INDIAN RAILWAYS

YEAR BOOK
2015-16

सत्यमेव जयते

BHARAT SARKAR
GOVERNMENT OF INDIA
RAIL MANTRALAYA
MINISTRY OF RAILWAYS
(RAILWAY BOARD)

Contents

Key Statistics

		Unit	2014-15	2015-16
PLANT & EQUIPMENT				
Capital-at-charge		₹ in crore	2,42,116.97#	**2,75,135.23@**
Total Investment		"	3,68,758.21	**4,19,123.61**
Route Length		Kms.	66,030	**66,687**
Locomotives		Nos.	10,773	**11,122**
Passenger Service Vehicles		"	61,558	**63,342**
Other Coaching Vehicles		"	7,000	**6,899**
Wagons		"	2,54,018*	**2,51,256**
Railway Stations		"	7,137	**7,216**
OPERATION:				
Passenger:	Train Kms.	Millions	760.8*	**770.03**
	Vehicle Kms.	"	24,812*	**25,327**
Freight:	Train Kms.	"	401.9	**393.44**
	Wagon Kms.	"	18,930	**18,708**
VOLUME OF TRAFFIC:				
Passengers Originating		Millions	8,224	**8,107**
Passenger Kms.		"	1,147,190	**11,43,039**
Tonnes Originating:$				
Revenue Earning Traffic		"	1,095.26	**1,101.51**
Total Traffic (incl. non-revenue)		"	1,101.09	**1,108.62**
Net Tonne Kms.$				
Revenue Earning Traffic		"	6,81,696	**6,54,481**
Total Traffic (incl. non-revenue)		"	6,82,612	**6,55,605**
EMPLOYMENT AND WAGES:				
Regular Employees		Thousands	1,326	**1,331**
Wage Bill Of Regular Employees		₹ in crore	84,759.69*	**93,015.97**
Average Annual Wage per Regular Employee		₹ in units	6,51,376*	**7,18,147**
FINANCIAL RESULTS:				
Revenue		₹ in crore	1,56,710.54	**1,64,333.51**
Expenses		"	1,42,995.88	**1,47,835.93**
Miscellaneous Transactions		"	3,123.83	**2,730.90**
Net Revenue (before dividend)		"	16,838.49	**19,228.48**
Rate of Return on Capital		Percent	6.95	**6.99**
Dividend on Capital		₹ in crore	9,173.55	**8,722.51**
Shortfall(-)/Excess(+)		"	7,664.94	**10,505.97**

* revised

@ Includes investment (₹ 50,449.91 crore) from Capital Fund.

Includes investment (₹ 44,125.17 crore) from Capital Fund.

$ Excludes Konkan Railway.

Other Important Statistics

S.No.	Item	Unit	2014-15	2015-16
I	**Rail Network**			
1	Route Kilometres			
	(i) BG	Kms.	58,825	**60,510**
	(ii) MG	"	4,908	**3,880**
	(iii) NG	"	2,297	**2,297**
	(iv) Total (all gauges)	"	66,030	**66,687**
2	Running Track Kilometres (Total all gauges)	"	90,803	**92,081**
3	Total Track Kilometres (Total all gauges)	"	1,17,996	**1,19,630**
4	Electricfied Route Kilometre (Total all gauges)	"	22,224	**23,555**
II	**Rolling stock**			
1	Number of Locomotives	(in units)		
	(i) Steam	"	43	**39**
	(ii) Diesel	"	5,714	**5,869**
	(iii) Electric	"	5,016	**5,214**
	(iv) Total	"	10,773	**11,122**
2	Number of Wagons	"	2,54,018*	**2,51,256**
3	Number of Coaches-	(in units)		
	(i) Passenger Carriages (including DEMU/DHMU)	"	53,048	**54,506**
	(ii) Other Coaching Vehicles	"	7,000	**6,899**
	(iii) EMU and MEMU Coaches	"	8,475	**8,805**
	(iv) Rail Cars	"	35	**31**
	(v) Total	"	68,558	**70,241**
III	**Loco Utilisation**			
1	Tractive effort per loco			
	(i) BG	Kgs.	36,954	**37,483**
	(ii) MG	"	17,950	**17,853**
2	GTKMs (excl. wt. of engine & dept.) per kg. of tractive effort.			
	(i) BG	Kms.	4,642	**4,314**
	(ii) MG	"	1,337	**1,292**
3	Engine kilometres per day per engine in use (Pass.) (B.G)			
	(i) Diesel	Kms.	605*	**607**
	(ii) Electric	"	712*	**662**

S.No.	Item	Unit	2014-15	2015-16
4	Engine kilometres per day per engine in use (Goods)(B.G)			
	(i) Diesel	Kms.	381*	**367**
	(ii) Electric	"	414*	**380**
5	NTKMs per engine hour (BG) All traction		18,605*	**17,506**
6	Ineffective percentage of locomotives (B.G)	Percent		
	(i) Diesel	"	8.78*	**8.68**
	(ii) Electric	"	7.6*	**6.74**
IV	**Wagon Utilisation**			
1	Wagon KMs in terms of 8 wheelers	Million	18,930	**18,708**
2	Total Carrying Capacity (All Gauges)	Million Tonnes	14.32*	**14.39**
3	Average carrying capacity - wagon	Tonnes		
	BG	"	60	**60.8**
	MG	"	33.1*	**33**
4	Wagon Turn Round (in days) (BG)	Days	4.98	**5.18**
5	Wagon Kms. per wagon per day (BG)	Kms	220.0*	**214.5**
6	NTKMs per wagon per day (BG)	Kms	8,113*	**7,510**
7	Ineffective percentage of wagons (B.G)	%age	4.3*	**4.26**
V	**Coach Utilisation**			
1	Vehicle Kms	Millions		
	(i) Suburban (EMU)	"	1,942	**1,970**
	(ii) Non Suburban	"	22,870*	**23,358**
	(iii) Total	"	24,812*	**25,328**
2	Vehicle Kms per vehicle day (B.G)	Kms.	581	**569**
3	Ineffective percentage of coaches(B.G) (Passenger Carriage)	Percent	6.32*	**5.89**
VI	**Train Utilisation**			
a.	**Passenger Train Performance**			
1	Number of Passenger trains runs daily	Nos.	13,098	**13,313**
4	Passenger Train Kms	Millions	760.8*	**770.3**
b.	**Goods Train Performance**			
1	Number of Goods trains runs daily	Nos.	9,202	**9,212**
2	Goods Train Kms.	Millions	401.9	**393.44**
3	Average Speed of All Goods Train (B.G.)			
	(i) Diesel	Kms./Hour	22.7*	**23**
	(ii) Electric	"	24.5*	**23.7**
	(iii) All Traction	"	23.8*	**23.4**

