

CHAPTER 19

RAILWAYS

19.1 Railways in the World : During 2014, statistics from International Union of Railways, UIC members indicates significant increase of about 7.2% in passenger traffic in terms of passenger kilometres (pkm) whereas the freight traffic was estimated to contract by 1% (in terms of tonnes kilometres) compared to the year before. Though the decrease in freight traffic at 9690 billion tonnes Km from 9789 billion tonnes km during 2013 was significant, the passenger traffic increased by over 200 billion passenger kms to reach 3070 billion passenger Km during 2014. Bleak European scenario continued to manifest itself through decline in movement of both goods and passengers. Asia, Ocenia & Middle East, which comprise bulk of the passenger traffic, contributed to the overall increase in passenger traffic, besides Africa. Growth in freight traffic was observed in Russia's extremely dynamic freight sector.

19.2 Asia, Ocenia & Middle East put together accounts for more than three quarters of railway passenger traffic (pkms) and during 2014, within the group, India accounted for about half the share (49 % approx). Out of the total passenger traffic in the world, during 2014, India accounted for about one third (38%) and China accounted for about a quarter (26%). However, in terms of freight traffic as measured by tonnes kilometers, USA, China & Russian Federation each accounts for about a quarter of world freight traffic . Share of India in the same was about 7 per cent.

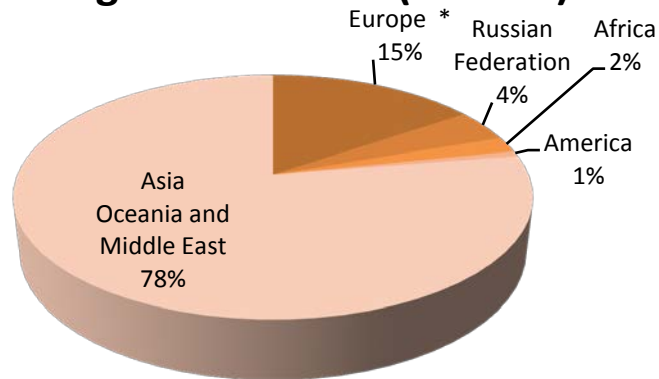
19.3 USA leads in rail network, in terms of length of lines, accounting for about a fifth of total rail network. Russian Federation with about 8 % share , China and India also contributed significantly to world rail network.

International Railway Statistics : Synopsis (Source : International Union of Railways, UIC)

<u>Passenger-kilometres (billions)</u>	2007	2008	2009	2010	2011	2012	2013	2014	Δ%
Europe (including Turkey)	469.2	483.8	470.5	472.8	485.6	480.0	476.1	475.3	-0.2%
Russian Federation	173.4	175.9	153.6	139.0	139.8	144.6	144.6	128.8	-10.9%
Africa	61.6	62.0	62.2	62.3	49.3	49.3	49.3	63.5	29%
America	13.3	14.0	13.5	12.0	20.8	20.9	22.3	21.7	-2.4%
Asia Oceania and Middle East	1,788.6	1,950.9	2,012.0	2,079.3	2,187.8	2,171.7	2,173.0	2,380.9	9.6%
WORLD estimates	2,506.1	2,686.6	2,711.9	2,765.4	2,883.4	2,866.6	2,865.3	3,070.2	7.2%
<u>Tonne-kilometres (billions)</u>	2007	2008	2009	2010	2011	2012	2013	2014	Δ%
Europe (including Turkey)	723.2	986.8	546.0	700.6	648.6	621.4	604.1	569.6	-5.7%
Russian Federation	2,090.3	2,116.2	1,865.3	1,903.2	2,127.2	2,222.4	2,222.4	2,298.6	3.4%
Africa	139.2	138.4	137.1	139.2	139.1	139.1	139.4	158.7	14%
America	3,540.2	3,513.8	2,973.2	3,076.1	3,132.6	3,231.0	3,231.0	3,252.5	0.7%
Asia Oceania and Middle East	3,095.9	3,452.7	3,466.2	3,462.0	3,621.2	3,593.1	3,592.3	3,410.7	-5.1%
WORLD estimates	9,588.9	10,207.9	8,987.9	9,281.2	9,668.6	9,807.0	9,789.2	9,690.2	-1.0%
<u>Length of lines (kilometres)</u>	2007	2008	2009	2010	2011	2012	2013	2014	Δ%
Europe (including Turkey)	2,64,630.4	2,63,805.8	2,68,465.9	2,85,408.3	2,70,341.9	2,65,115.6	2,65,231.0	3,48,514.0	1.4%
Russian Federation	84,158.0	85,194.0	85,281.0	85,292.0	85,167.0	84,249.0	84,249.0	85,266.0	1.2%
Africa	52,400.0	52,482.0	52,299.0	50,274.5	70,505.1	70,504.6	70,505.0	50,959.0	-28%
America	3,89,862.8	3,86,772.8	3,83,079.2	3,75,773.6	3,69,222.0	3,69,222.0	3,81,538.0	3,71,114.0	2.7%
Asia Oceania & Middle East	2,22,644.5	2,21,827.0	2,24,151.0	2,24,204.9	2,33,570.4	2,32,365.9	2,27,707.0	2,29,702.0	0.9%
WORLD estimates	10,13,695.7	10,10,081.6	10,13,276.1	10,20,953.2	10,28,806.4	10,21,457.1	10,29,230	10,00,289	-2.8%

