.44	66.04	42,37,508	96,200 (2.27)	74,271 (1.75)	
France	1.94	100.0 (2010)	10,62,693	11,491 (1.08)	8,894 (0.84)	
India (2012-13)	1.59	60.61	52,31,922	NA	79,116 (1.51)	
Japan	0.90	NA	3,41,509	8,050 (2.36)	51,237 (15.0)	
Korea, Republic	1.06	83.43	1,05,703	4,044 (3.83)	13,766 (13.02)	
Russian Federation	0.08	72.3	12,83,400	NA	NA	
United Kingdom	1.73	100.00	4,20,346	3,733 (0.88)	49,076 (11.68)	
United States of America	0.67	NA	65,86,623	76,335 (1.11)	25,531 (0.39)	

Sources: For India – Transport Research Wing, Ministry of Road Transport & Highways
For all other countries – 'World Road Statistics 2014', International Road Federation, Geneva
Figures in parentheses in columns 1 & 3 refer to the year while in columns 5 and 6, it indicates the % share of the category in total road length.

21.4 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. As per Basic Road Statistics of India 2012-13, while the number of registered motor vehicles has grown at a CAGR of 10.8 per cent between 1951 and 2013, the growth in the road network during the same period was 4.2 per cent. In the past decade, 2003-13, total road network grew at CAGR of 4.0 %, with the highest CAGR recorded by rural roads (4.3%), followed by urban roads (4.1%), State Highways and Other PWD Roads (SH and OPWD roads) (4.0%), NH (3.1%) and project roads (1.8%). 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 2013

CAGR (in %) of Road Networks and Total Registered Motor Vehicles -1951 to 2013							
Period	Roads						Total Registered Motor Vehicles
	NHs	SHs & OPWD	Rural	Urban	Project	Total	
2013/1951	2.2	3.2	4.5	-	-	4.2	10.8
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
2013/2003	3.1	4.0	4.3	4.1	1.8	4.0	10.5

21.5 Growth in Road Length : The total road length of the country increased significantly from 3.99 lakh kms as on 31st March, 1951 to 52.32 lakh kms as on 31st March 2013, growing at a Compound Annual Growth Rate (CAGR) of 4.2%. While in 1951, the network of roads was comprised of NHs, SHs, OPWD roads and rural roads, urban and project roads were added later on to the network of roads from 1961 and 1971 respectively. During the period 1951 to 2013, rural roads recorded the highest CAGR of 4.5% amongst the various categories of roads and the largest share in the road network as on 31st March 2013 was that of rural roads (60.39%). As on 31st March 2013, other PWD Roads accounted for the second highest share (20.39%), followed by Urban Roads (8.53%), Project Roads (5.94%), State Highways (SHs) (3.24%) and National Highways (NHs) (1.51%)

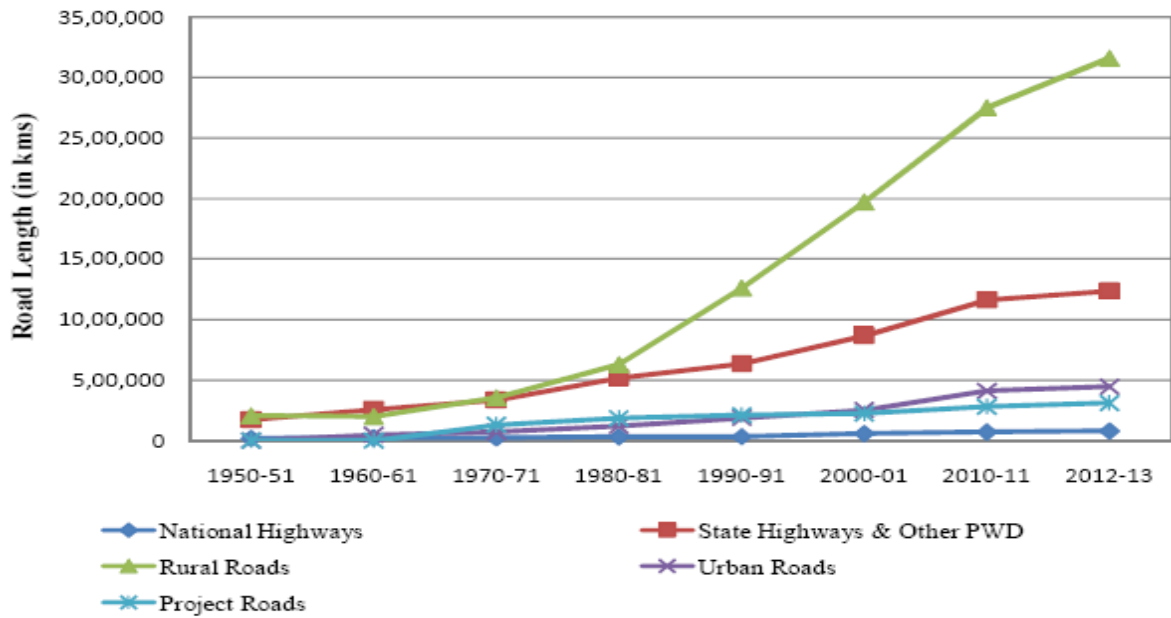
21.6 Road network in India increased by about 3.7 lakh Kms during last one year (2011-12 to 2012-13). Most of the increase was in case of rural roads