S.No.	Item	Unit	2014-15	2015-16
4	Average Net load of Goods train (B.G)(All traction)	Tonnes	1,693*	**1,664**
5	Average Gross load of Goods train (B.G)(All traction)	Tonnes	2,951*	**2,955**
VII	**Volume of traffic**			
a.	**Passenger Traffic (Suburban + Non-Suburban)**			
1	Passenger Originating	Millions	8,224	**8,107**
2	Passenger Kilometres	Millions	11,47,190	**11,43,039**
3	Average Lead	Kms.	139.5	**141**
4	Passenger Earnings	₹ in crore	42,189.61	**44,283.26**
5	Average rate per PKMs	Paise	36.78	**38.74**
6	Number of Passenger carried per day	Millions	23.00	**22.21**
b.	**Freight Traffic (Revenue)**			
1	Tonnes originating	Millions	1,095.26	**1,101.51**
2	Lead (originating)	Kms.	622	**594**
3	Freight Earnings excl. Demurrarge/Wharfage	₹ in crore	1,03,100.15	**1,06,940.55**
4	Frieght NTKMs	Millions	6,81,696	**6,54,481**
5	Average rate per NTKMs	Paise	151.2	**163.4**
6	Earnings per million tonne	₹ in crore	94.13	**97.09**
7	Freight carried per day (including non-revenue)	Millions Tonnes	3.02	**3.03**
VIII	**Train Accidents (Excl. KRCL)**	Nos.	131	**106**
1	Collisions	"	5	**3**
2	Derailment	"	60	**64**
3	Level Crossing	"	56	**35**
4	Fire in trains	"	6	**-**
5	Miscellaneus	"	4	**4**
6	Accident per million train kms		0.11	**0.10**
IX	**Density**			
1	Net Tonne Kms per route Km. (BG)	Km.	11.60	**10.83**
2	Passenger Kms per route Km. (BG)	"	19.24	**18.66**
3	Gross Tonne Kms per route Km. (BG)	"	33.75*	**32.35**
X	**Comsumption of Fuel/Energy by Locomotive**			
	(i) Diesel	Million litres	2,856.19	**2,874.35**
	(ii) Electric	Million KWH	15,742.89	**15,701.20**
	* revised			

ECONOMIC REVIEW

Macroeconomic outcome

Amidst a subdued global economic milieu, India's macroeconomic outcome remains robust and stands out in comparison with its peers. The global economic and financial turbulence continues to cast a shadow on the outcome of most economies with commodity price shocks, volatile equity and currency markets and policy stances including market expectations in this regard in major economies. Growth in advanced economies has improved modestly since 2013, while the emerging economies have witnessed a consistently declining trend in growth rate since 2010. It is against this background that the resilience to shocks and robust growth outcome of the Indian economy assumes significance. This owes to the strength of the domestic demand and the structure of the Indian economy. Consumption (65.4 per cent) and investment (31.2 per cent) continue to remain the major components of the gross domestic product (GDP) in 2015-16. While the weak external sector demand remains a serious challenge as together imports and exports constituted over 43 per cent of the GDP, the growth outcome in 2014-15 and 2015-16 was supported by net exports which continued to be negative but by a somewhat lesser magnitude than that obtained in normal years. Lower levels of current account deficits and ample financing through capital inflows with robust and record gross inflow of foreign direct investment (FDI) testify to the strengths of the economy. These in conjunction with the fiscal rectitude of the Government and the contextually calibrated monetary policy stance of the Reserve Bank of India (RBI) imparted resilience to the global turbulence. The decline in CPI inflation owes largely to the economic policies and the robust economic outcome and to the lower global commodity prices of key intermediates. While growth has been strong, it was uneven driven mainly by private consumption and public investment. Going forward, for sustainable and rapid medium term growth, private sector investment and exports need to revive.

GDP Growth:

As per the Provisional Estimates of Gross Domestic Product (GDP) at constant (2011-12) prices or real GDP in the year 2015- 16 was placed at a level of ₹113.50 lakh crore, as against the First Revised Estimate of GDP for the year 2014-15 of ₹105.52 lakh crore. The growth in GDP during 2015-

16 is estimated at 7.6 per cent as compared to the growth rate of 7.2 per cent in 2014-15. Real gross value added (GVA), i.e, GVA at basic constant (2011-12) prices for the year 2015-16 which reflects the production side or supply side method of calculating GDP is estimated at ₹104.27 lakh crore showing a growth rate of 7.2 per cent (as against 7.1 per cent as per the First Revised Estimates of GVA for the year 2014-15 of ₹97.27 lakh crore). 'Agriculture, forestry and fishing' registered a year-on-year growth rate of 1.2 per cent in 2015-16. Of the 7 non-agricultural sub-sectors, growth was driven by 'financial, real estate and professional services' (10.3 per cent), manufacturing (9.3 per cent), 'trade, hotels, transport, communication and services related to broadcasting' (9.0 per cent), and 'mining and quarrying' (7.4 per cent).

GDP at constant prices 2011-12

	2012-13 (2nd RE)	2013-14 (2nd RE)	2014-15 (1st RE)	**2015-16 PE**
GDP at constant prices (₹ crore)	9226879	9839434	10552151	**11350249**
Growth rate (%)	5.62	6.6	7.2	**7.6**

Source: Central Statistics Office (CSO)
RE: Revised Estimate PE: Provisional Estimate

Agriculture

After reaching a high growth of 4.2 percent in 2013-14, output in agriculture declined by 0.2 per cent in 2014-15. This pattern of undulating growth in agriculture is best explained by the fact that 60 percent of agriculture in India is rainfall dependent. Despite deficiency of monsoon rainfall during 2015-16, production was not affected significantly. As compared to a level of production of 252.02 million tonnes in 2014-15, production during 2015-16 as per the 4th advanced estimate was 252.22 million tonnes. This was higher by 0.20 million tonnes This partly owes to the decline in the share of crop agriculture over time and the shift within in term of value added in crop agriculture.

Production of selected agricultural commodities (million tonnes)

Items	2011-12	2012-13	2013-14	2014-15	**2015-16 4th AE**
Food grains	259.29	257.13	265.04	252.02	**252.22**
Wheat	94.88	93.51	95.85	86.53	**93.50**
Rice	105.30	105.24	106.65	105.48	**104.32**
Coarse Cereals	42.01	40.04	43.29	42.86	**37.94**
Pulses	17.09	18.34	19.25	17.15	**16.47**

Source: Dept. of Agriculture and Cooperation
FE: Final Estimate AE: Advanced Estimate

Industry

While the national accounts data measures value added in industry through the larger dataset of the Ministry of Corporate Affairs, industrial growth on a more frequent monthly basis is measured by the index of industrial production (IIP). As per the latter, industrial growth continued on positive trajectory, starting 2014-15 and registered a growth rate of 2.4 per cent in 2015-16. The manufacturing sector has been a major contributor in sustaining this high growth rate (Table 3). The manufacturing sector, which has a weight of 75.53 per cent in IIP, recorded a growth of 2.0 per cent in 2015-16, as against 2.3 per cent in 2014-15. The growth was the result of continuous government initiative in terms of ease of doing business and Make in India initiative.