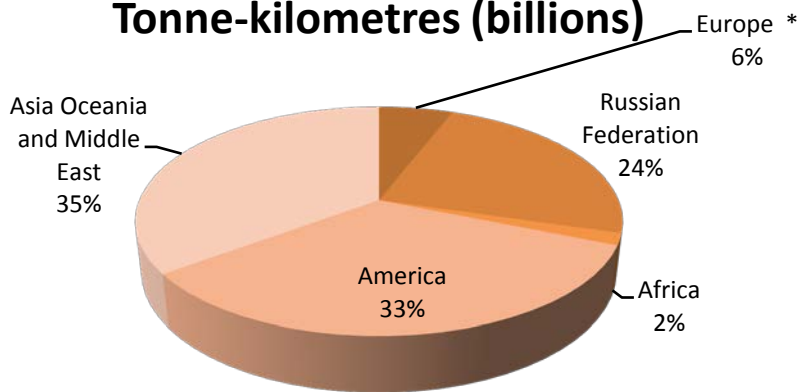
International Railway Statistics 2014

Passenger-kilometres (billions)



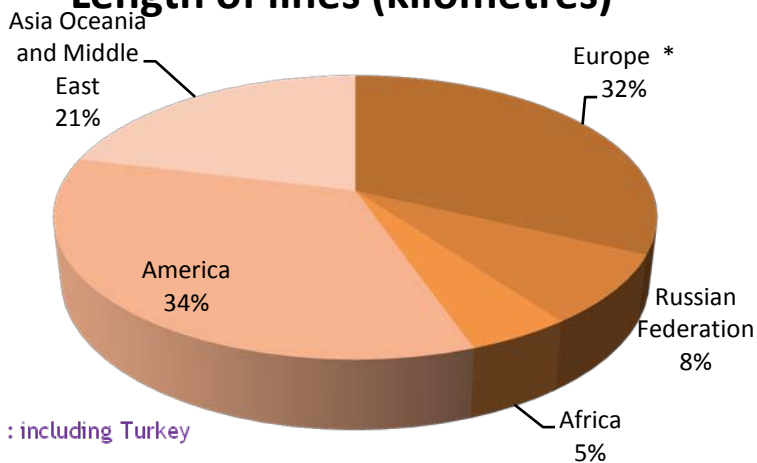
Europe* : including Turkey

Tonne-kilometres (billions)



Europe* : including Turkey

Length of lines (kilometres)



Europe* : including Turkey

Source : International Union of Railways, UIC

(The analysis is however constrained by data availability for the recent year and use of previous years data for large entities is likely to introduce the effect of no change in annual comparisons).

19.4 Indian Railways(IR) : Indian Railways(IR) have a history and rich heritage spanning over 150 years. IR is a state owned public utility of

Government of India under the Ministry of Railways. As a national common carrier transporting passenger and goods over vast network of 65,808 kms route lengths, it has played a key role in India's social and economic development. It is a cheap and affordable means of transportation for millions of passengers. As a carrier of bulk freight namely ores and minerals, iron and steel, Cement, mineral oils, food grains and fertilizers etc, the importance of Indian Railways for development of Agriculture, Industry and for the benefit of common men, is well recognized.

19.5 The first railway on Indian sub-continent ran over a stretch of 21 miles from Bombay to Thane. However, the first passenger train steamed out of Howrah station destined for Hooghly, a distance of 24 miles, on 15th August, 1854 . In south, the first line was opened on 1st July, 1856 by the Madras Railway Company. By 1880, the Indian Railway system had a route mileage of about 9000 miles. Presently, Indian Railways, the premier transport organization of the country is the largest rail network in Asia and the world's second largest under one management.

19.6 For Administrative purposes, Indian Railways is divided into 17 zones which include Metro Railway, Kolkata. These zones are further sub divided into 68 operating Division. IR has 1,36,720 bridges, out of which 741 are important, 10,944 are major and 1,25,035 are minor bridges. In 2013-14, 739 bridges were rehabilitated/rebuilt.

19.7 The Indian Railways are also classified by Gauges as Broad (1.676m.), Meter (1.000m) and Narrow (0.762m. & 0.610m) according to the minimum distance between two rails in meters mentioned in brackets. During 2013-14, Indian Railways carried 23 million passengers and 2.90 million tonnes of freight each day on an average.