which increased by about 3.2 lakh Kms with increase of about 1.8 lakh Kms in JRY & PMGSY roads and about 1.4 lakh Kms in case of Panchayati Raj Roads .

21.7 Category wise Growth in Road Length : The share of NHs in the total length of road network was 1.51% of the total road length of the country as on 31st March, 2013, having decreased from 4.95% as on 31st March 1951. The share of SHs and OPWD roads together was 43.44% as on 31st March 1951. Their share reduced to 23.63% as on 31st March, 2013. The share of urban roads has more or less remained the same; from 8.84% as on 31st March 1961, it has marginally reduced to 8.53% as on 31st March 2013. The share of project road has declined from 14.31% as on 31st March 1971 to 5.94% as on 31st March 2013. Share of rural roads, meanwhile, has increased from about 52 % as on 31st March 1951 to over 60 % as on 31st March 2013.

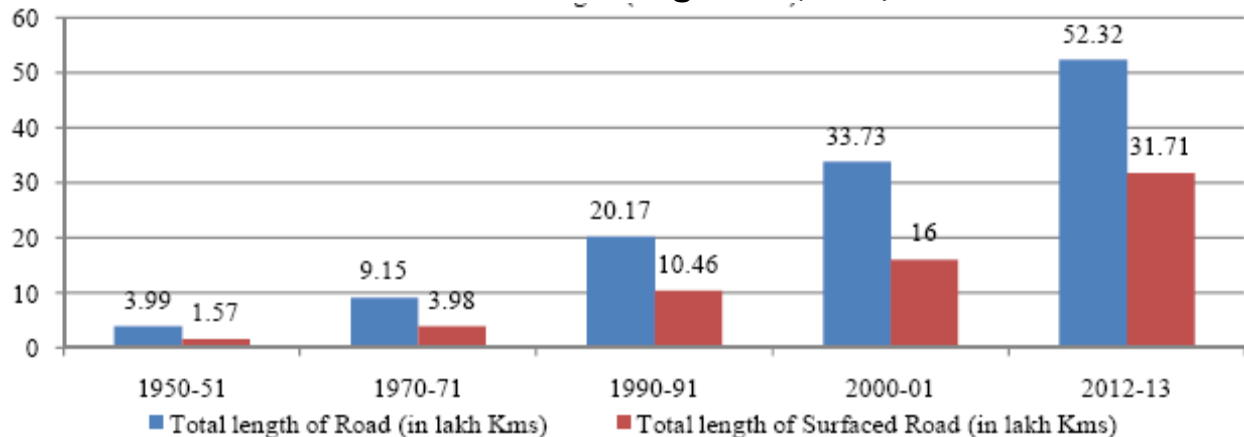
Road Network by Categories (in kilometres) -1951 to 2013 (As on 31 st March)								
Road Category	1951	1961	1971	1981	1991	2001	2011	2013
National	19,811	23,798	23,838	31,671	33,650	57,737	70,934	79,116
Highways	(4.95)	(4.54)	(2.61)	(2.13)	(1.45)	(1.71)	(1.52)	(1.51)
State Highways	^	^	56,765	94,359	1,27,311	1,32,100	1,63,898	1,69,227
			(6.20)	(6.35)	(5.47)	(3.92)	(3.50)	(3.24)
OPWD Roads	1,73,723	257,125	2,76,833	4,21,895	5,09,435	7,36,001	9,98,895	10,66,747
	(43.44)	(49.02)	(30.26)	(28.40)	(21.89)	(21.82)	(21.36)	(20.39)
Rural Roads	2,06,408	197,194	3,54,530	6,28,865	12,60,430	19,72,016	27,49,804	31,59,639
	(51.61)	(37.60)	(38.75)	(42.34)	(54.15)	(58.46)	(58.80)	(60.39)
Urban Roads	0	46,361	72,120	123,120	1,86,799	2,52,001	4,11,679	4,46,238
	(0.00)	(8.84)	(7.88)	(8.29)	(8.03)	(7.47)	(8.80)	(8.53)
Project Roads	0	0	1,30,893	1,85,511	2,09,737	2,23,665	2,81,628	3,10,955
	(0.00)	(0.00)	(14.31)	(12.49)	(9.01)	(6.63)	(6.02)	(5.94)
Total	3,99,942	5,24,478	9,14,979	14,85,421	23,27,362	46,90,342	46,76,838 *	52,31,922
Note: Figures within parentheses indicate per cent to total road length in each road category.								
^ Included in OPWD roads								
* Fig is less because of non reporting in some States.								