Sectoral Growth Rates of Industrial Sector based on IIP (%)
(Base: 2004-05 = 100)

Industry Group	Weight	2011-12	2012-13	2013-14	2014-15	**2015-16**
General Index	100	2.9	1.1	-0.1	2.8	**2.4**
Mining	14.2	-2.0	-2.3	-0.6	1.5	**2.2**
Manufacturing	75.5	3.0	1.3	-0.8	2.3	**2.0**
Electricity	10.3	8.2	4.0	6.1	8.4	**5.7**

Source: CSO

In terms of use-based classification, basic goods and capital goods which witnessed marked improvement in performance during 2014-15, however registered subdued growth of 3.6 per cent and a decline of 2.9 per cent respectively, as against growth rates of 7.0 per cent and 6.4 per cent, during 2014-15. Intermediate goods recorded an increase of 2.5 per cent in 2015-16, as against 1.7 per cent increase during 2014-15. Consumer durable goods recorded a growth of 11.3 per cent during 2015-16, as against a decline of 12.6 per cent in 2014-15. Consumer non durables declined by 1.8 per cent in 2015-16, as against a growth of 2.8 per cent growth recorded in the preceding year.

Infrastructure

The index of 8 core industries (comprising coal, crude oil, natural gas, petroleum refinery products, fertilizers, electricity, cement and finished carbon steel) with a weight of 37.9 in the IIP have a large bearing on the activity in infrastructure. The index grew at 2.9 percent in 2015-16 compared to 4.5 percent in 2014-15 reflecting a general slowdown in the economy. Natural Gas with a negative growth rate of 4.2 percent continued to be the poorly performing infrastructure industry in 2015-16 followed by crude oil and steel, which registered negative growth rates of 1.4 per cent and 1.5 per

cent respectively. Natural gas and crude oil production declined because of the lack of major discoveries and problems associated with old oilfields. The negative growth in steel industry owed to world-wide production glut, which had its impact on developing economy as well. Fertilizer production has witnessed robust growth on account of low oil and gas prices and various government initiatives. Fertilisers and electricity were the drivers of activity recording an improvement in growth from -0.1 percent and 8.4 percent in 2014-15 to 12.1 percent and 5.9 percent in 2015-16 respectively.

Growth (%) in Core Industries (Base: 2004-05=100)

Sectors	Weight	2011-12	2012-13	2013-14	2014-15	**2015-16**
Coal	4.38	1.3	4.6	1.3	8.1	**4.6**
Crude oil	5.21	1.0	-0.6	-0.2	-0.9	**-1.4**
Natural Gas	1.71	-8.9	-14.5	-13.0	-4.9	**-4.2**
Refinery Products#	5.94	3.1	29.0#	1.5	0.3	**3.8**
Fertilizers	1.25	0.4	-3.4	1.5	-0.1	**12.1**
Steel	6.68	10.3	4.1	11.5	4.7	**-1.5**
Cement	2.41	6.7	7.7	3.1	5.6	**4.8**
Electricity	10.32	8.1	4.0	6.0	8.4	**5.9**
Overall	37.90	5.0	6.5	4.2	4.5	**2.9**

Source: Office of the Economic Adviser, D/o Industrial Policy & Promotion
Refinery Products' yearly growth rates of 2012-13 are not comparable with other years on account of inclusion of RIL (SEZ) production data since April, 2012

External Sector

Foreign Trade

After reaching unsustainably high levels in 2011-12 and 2012-13, trade and current account deficits moderated on import restrictions in 2013-14 and continued so in 2014-15. It might be recalled that the restrictions on gold were withdrawn mid-year in 2014-15 and the robust outcome in 2015-16 indicates that the external sector position is now sustainable. Such an outcome in times of continued low growth in trade volumes and weak global prospects is creditable.

India's merchandise exports declined continuously since December 2014 in line with the economic outcome in different countries and reflecting a slowdown in the value of global trade owing to the decline in global commodity prices and weak demand. The value of India's merchandise exports declined by 15.48 per cent to US$ 262.3 billion in 2015-16, year-on-year. Imports for 2015-16 were valued at US$ 381.0 billion, 14.96 per cent lower year-on-year. Moderation in trade deficit in 2014-15 was due to, among other factors, decline in the value of imports of petroleum, oil and

lubricants (POL) by 16.0 percent, caused by fall in international oil price by 20.2 percent in 2014-15. The moderation continued through in 2015-16 with further decline in global crude oil prices, with trade deficit in 2015-16 placed at US $ 118.7 billion.

Export, Import and Trade Deficit (in US $ billion)

Item	2014-15	Growth (%)	**2015-16**	**Growth (%)**
Exports	310.3	-1.29	**262.3**	**-15.48**
Imports	448.0	-0.48	**381.0**	**-14.96**
Trade Balance	-137.7		**-118.7**	

Source: Department of Commerce

Current Account Deficit (CAD)

The outcome in terms of trade data was reflected largely in the trade account on balance of payments basis adjusting for leads and lags. Net invisible earnings declined in 2015-16, primarily reflecting moderation in both net services earnings and private transfer receipts. The CAD moderated to US$ 22.1 billion in 2015-16 (1.1 per cent of the GDP) from US$ 26.8 billion (1.3 per cent of the GDP) in 2014-15 on account of the lower trade deficit.

Foreign Capital Inflows

Reflecting the strength of the macroeconomic outcome, capital/financial flows to India far exceeded the requirements for financing the CAD. Gross foreign direct investment (FDI) inflows to India were placed at US$ 55.6 billion, which is the highest ever. Net FDI increased by 15.3 percent from US$ 31.25 billion in 2014-15 to US$ 36.02 billion in 2015-16. Portfolio investment, however, recorded a net outflow of US$ 4.13 billion in 2015-16 as against a net inflow of US$ 42.21 billion in the year 2014-15 mainly on global financial market turbulence. Thus, reduced level of CAD minimizes India's reliance on foreign institutional investments as the means of financing it and associated vulnerabilities.