19.8 Four sites of Indian Railways have been declared as "World Heritage site" by the UNESCO. These are Darjeeling, Himalayan Railway inscribed in 1999, Mumbai CST Building inscribed in 2004, Neelgiri Mountain Railways inscribed in 2005 and Kalka-Shimla Railways inscribed in 2008.

19.9 At present, 5 luxury tourist trains are run by Indian Railways which are (i) "Palace on Wheels" in a circuit covering Rajasthan, Delhi and Agra, (ii) "Royal Rajasthan on Wheels" in a circuit covering Rajasthan, Delhi, Agra, Khujrao and Varanasi, (iii) "Deccan Odyssey", (iv) "Golden Chariot" and (v) "Maharajas"s Express covering various tourist destinations spread across the country. Besides, Indian Railways also operate "Fairy Queen" the Heritage Steam Train between Delhi and Alwar offering weekend package, Buddhist special train in the popular Buddhist circuit and "Bharat Darshan" trains for the common man.

Performance of Indian Railways :

19.10 Rail Network : As on 31.03.2014, the route length of Indian Railways covered 65,808 kms. with running track length of 89,919 kms. The total trackage including yards, sidings etc. stood at 1,16,765 kms.

19.11 During 2013-14, new lines over a length of 449 Kms. were constructed, 404 Kms. of track was converted from MG/ NG to BG , 708 Kms. of track has been doubled from single line to double line and 2,885 Kms. of track renewal was carried out. During 2013-14 , 1350 route kms of railway electrification was commissioned and 21,614 route kms were electrified as on 31.03.2014, taking the percentage of electrified route kms to total route kms to 32.84 %. This percentage has increased over the years starting from 8.73 % in 1980-81. A brief trend indicating developments in electrification is given in the table below:

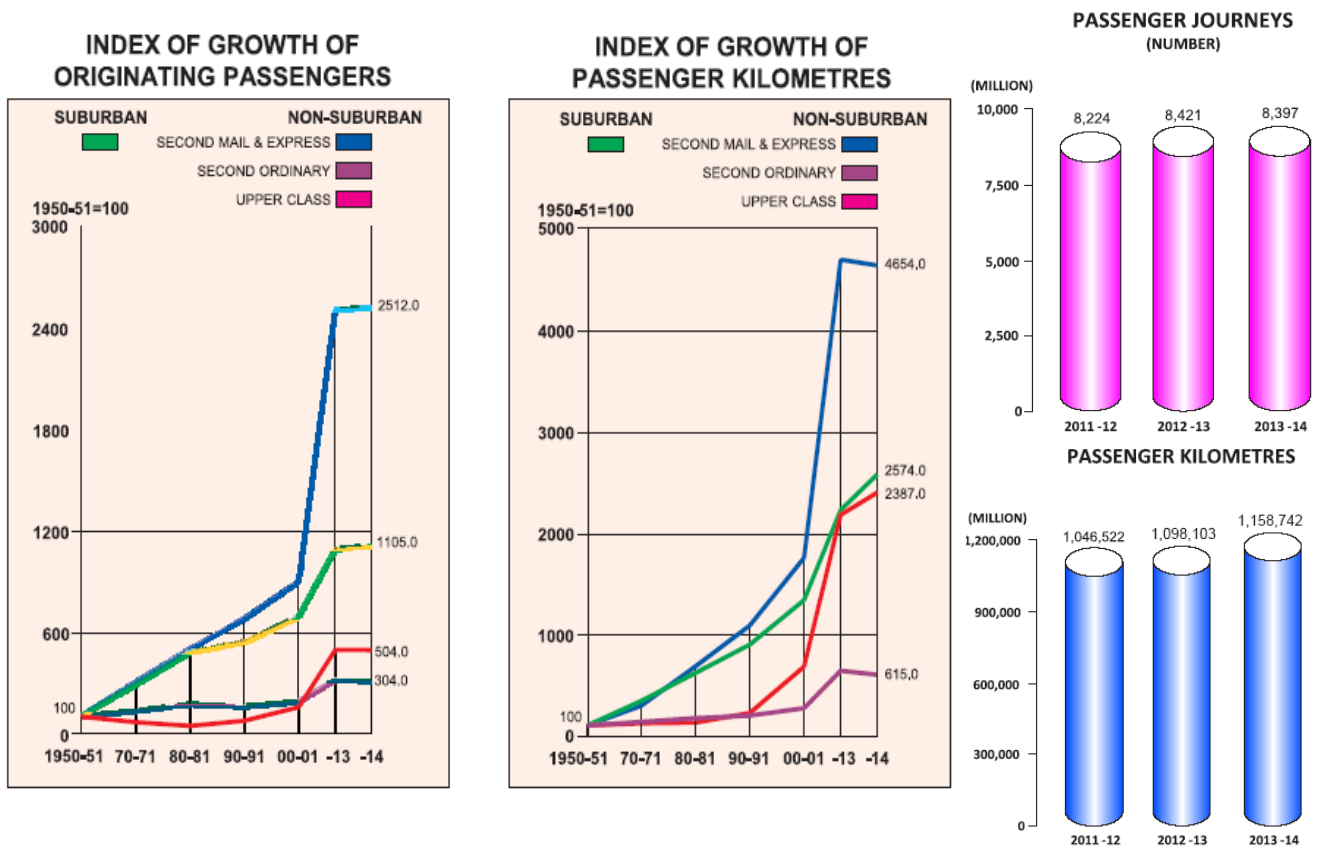
Year	Route Kms.		Running track Kms.		Total track Kms.	
	Electrified	Total	Electrified	Total	Electrified	Total
1950-51	388	53,596	937	59,315	1,253	77,609
1960-61	748	56,247	1,752	63,602	2,259	83,706
1970-71	3,706	59,790	7,447	71,669	9,586	98,546
1980-81	5,345	61,240	10,474	75,860	13,448	104,480
1990-91	9,968	62,367	18,954	78,607	25,305	108,858
2000-01	14,856	63,028	27,937	81,865	36,950	108,706
2009-10	18,927	63,974	35,811	87,087	48,639	113,617
2010-11	19,607	64,460	36,000	87,040	49,489	113,993
2011-12	20,275	64,600	38,775	89,910	51,198	115,171
2012-13	20,884	65,436	38,236	89,236	52,101	1,15,833