Growth in Road Length by categories: 1951:2013



21.8 Along with the increase in the total road length, the **surfaced road** length has also increased. The latter grew from 1.57 lakh kms as on 21st March 1951 to 31.71 lakh kms as on 31st March 2013. Surfaced roads formed 39.4% of the total road length as on 31st March, 1951. Their share increased to 60.6% as on 31st March, 2013.

Total & Surfaced Road Length in (Kms) in India

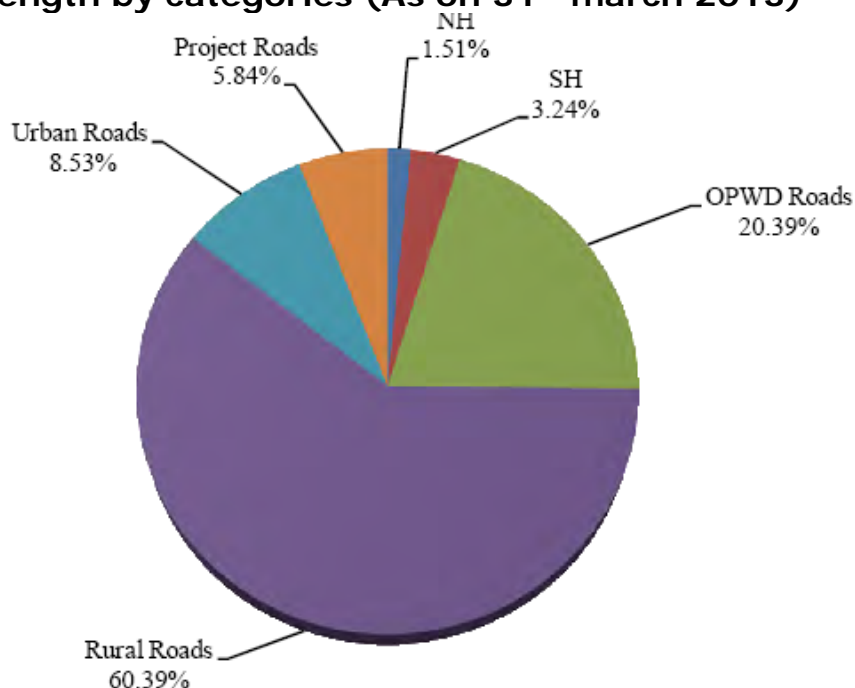


21.9 Maharashtra recorded the highest road length of 589,625 kms as on 31st March, 2013 which was 13.6 % of the total road length, excluding Jawahar Rozgar Yojana roads. The five states with the largest road

networks, viz. Maharashtra, Uttar Pradesh, West Bengal, Karnataka and Assam, accounted for about 44.52 % of the total road length of the country.