Net Foreign Direct Investment (FDI)/Net Portfolio Investment

(In US$ billion)

	Net FDI	**Net Portfolio Investment**
2011-12	22.06	17.17
2012-13	19.82	26.89
2013-14	21.56	4.82
2014-15	31.25	42.21
2015-16	**36.02**	**-4.13**

Source: Reserve Bank of India

Foreign Exchange Reserves & Exchange rate

India's foreign exchange reserves comprise of foreign currency assets, gold, Special Drawing Rights and Reserve Tranche Position in the International Monetary Fund. The reserves increased from US$ 341.64 billion at the end of March 2015 to $ 360.18 billion in March 2016. The rupee-US dollar exchange rate depreciated, by 5.9 percent from ₹ 62.6/US$ on March 31, 2015 to ₹ 66.3/US$ on March 31, 2016, mainly on account of the fact that the dollar strengthened against all the major currencies, as well as the fact that China's growth and currency developments in 2015-16 deteriorated, impacting the outlook on other EMDEs owing to risk-averse perceptions of global investors. It is, however, instructive to note that in 2015-16, the rupee has performed better than the currencies of most of other EMDEs (except the Chinese yuan). A part of the resilience of the rupee could be attributed to the outlook on the economy based on the consolidation path chartered by the fiscal policy and ably supported by the appropriateness of monetary policy framework.

Fiscal outcome

The focus of the recent Budgets on the fiscal consolidation and the strict adherence to the promised fiscal outcome in the recent years were significant features that improved the outlook on the economy with robust investment flows. Fiscal deficit of the Government of India as a proportion of GDP was 4.1 per cent in 2014-15 and 3.9 per cent for 2015-16 (RE) and is budgeted to be 3.5 per cent in 2016-17. What is redeeming is that while earlier these were achieved largely through expenditure compression, in 2015-16, the achievement of the fiscal outcome was broad based. The fiscal deficit of the General Government (State + Centre) is estimated to decline from 6.9 per cent of GDP in 2014-15 to 6.3 per cent in 2015-16. From the angle of internal and external public debt stock, India does not face serious fiscal solvency related issues. At the end of 2015-16, the total outstanding liabilities of the Central government are estimated at 44 per cent of GDP including external debt of 2 per cent of GDP. The adherence to fiscal prudence helped anchor monetary policies and these together with the slew of measures of the Government to control prices resulted in achieving the announced inflation targets in terms of the new series of consumer price inflation as measured by the CSO.

Inflation

The decisive steps taken by the government along with decline in crude prices and benign global prices of tradables helped the economy to retract

from inflationary spiral to stable prices. Headline inflation based on the new series of Consumer Price Index (Combined) averaged 4.9 per cent in 2015-16 as compared to 5.9 per cent in 2014-15. Headline WPI inflation remained negative between November 2014 and March 2016 and it averaged (-) 2.5 per cent in 2015-16 as compared to 2.0 per cent in 2014-15. Fuel inflation which was at (-) 0.94 per cent in 2014-15, further decelerated to (-) 11.67 per cent due to continued weak global demand and fall in the global oil prices. Manufacturing inflation which was at 2.42 per cent in 2014-15 further moderated and fell to (-)1.10 per cent in the year 2015-16.

Annual Inflation rate (%) based on WPI (Base 2004-05=100)

Items/Groups	Weight (%)	April-March (Average)	
		2014-15	**2015-16**
All Commodities	100	2.00	**-2.49**
1.Primary articles	20.1	2.98	**0.31**
2.Fuel and Power Group	14.9	-0.94	**-11.67**
3.Manufactured Products	65.0	2.42	**-1.10**

Source: Computed from base data released by the Office of the Economic Adviser, D/o Industrial Policy & Promotion

WPI based inflation rates of select inputs used by the Indian Railways (IR) recorded negative to low inflation during 2015-16. High speed diesel recorded an inflation rate of (-)16.28 per cent, as against 2.49 per cent in 2014-15. Other inputs like electricity for railway traction and lubricants recorded inflation rates of 3.17 per cent and 2.11 per cent in 2015-16, as against 4.65 per cent and 4.74 per cent in 2014-15, respectively.

Major commodities carried by Indian railways

The following Table (Table 8) shows the percentage of total availability (production plus imports) of some of the major commodities carried by the Indian Railways during the last 5 years.

Percentage of total availability (production plus imports) of select major commodities carried by the Indian Railways

	Coal	Iron Ore	Cement	Foodgrains	Fertilizers	Pol Products
2011-12	70.91	61.75	47.74	17.89	86.12	18.16
2012-13	70.70	79.76	41.81	19.06	85.32	17.39
2013-14	69.35	81.33	42.74	20.79	86.06	17.33
2014-15 (R)	65.88	79.98	40.36	22.01	85.22	16.95
2015-16 (P)	**65.82**	**71.79**	**36.99**	**18.04**	**87.53**	**16.62**

(P) provisional (R) revised

SELECTED ECONOMIC INDICATORS

	ITEM	Unit / Base	2011-12	2012-13	2013-14	2014-15	2015-16
I.	**(a) Net National Income#**						
	(i) At 2011-12 prices	₹ crore	7742074	8109505*	8615309*	9235026@	**9934863#**
	(ii) At current prices	₹ crore	7742074	8774615*	9934405*	11007592@	**11969428#**
	(b) Per capita net national income#						
	(i) At 2011-12 prices	₹ in units	63460*	65664*	68867*	72889@	**77435#**
	(ii) At current prices	₹ in units	63460*	71050*	79412*	86879@	**93293#**
II.	**Gross Capital Formation#**						
	Railways						
	(i) At 2011-12 prices	₹ crore	32087*	39533*	42264*	51737@	**&**
	(ii) At current prices	₹ crore	32087*	41731*	46119*	57970@	**&**
III.	**Foreign Trade:**						
	(a) Value of exports	₹ crore	1465959	1634318	1905011	1896348	**1716378**
	Value of imports	₹ crore	2345463	2669162	2715434	2737087	**2490298**
	(b) Value of exports	US $ Million	305964	300401	314405	310338	**262290**
	Value of imports	US $ Million	489319	490737	450200	448033	**381006**
IV.	**Index of Agricultural Production (Triennium ending 2007-08 =100)**						
		Weight					
	(a) All Crops	(100.00)	124.3	116.9	121.0	119.6	**116.0**
	(b) Foodgrains	(50.66)	119.5	117.5	121.1	115.1	**115.2**
	(c) Non-foodgrains	(49.34)	129.3	116.6	121.0	121.6	**116.3**
V.	**Index of Industrial Production (2004-05=100)**						
		Weight					
	(a) General Index	(100.00)	170.3	172.2	172.0	176.9	**181.1**
	(b) Mining & Quarrying	(14.157)	128.5	125.5	124.7	126.5	**129.3**
	(c) Manufacturing	(75.527)	181.0	183.3	181.9	186.1	**189.8**
	(d) Electricity	(10.316)	149.3	155.2	164.7	178.6	**188.7**

#Data is as per revised series of national accounts, released by CSO on January 30, 2015 and is available only from 2011-12 onwards.