Includes track in yards, sidings, crossings at stations, etc.

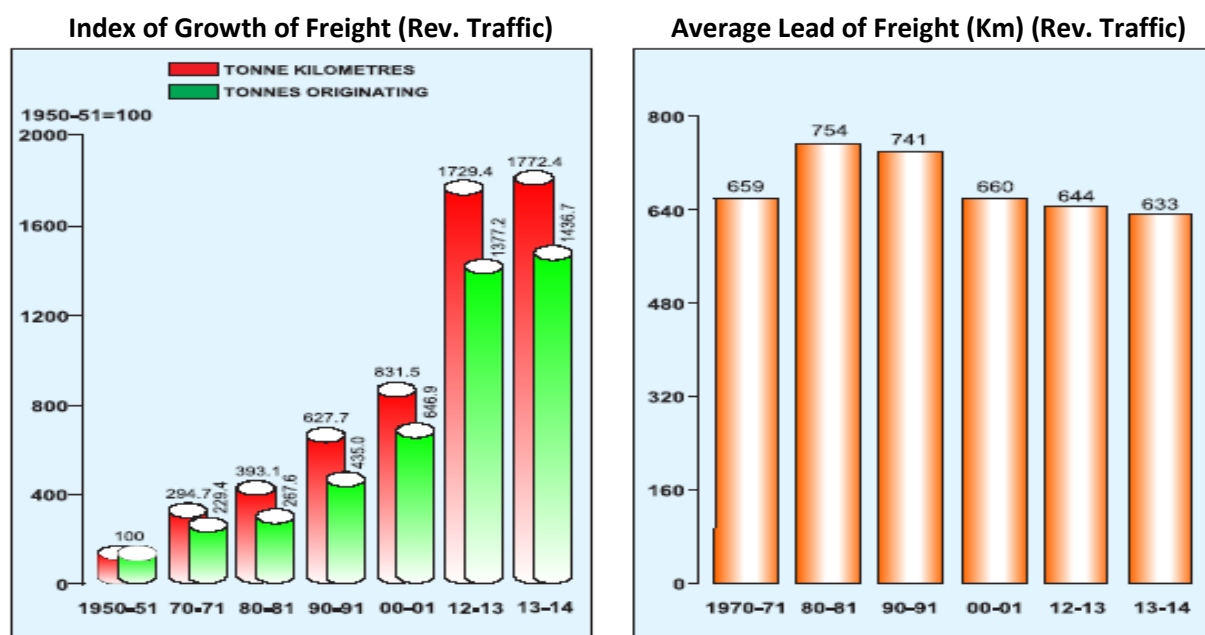
Rail Transport :

19.12 Passenger Business: Indian Railways is a commonly used mode of public transportation in the country. During 2013-14, it carried 8,397 million passengers as against 8,421 million in 2012-13, a decrease of 24 million passengers carried. During 2013-14, passenger kilometres, which is calculated by multiplying the number of journeys by mean kilometric distance was 1,159 billion, up by 5.56% from 1,098 billion in the previous year. Passenger earnings also increased by Rs 5,209.41 crore (16.63%) in comparison with 2012-13.