21.10 Road Network in Terms of Broad Categories : Rural roads with more than 60 % share in the total road length continue to constitute the major share. National Highways, though constitute small proportion of total road length (1.5%), 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 (As on 31st march 2013)



21.11 National Highways : All NHs are surfaced. As on 31st March 2013, two-lane NHs constituted the largest share of NHs, i.e. 51.39% of the total length of NHs, followed by single/intermediate lane NHs (24.43%) and four lanes and above (24.18%). Compared to 2011-12, there was a marginal decrease both in terms of length and proportion in two categories of NHs, viz. two-lane and four lanes and above NHs. Uttar Pradesh accounted for the largest share (9.9%) of the total length of NHs as on 31st March 2013, followed by Rajasthan (9.1%), Madhya Pradesh (6.5%), Andhra Pradesh (6.3%) and Tamil Nadu (6.2%). These five States accounted for about 38.02% of the total road length of NHs.

21.12 State Highways: State Highways act as arterial roads within a State. As on 31st March, 2013, out of total length of State Highways around 98.8% were surfaced. Out of total length of surfaced SHs, Bituminous Top (BT) and

Cement Concrete (CC) roads accounted for 99.02% and the remaining were Water Bound Macadam (WBM). Maharashtra accounted for the largest share (22.9 %) as on 31st March 2013, followed by Karnataka (12.3%), Gujarat (10.9%), Madhya Pradesh (6.5%) and Tamil Nadu (6.4 %). These five States accounted for about 59.0% of the total length of SHs.

21.13 **Other PWD Roads (OPWD Roads)** consist of district roads and rural roads developed and maintained by Public Works Department of the State/UTs . They serve as the main roads for intra district movements. As on 31st March, 2013, out of total length of OPWD Roads, around 86.4% were surfaced. Out of the total length of surfaced OPWD Roads, Bituminous Top (BT) and Cement Concrete (CC) roads accounted for 90.1% and the remaining were Water Bound Macadam (WBM). Maharashtra accounted for the largest share (22.9%) in total length of OPWD Roads as on 31st March 2013, followed by Uttar Pradesh (17.4%), Rajasthan (7.6%), Gujarat (5.3%) and Andhra Pradesh (5.3%) . These five States accounted for about 58.6% of the total length of OPWD Roads.

21.14 **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, 2013, was 31,59,639 kms. Out of this, 17,25,318 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), 5,34,321 kms of PMGSY Roads by National Rural Road Development Agency (NRRDA), Ministry of Rural Development and the remaining 9 lakhs kms (nine lakh kms) of roads were constructed under Jawahar Rozgar Yojana (JRY). Maharashtra accounted for the largest share (11.6%) in total length of Rural Roads as on 31st March 2013, followed by Assam (9.8%), Odisha (9.4%), West Bengal (8.1%) and Andhra Pradesh (7.5%) These five States accounted for about 46.5% of the total length of Rural Roads.

21.15 **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 94.86%, followed by railways roads (2.47%), MES roads (2.42%), major ports roads (0.19%) and minor ports roads (0.06%). West Bengal accounted for the largest share (21.0%) in total length of Urban Roads as on 31st March 2013, followed by Uttar Pradesh (17.2%), Karnataka (9.6%), Delhi (6.6%) and Tamil Nadu (5.0%) These five States accounted for about 59.4% of the total length of Urban Roads.

21.16 **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, 2013, Forest Department Roads accounted for the highest share of 51.93%, followed by Irrigation Department Roads (30.44%), BRO Roads (8.15%) and remaining constituted 9.48%.

Government Initiatives:

21.17 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)

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

21.19 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).

21.20 As per National Highways Authority of India, out of the 5846 Km length of Golden Quadrilateral, the task for 6/4 has already been completed in 2012 & out of 7142 Km of NS-EW corridors, task of 6/4 laning has been completed for 6394 Km as on 31st July 2015. Taking together allocation to NHAI under various phases of NHDP (Including Misc, (till NHDP Phase VII), out of 48,648 km road length, 24,379 Kms have already been 4/6 laned and work for 9608 Km was under implementation as on 31st July 2015, whereas contract for 14,661 Kms was yet to be awarded.

21.21 **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, Registered motor vehicles, production & sales of motor vehicles, revenue from road transport, road accidents- injuries and fatalities by various categories etc . Information on expenditure related to Raods 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, 2012-13**, Ministry of Road Transport & Highways , has been used extensively. Information on Progress of NHDP has been taken from website of NHAI.