* Second Revised Estimates @ First Revised Estimates
& data not available from CSO

SELECTED ECONOMIC INDICATORS (Contd.)

	ITEM	Unit / Base	2011-12	2012-13	2013-14	2014-15	**2015-16**
VI.	Wholesale Price Index (Financial Year Average with weights) (Base 2004-05=100)	Weight					
(a)	All Commodities	(100.00)	156.1	167.6	177.6	181.2	**176.7**
(b)	Primary Articles	(20.12)	200.3	220.0	241.6	248.8	**249.6**
(c)	Fuel & Power	(14.91)	169.0	186.5	205.4	203.5	**179.8**
(d)	Manufactured Products	(64.97)	139.5	147.1	151.5	155.1	**153.4**
VII.	Wholesale Price Indices of Important Commodities used by Railways	Weight					
(a)	Non-coking coal	(1.01)	180.1	217.0	176.7	178.1	**178.1**
(b)	Minerals Oils	(9.36)	184.0	202.5	226.0	219.6	**179.5**
(c)	Electricity for Railway traction	(0.09)	116.2	125.2	150.6	157.6	**162.6**
(d)	Basic Metals, Alloys & Metal Products	(10.75)	156.3	166.1	164.5	165.6	**154.6**
(i)	Steel	(0.03)	123.5	126.2	126.2	130.6	**127.9**
(ii)	Ferro Alloys	(0.14)	146.8	151.7	155.6	158.9	**149.8**
(iii)	Non-Ferrous Metals	(1.00)	157.1	160.9	164.0	168.6	**164.2**
(e)	Electrical Machinery, Equipment & Batteries	(2.34)	129.7	133.0	136.6	138.6	**138.2**
(f)	Chemicals & Chemical Products	(12.02)	134.7	143.6	148.9	152.8	**150.5**
(g)	Non-metallic Mineral Products	(2.56)	152.9	163.3	166.2	172.9	**177.3**
(h)	Cotton Textiles	(2.61)	143.8	146.2	158.0	162.6	**156.6**
(i)	Logs & Timber	(0.08)	132.7	145.3	144.3	130.6	**138.5**
(j)	Cement & Lime	(1.39)	157.0	168.6	167.0	169.6	**173.6**
(k)	Lubricants	(0.17)	230.4	244.6	259.5	271.8	**277.5**
(l)	High Speed Diesel	(4.67)	164.5	183.6	217.8	223.3	**186.9**
VIII.	Consumer Price Index (Industrial Workers) (Base 2001=100)		194.8	215.2	236.0	250.8	**265.0**

Planning

Outlays in Five Year Plans:

IR draws up its Development Plans within the framework of National Five-Year Plans. Plan outlays for IR and the transport sector as a whole are given below:

(₹ in crore)

Sectors/Units	Upto V Plan ^ 1950-78	VI Plan 1980-85	VII Plan 1985-90	VIII Plan 1992-97	IX Plan 1997-02	X Plan 2002-07	XI Plan 2007-2012	**XII Plan 2012-2017**
Railways	4,723	6,585	16,549	32,306	45,725	84,003	*1,89,838@	4,19,221 @
Transport Sector	10,117	13,962	29,548	65,173	1,17,563	2,59,777	6,13,185	12,04,172
Total Plan Outlay	59,979	1,09,292	2,18,729	4,85,457	8,13,998	15,25,639#	36,76,936	76,69,807
Transport Sector as %age of Total Plan	16.9	12.8	13.5	13.4	14.4	17.0	16.7	15.7
Railways as % age of Total Plan	7.9	6.0	7.6	6.7	5.6	5.5	5.2	5.5

^ Excludes inter-plan period 1966-69. # Original Outlay. @ the outlay do not include funding from PPP or private source.
* revised

In the year 2015-16 the following assets were acquired and task accomplished.

	Heads		**2015-16**
1.	Locomotives	(Nos.)	**621**
2.	Wagons (BLC+ Private Wagons)	(”)	**13,412**
3.	Coaches including	(”)	**4,126**
	EMUs	(”)	**396**
	MEMUs	(”)	**138**
	DMUs	(”)	**287**
4.	Route Kms of track electrified	(Kms.)	**1,730**
5.	New lines constructed	(Kms.)	**813**
6.	Double/Multiple lines provided	(Kms.)	**973**
7.	Track renewals (both primary & secondary renewal)	(Kms.)	**2,794**
8.	Gauge Conversion to BG from MG/NG	(Kms.)	**1,042**

The Plan allocation (Revised Estimates) and Actual Net Expenditure for 2015-16 compared with 2014-15, were as follows:-

(₹ in crore)

Plan Head	2014-15		2015-16	
	Allocation (R.E.)	Actual Net Expenditure	**Allocation (R.E.)**	**Actual Net Expenditure**
CIVIL ENGINEERING				
1 New Lines (Construction)	* 8,973.67	7,107.03	****1,3467.78**	**13,209.60**
2 Restoration of Dismantled Lines				
3 Gauge Conversion	@ 3,228.97	3,520.12	**@@4,089.64**	**3,615.64**
4 Doubling	!4,028.14	3,859.32	**!!8,989.62**	**10,472.35**
5 Traffic Facilities- Yard Remodelling and Others	$950.72	780.74	**$$1,210.73**	**983.01**
6 Road Safety Works -Level Crossings	459.75	441.16	**517.70**	**468.00**
7 Road Safety Works - Road Over/Under Bridges	> 2,017.25	1,765.28	**2,143.71**	**2,132.60**
8 Track Renewals	3,736.00	3,734.39	**3,901.23**	**4,367.59**
9 Bridge Works	452.04	413.11	**485.58**	**517.20**
10 Staff Quarters	307.29	241.24	**322.12**	**282.54**
11 Amenities for Staff	341.69	272.18	**301.64**	**288.77**
12 New Lines (const.) – Dividend free Projects	^1300	#1294.42	**^^1,500**	**2,580.13**
TOTAL	25,795.52	23,428.99	**36,929.75**	**38,917.43**
MECHANICAL				
1 Rolling Stock	&16,814.90	£16,274.73	**&&18,866.30**	**17,.912.75**
2 Leased Assets – Payment of Capital Component	5,452.00	5,449.24	**6,293.00**	**6,324.74**
3 Machinery and Plant	458.47	459.34	**405.37**	**394.32**
4 Workshops & Production Units	#2,707.04	1,669.67	**##2,105.16**	**1,526.82**
TOTAL	25,432.41	23,852.99	**27,669.83**	**26,158.63**
ELECTRICAL ENGINEERING				
1 Electrification Projects	1,397.00	1,386.67	**%2,260.22**	**2,265.19**
2 Other Electrical Works	129.65	106.03	**160.26**	**105.62**
3 Traction Distribution Works	221.66	194.71	**187.15**	**177.57**
TOTAL	1,748.31	1,687.38	**2,607.63**	**2,548.38**
SIGNAL & TELECOMMUNICATION				
1 S & T Works	1,027.11	1,002.46	**843.24**	**892.89**
TOTAL	1,027.11	1,002.46	**843.24**	**892.89**
OTHERS				
1 Computerisation	316.77	203.79	**294.19**	**238.89**
2 Railway Research	25.00	19.49	**24.43**	**24.92**
3 User's Amenities	< 1,049.21	857.84	**<<1,211.84**	**1,080.83**
4 Investment in PSUs	571.5	654.01	**926.12**	**2,410.39**
5 Investment in non-Government Undertakings including JVs/SPVs	% 7,811.5	££ 4,484.30	**%%6,056.2**	**4,939.32**
6 Other Specified Works	448.03	339.24	**384.73**	**353.98**
7 Inventories	(-) 207.11	1193.76	**(-)359.98**	**(-)470.50**
8 M.T.Ps.	s 1,779.43	992.36	**ss 23,412.02**	**1,343.64**
TOTAL	11,795.03	8,747.09	**31,949.55**	**9,921.47**
GRAND TOTAL	**65,797.68**	**58,718.94**	**100000.00**	**%78,438.79**