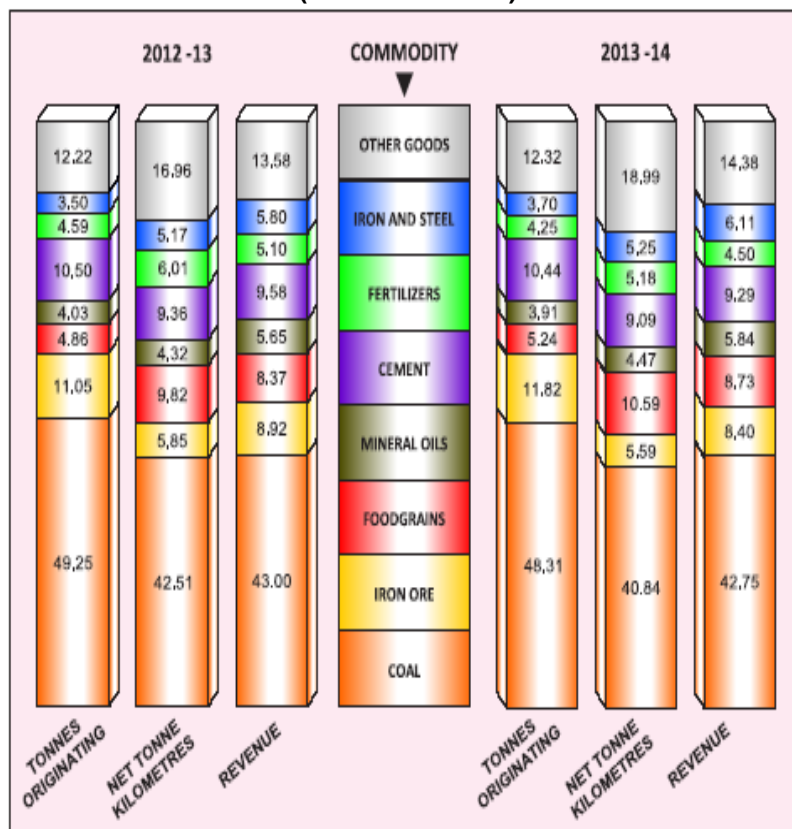
Passenger Kilometres								Number of Passengers Originating							Avg Lead
Year	Suburban (All classes)	Non suburban					Grand Total	Suburban (All classes)	Non suburban					Grand Total	(in kms.)
		Second Class				Total Non- subur- ban			Second Class				Total Non- subur- ban		
		Upper Class	Mail/ Exp#	Ordinary	Total				Upper Class	Mail/ Exp#	Ordinary	Total			
1950-51	6,551	3,790	12,537	43,639	56,176	59,966	66,517	6,551	3,790	12,537	43,639	56,176	59,966	66,517	51.8
1960-61	11,770	3,454	22,251	40,190	62,441	65,895	77,665	11,770	3,454	22,251	40,190	62,441	65,895	77,665	48.7
1970-71	22,984	4,394	37,856	52,886	90,742	95,136	118,120	22,984	4,394	37,856	52,886	90,742	95,136	118,120	48.6
1980-81	41,086	5,140	86,712	75,620	162,332	167,472	208,558	41,086	5,140	86,712	75,620	162,332	167,472	208,558	57.7
1990-91	59,578	8,712	138,054	89,300	227,354	236,066	295,644	59,578	8,712	138,054	89,300	227,354	236,066	295,644	76.6
2000-01	88,872	26,315	222,568	119,267	341,835	368,150	457,022	88,872	26,315	222,568	119,267	341,835	368,150	457,022	94.6
2010-11	137,127	62,203	500,631	278,547	779,178	841,381	978,508	137,127	62,203	500,631	278,547	779,178	841,381	978,508	127.9
2011-12	144,057	72,148	548,861	281,456	830,317	902,465	1,046,522	144,057	72,148	548,861	281,456	830,317	902,465	1,046,522	127.2
2012-13	145,654	82,674	587,785	281,990	869,775	952,449	1,098,103	145,654	82,674	587,785	281,990	869,775	952,449	1,098,103	130.4
2013-14	168,589	89,117	612,475	288,561	901,036	990,153	1,158,742	168,589	89,117	612,475	288,561	901,036	990,153	1,158,742	138.0
# also includes sleeper class															



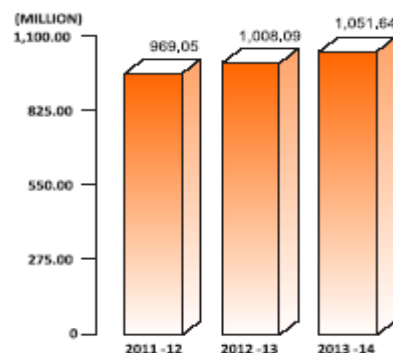
19.13 **Freight** : In 2013-14, IR loaded 1,058.81 million tonnes of freight traffic of which 1,051.64 million tonnes was revenue-earning and 7.17 million tonnes of non-revenue earning nature. It also achieved total net tonne kilometers (NTKMs) of 667 billion as against 651 billion in 2012-13. The freight earnings went up from Rs 83,478.83 crore in 2012-13 to Rs 91,570.85 crore in 2013-14, registering a growth of 9.69%. Following charts delineate basic characteristics in growth of freight traffic over the years .



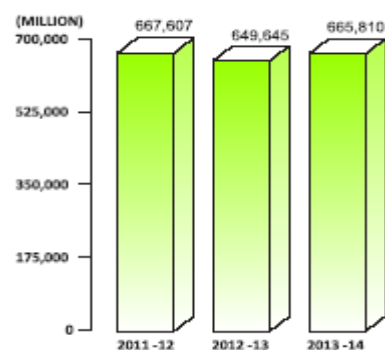
**Pattern of Revenue Earning Freight Traffic
(Percent to Total)**



**TONNES ORIGINATING
(REVENUE-EARNING)**



**NET TONNE KILOMETRES
(REVENUE - EARNING)**



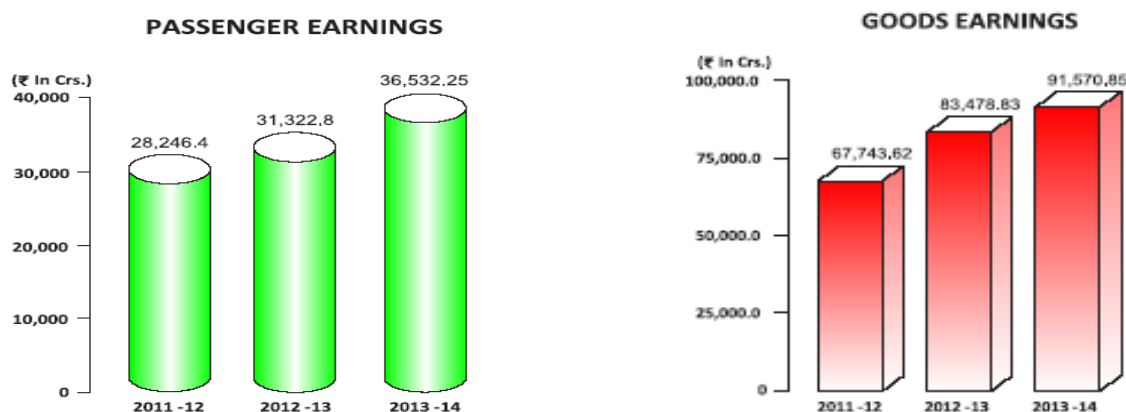
19.14 Traffic Density: Huge increase in traffic, both passenger & freight, has been observed in case of Indian Railways. Growth in traffic has outpaced the growth in infrastructure, resulting in increased traffic density. Railways has been converting more & more Narrow gauge and Meter Gauge lines into Broad Gauge increasing share of Broad Gauge lines from about 72 % in 2002-03 to 88% in 2013-14. Between 1950-51 and 2013-14, traffic density (million GTKMs. per running track km.) increased from 4.29 to 23.73 on Broad Gauge. Broad Gauge, though forming 88.4% of the route, accounted for 99.9% of the freight output (NTKms) and 98.5 % of the passenger output (Pkms).

Year	(Millions)					
	NTKMs per Running Track Km.		Passenger Kms. per Running Track Km.		Gross tonne Kms. per Running Track Km.	
	B.G.	M.G.	B.G.	M.G.	B.G.	M.G.
1950-51	1.23	0.24	1.45	0.85	4.29	1.19
1960-61	2.19	0.54	1.61	0.87	6.59	2.15
1970-71	2.60	0.79	2.07	1.22	7.49	2.87
1980-81	3.06	0.76	3.63	1.64	8.84	2.63
1990-91	4.41	0.92	4.98	1.87	12.67	3.01
2000-01	4.93	0.24	6.73	2.03	15.55	1.75
2010-11	8.08	0.09	12.37	2.75	22.72	1.29
2011-12	8.26	0.08	12.65	3.39	23.16	1.34
2012-13*	7.90	0.07	12.67	2.68	22.72	1.25
2013-14	8.13	0.10	13.35	2.84	23.73	1.38

*revised

19.15 Earnings: Passenger earnings in 2013-14 were Rs 36,532.25 crore. This was Rs 5,209.41 (16.63%) higher than the earnings in 2012-13. Suburban

traffic contributed 6.19% to the total earnings. The remaining 93.81% came from non-suburban passengers. Earnings from Second and Sleeper Class Mail/Express passengers accounted for 51.34% of the total passenger earnings. The freight earnings went up from Rs 83,478.83 crore in 2012-13 to Rs 91,570.85 crore in 2013-14, registering a growth of 9.69%.