Revised Estimates

*	Includes ₹4,427 crore for National Projects (NE Region) and ₹22 crore for Projects of National Importance(NR) . It also includes ₹1,435.88 crore under EBR.
**	Includes ₹4,799 crore for National Projects ₹54 crore for Projects of National Importance. It also includes ₹2,060.90 crore under EBR (PPP).
@	Includes provision of ₹1,602 crore for National Projects (NE Region) and ₹100 crore under EBR.
@@	Includes provision of ₹1,300 crore for National Projects (NE Region) and ₹603.61 crore under EBR (PPP).
!	Includes ₹166.08 crore under EBR.
!!	Includes ₹7,175.79 crore under EBR (PPP).
$	Includes ₹98.60 crore under EBR(PPP).
$$	Includes ₹131.19 crore under EBR(PPP).
>	Includes ₹277 crore under EBR(PPP).
^	Includes provision for Udhampur Srinagar- Barmula New Line.
^ ^	Includes provision for Udhampur Srinagar- Barmula New Line.
&	Includes ₹11,772.61 crore for Market Borrowing through IRFC.
&&	Includes ₹11,591.67 crore for Market Borrowing through IRFC.
#	Includes ₹988 crore under EBR.
##	Includes ₹ 429.99 crore under EBR(PPP).
%	Includes ₹2,230.20 crore under EBR.
<	Includes ₹4 crore under EBR.
<<	Includes ₹12.10 crore under EBR (PPP).
%	Includes ₹2,091 crore under EBR.
%%	Includes ₹ 2,217.40 crore under EBR(PPP).
s	Includes ₹ 834.50 crore for EBR (PPP).
ss	Includes ₹ 22,247.29 crore for EBR (PPP).

Actual Net Expenditure (2014-15) and (2015-16)

#	Includes National Projects.
£	Includes Bonds raised by IRFC.
££	Includes Bonds raised by RVNL.
%	Excludes actual expenditure of ₹ 15,081 crore under EBR (PPP)

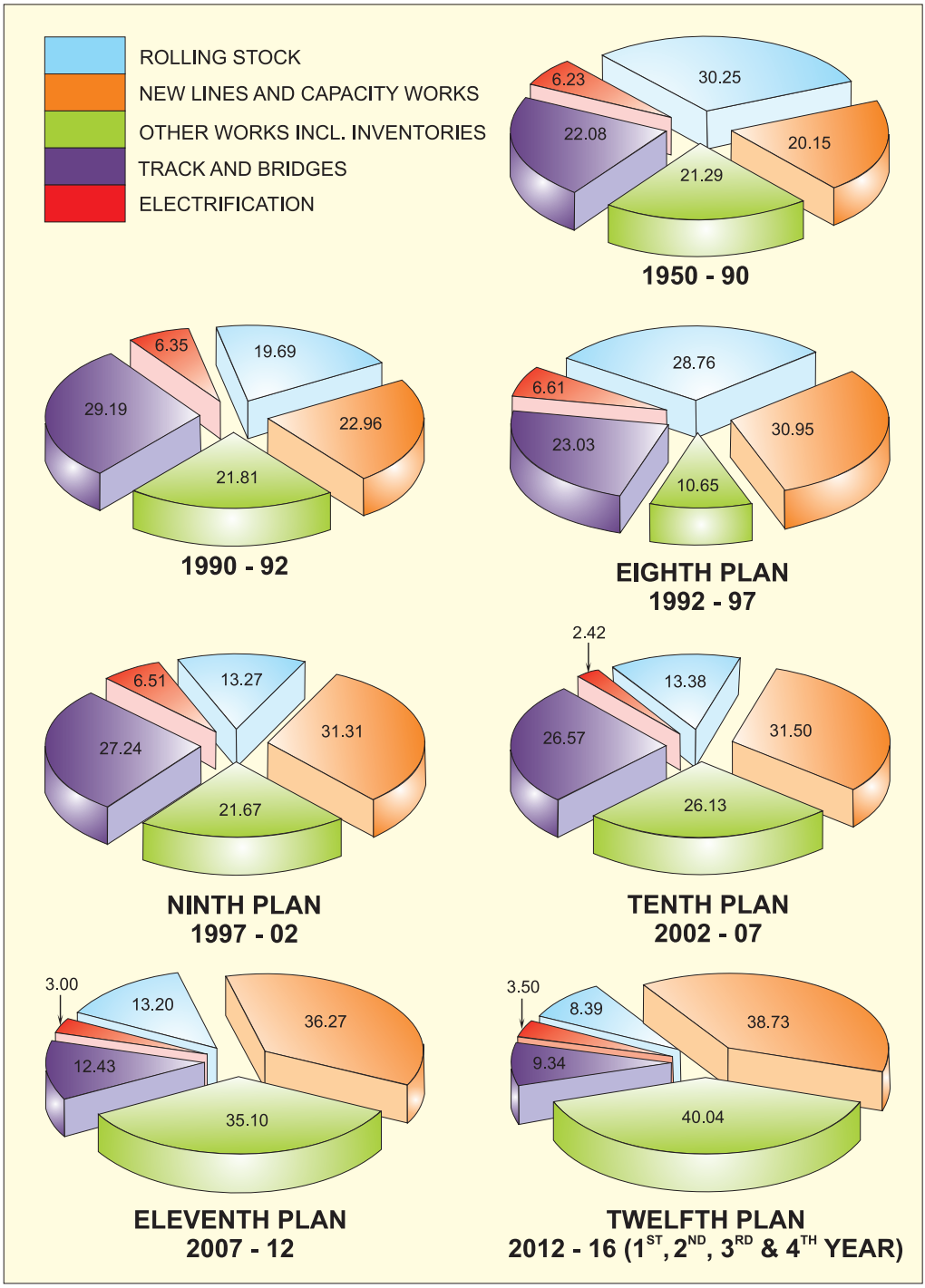
Productivity:

The following table shows the indices of growth of traffic output vis-à-vis input

Indices of Growth of Traffic Output and Inputs (1950-51=100)

Year	Traffic Output Indices		Investment Input Indices				
	Freight traffic (NTKms) (Rev+ Non rev.)	Passenger traffic (Non- suburban passenger kms.)	Wagon capacity	Passenger coaches	Route Kms.	Running track Kms	Tractive effort of locos
1950-51	100	100	100	100	100	100	100
1960-61	199	110	152	154	105	107	144
1970-71	289	159	226	188	112	121	178
1980-81	359	279	269	210	114	128	201
1990-91	550	394	278	219	116	133	192
2000-01	715	614	246	254	118	138	233
2012-13	1,475	1,512	325	367	122	150	390
2013-14	1,511	1,571	330	383	123	152	417
2014-15	1,547	1,660	346	395	123	153	434
2015-16	**1,486**	**1,664**	**347**	**405**	**124**	**154**	**456**

ANALYSIS OF PLAN EXPENDITURE
(PERCENTAGE)



(EXCLUDES EXPENDITURE UNDER MTP, IRFC, RVNL AND WAGON INVESTMENT SCHEME)

Passenger Business

Indian Railways is a commonly used mode of public transportation in the country. During 2015-16, it carried 8,107 million passengers as against 8,224 million in 2014-15. Passenger kilometres, which is calculated by multiplying the number of journeys by mean kilometric distance in case of each class was 1,143 billion as against 1,147 billion in the previous year. Passenger earnings increased by ₹ 2,093.66 crore (4.96%) in comparison with 2014-15.

The trend of passenger traffic since 1950-51 is shown below:

Table I. Number of Passengers Originating

(in millions)

Year	Suburban (All classes)	Non suburban				Total Non-suburban	Grand Total
		Second Class					
		Upper class	Mail/ Exp.#	Ordinary	Total		
1950-51	412	25	52	795	847	872	1,284
1960-61	680	15	96	803	899	914	1,594
1970-71	1,219	16	155	1,041	1,196	1,212	2,431
1980-81	2,000	11	260	1,342	1,602	1,613	3,613
1990-91	2,259	19	357	1,223	1,580	1,599	3,858
2000-01	2,861	40	472	1,460	1,932	1,972	4,833
2010-11	4,061	100	1,046	2,444	3,490	3,590	7,651
2013-14	4552	126	1306	2413	3719	3845	8397
2014-15	4,505	138	1,277	2,304	3,580	3,719	8,224
2015-16	**4,459**	**145**	**1,321**	**2,182**	**3,503**	**3,648**	**8,107**

Also includes Sleeper Class

Table II. Passenger Kilometres

(in millions)

Year	Suburban (All classes)	Non suburban				Total Non-suburban	Grand Total
		Second Class					
		Upper Class	Mail/ Exp#	Ordinary	Total		
1950-51	6,551	3,790	12,537	43,639	56,176	59,966	66,517
1960-61	11,770	3,454	22,251	40,190	62,441	65,895	77,665
1970-71	22,984	4,394	37,856	52,886	90,742	95,136	118,120
1980-81	41,086	5,140	86,712	75,620	162,332	167,472	208,558
1990-91	59,578	8,712	138,054	89,300	227,354	236,066	295,644
2000-01	88,872	26,315	222,568	119,267	341,835	368,150	457,022
2010-11	137,127	62,203	500,631	278,547	779,178	841,381	978,508
2013-14	1,50,259	89,117	612,475	288,561	901,036	990,153	1,140,412
2014-15	151,775	101,215	614,686	279,514	894,200	995,415	1,147,190
2015-16	**145,253**	**105,315**	**634,604**	**257,867**	**892,471**	**997,786**	**1,143,039**

Also includes Sleeper Class.

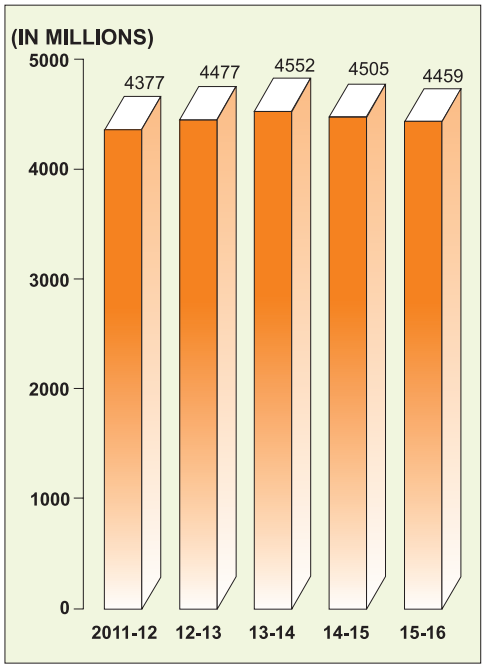
Table III. Average Lead

(in kms.)

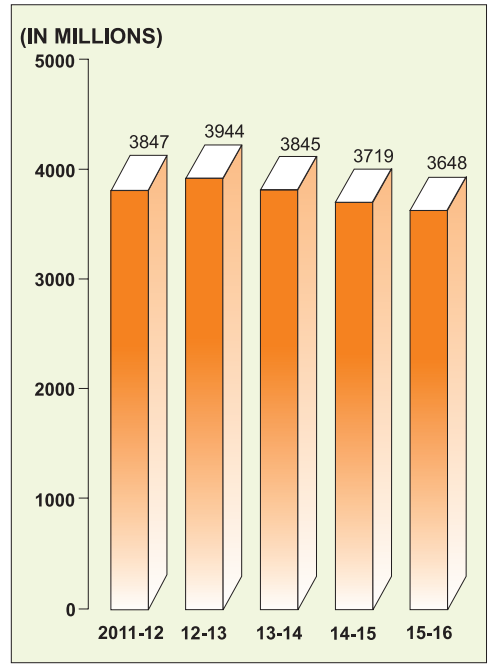
Year	Suburban (All classes)	Non suburban				Total Non-suburban	Grand Total
		Second Class					
		Upper Class	Mail/ Exp.#	Ordinary	Total		
1950-51	15.9	151.6	241.1	54.9	66.3	68.8	51.8
1960-61	17.3	203.3	232.4	50.0	69.5	72.1	48.7
1970-71	18.9	274.6	244.2	50.8	75.9	78.5	48.6
1980-81	20.5	484.0	333.3	56.4	101.3	103.9	57.7
1990-91	26.4	462.8	386.5	73.0	143.9	147.6	76.6
2000-01	31.1	659.3	471.3	81.7	176.9	186.7	94.6
2010-11	33.8	623.1	478.5	114.0	223.2	234.4	127.9
2013-14	33.0	706.0	469.1	119.6	242.3	257.5	135.8
2014-15	33.7	731.9	481.6	121.3	249.7	267.7	139.5
2015-16	**32.6**	**726.8**	**480.5**	**118.1**	**254.7**	**273.5**	**141.0**