19.16 Revenue from Freight accounted for 65.61% of Gross Earnings. Passenger Earnings constituted 26.18% of the Gross Earnings, of which 6.19% was from Suburban Services, 80.81 % from Express Long distance and 13.00 % from Ordinary Short Distance traffic. Bulk freight like coal, ores, iron & steel, cement, foodgrains, fertilizers, POL products, limestone, dolomite, stones other than marble, salt and sugar contributed 87.58 % of the total goods earnings, while commodities other than the above accounted for 9.93%. Miscellaneous realization like demurrage, wharfage, shunting and siding charges etc. made up the remaining 2.49%.

19.17 In the Railway Budget for 2013-14, the proposal to implement Fuel Adjustment Component (FAC)-linked tariff revision, bi-annually, in sync with the movement in fuel costs in either direction was introduced w.e.f. 01.04.2013. The impact of this revision was an across-the-board increase of 5.8% in freight rates. The average rate charged per tonne km increased from 128.5 paise during 2012-13 to 137.5 paise during 2013-14.

Passenger revenue in terms of earnings per passenger kilometres for different classes during 2012-13 and 2013-14 were as under:

Segment	(in paise)	
	2012-13	2013-14
Non-suburban:		
Upper class	109.67	118.14
Second Class-Mail/Express (incl. sleeper class)	27.47	30.65
Second Class-Ordinary	14.54	17.22
Non-suburban (all classes)	30.78	34.61
Suburban (all classes)	13.80	13.41
Overall average	28.52	31.53

Performance Parameters

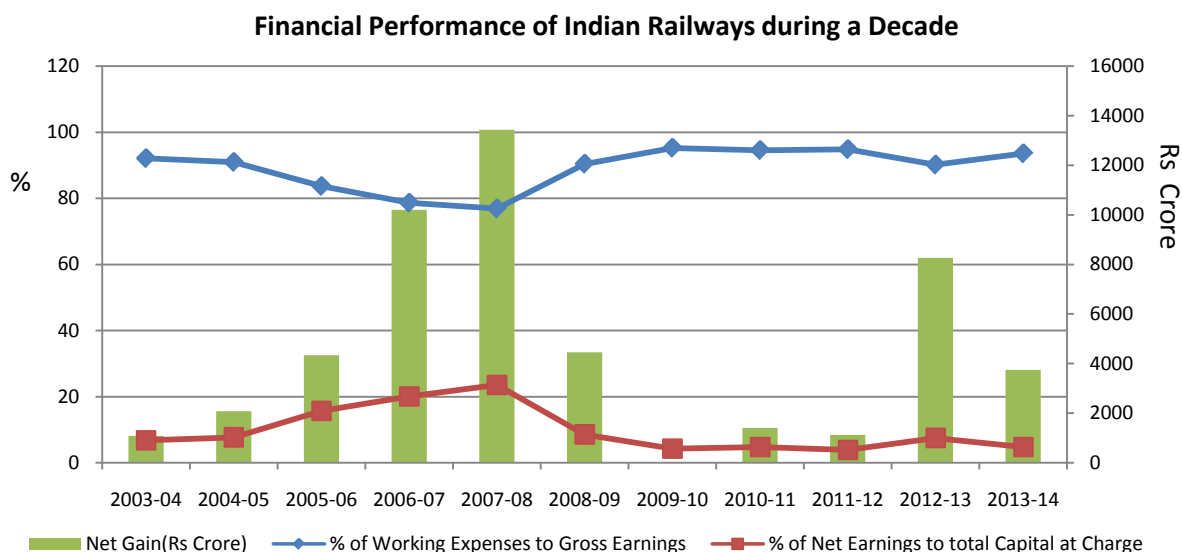
19.18 **Productivity:** IR has been highly successful in improving productivity of its assets in 2013-14. Some important indices for Broad Gauge are given below:

	1980-81	1990-91	2000-01	2012-13	2013-14
Wagon kms. per wagon per day (+)	73.4	110.5	179.0	265.5	266.5
Net tonne kms. (millions) per route km.	4.34	6.30	6.96	11.38	11.45
NTKms. per wagon per day (+)	986	1,407	2,042	8,453	8,471
Passenger kms. (millions) per route km.	5.15	7.12	9.49	18.10	18.80
NTKms. per engine hour	6,295	10,393	12,850	19,468	18,908

(+) From 2009-10 onward figures in terms of 8-wheelers

19.19 **Financial Performance:** Gross Traffic Receipts of the Railways went up from Rs1,23,732.59 crore in 2012-13 to Rs1,39,558.18 crore in 2013-14. Total Working Expenses increased from Rs 1,11,572.04 crore in 2012-13 to Rs 1,30,320.76 crore in 2013-14. After taking into account the miscellaneous transactions, the Net Revenue Receipts were Rs11,749.07 crore and after meeting the Dividend Liability, the year ended with an excess of Rs 3,740.40 crore.

19.20 Various parameters like percentage of Net Earnings to Total Capital at Charge, Percentage of Working Expenses to Gross Earnings & Gain to State on Revenue Account indicated significant improvement during 2005-06 to 2007-08 and a decline thereafter. However, during 2012-13 railways again recorded excess of Rs 8266 Cr (after meeting dividend liability) as its earnings far exceeded its total working expenses.



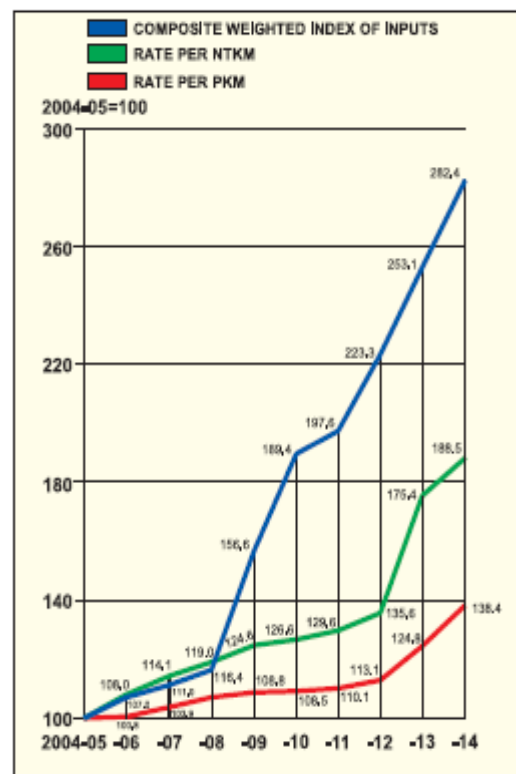
19.21 With a view to reduce the burden on common man, passenger fares and freight rates on products for mass consumption were kept low. The gap between the unit revenue and increase in input costs is given below

(Base 2004-05=100)

	2012-13		2013-14	
	Revenue Index	Cost Index	Revenue Index	Cost Index
Unit Revenue:				
Average receipt per pkm	124.8*		138.4	
Average receipt per ntkm	175.4*		188.5	
Inputs:				
Average annual wage per employee @		333.4*		372.2
Diesel (H.S.D.)		183.6		217.8
Electricity (Railway traction)		125.2		150.6
Transport equipment and parts		129.8		134.5
Non ferrous metals		160.9		164.0
Electrical machinery, equipment & battery		133.0		136.6
Lub. Oil		244.6		259.5
Manufactured products		147.1		151.5
Ferrous metals (Ferro Alloys)		156.3		154.9
Composite weighted index of inputs		253.1		282.4

* revised @ Based on Annual Statistical Statement No.40

UNIT RECOVERY VS UNIT OF INPUT COST



19.22 Terms & Definitions:

- **Capital-at-Charge** : Book value of the capital assets of Railways.
- **Gross Earnings**: The true earnings in an accounting period whether actually realized or not
- **Gross Receipts**: Earnings actually realized in an accounting period.
- **Net Revenue**: Gross traffic receipts minus total working expenses.
- **Working Expenses**: Expenditure on administration, operation, maintenance and repairs, contribution to Depreciation Reserve Fund and Pension Fund .
- **Route Kilometers**: This represents the length of the railway routes open for traffic at the end of each year. In calculating the length of the route, double or more than double lines are counted only once.
- **Running Track Kilometre**: The length of all running tracks excluding tracks in sidings, yards and crossings.
- **Track Kilometre**: The length of all running tracks including tracks in sidings, yards and crossings.
- **Train Kilometres**: This represents the kilometers run by trains carrying passengers or goods or both as well as the kilometers run by empty trains. No deduction is made for departmental trains.
- **Lead**: Average haul of a passenger or a tonne of freight
- **Number of Passengers and Metric Tonne carried**: The figures represent the number of passengers and weight in metric tonne of

goods, originating on all Railways, treating passengers traveling or goods carried over two or more Railways as single journey.

- **Passenger Kilometres and Net Tonne Kilometres:** These figures represent the real indices of the volume of passengers and goods traffic handled. These are arrived at by multiplying the total number of passengers carried and the total tonnage of goods carried by the respective number of kilometers, over which they are moved.

19.23 **Source of Railway Statistics :** Indian Railway is a state owned public utility of Government of India under the Ministry of Railways. The Ministry brings out various publications including the Indian Railways Year Book, Annual Report & Accounts, Facts and Figures and Annual Statistical statements which contains information on railway network- zone wise and all India, railway infrastructure & expenditure thereon- track & bridges, electrification, signal & telecom, rolling stock, traction etc , passenger business & freight operations, asset utilization etc.

References:

- International Union of Railways, UIC Website (Online Statistics -Synopsis 2014).
- Indian Railways - Year Book 2013-14 , Annual Report and Accounts 2013-14 and Facts and Figures 2013-14