#Also includes Sleeper Class.

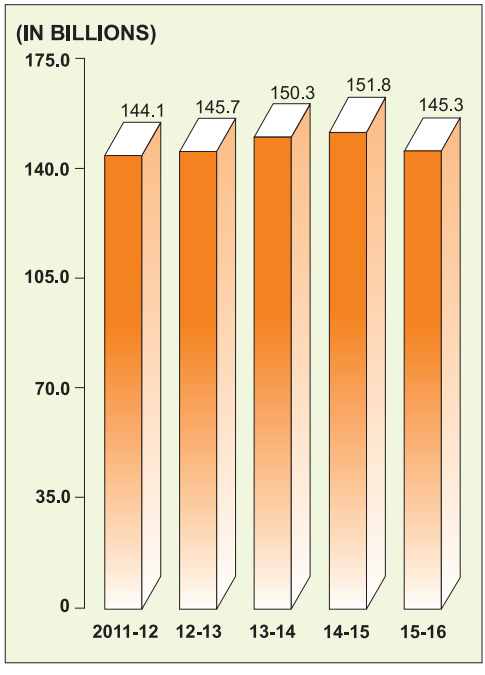
PASSENGERS ORIGINATING
SUBURBAN



PASSENGERS ORIGINATING
NON-SUBURBAN



PASSENGER KILOMETRES
SUBURBAN



PASSENGER KILOMETRES
NON-SUBURBAN

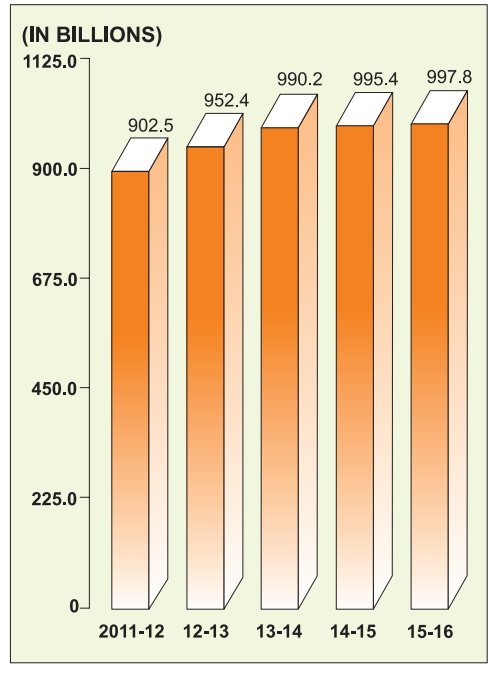


Table IV. Proportion to total traffic-No. of Passengers(Percentage)

	1960-61	1970-71	1980-81	1990-91	2000-01	2010-11	2014-15	**2015-16**
Non-Suburban:								
Second Class Ordinary	50.38	42.82	37.14	31.70	30.20	31.95	28.02	**26.92**
Second Class Mail/Express#	6.02	6.38	7.20	9.26	9.77	13.67	15.52	**16.29**
Upper Class	0.94	0.66	0.30	0.49	0.83	1.30	1.68	**1.79**
Total	57.34	49.86	44.64	41.45	40.80	46.92	45.22	**45.0**
Suburban (all classes)	42.66	50.14	55.36	58.55	59.20	53.08	54.78	**55.0**
Grand Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	**100.00**

#Also includes Sleeper Class.

Table V. Proportion to total traffic –Passenger Kms. (Percentage)

	1960-61	1970-71	1980-81	1990-91	2000-01	2010-11	2014-15	**2015-16**
Non-Suburban:								
Second Class Ordinary	51.75	44.77	36.26	30.20	26.10	28.47	24.37	**22.56**
Second Class Mail/Express#	28.65	32.05	41.58	46.70	48.70	51.16	53.58	**55.52**
Upper Class	4.45	3.72	2.46	2.95	5.75	6.36	8.82.	**9.21**
Total	84.85	80.54	80.30	79.85	80.55	85.99	86.77	**87.29**
Suburban (all classes)	15.15	19.46	19.70	20.15	19.45	14.01	13.23	**12.71**
Grand Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	**100.00**

Also includes Sleeper Class.

Table VI. Number of passenger trains run daily

Type of trains	**Broad Gauge**		**Metre Gauge**		**Total (incl.NG)**	
	2014-15	**2015-16**	2014-15	**2015-16**	2014-15	**2015-16**
EMU	5009	**5128**	0	**0**	5009	**5,128**
Mail/Express	3362	**3508**	25	**17**	3387	**3,525**
Ordinary Passenger Trains and Mixed Trains	4298	**4366**	270	**168**	4702	**4,660**
Total	**12,669**	**13,002**	**295**	**185**	**13,098**	**13,313**

Table VII. Overall average speed including halts (Kms. /hr.)

Type of trains	Broad Gauge		Metre Gauge	
	2014-15	**2015-16**	2014-15	**2015-16**
EMU	45.3	**41.0**	-	**-**
Mail/Express	50.8	**50.9**	28.7	**34.2**
Ordinary Passenger Trains (incl. mixed)	36.1	**33.9**	25.4	**25.3**

Note: All figures shown in the above tables (I-VII) are inclusive of Metro Railway, Kolkata.

Passenger Revenue

Passenger earnings in 2015-16 were ₹44,283.26 crore. This was ₹2,093.66 crore (4.96 %) higher than the earnings in 2014-15. Suburban traffic contributed 5.82 % to the total earnings. The remaining 94.18 % came from non-suburban passengers. Earnings from Second and Sleeper Class Mail/Express passengers comprised 51.52 % of the total passenger earnings.

Passenger revenue in terms of earnings per passenger kilometre for different classes during 2014-15 and 2015-16 was as under:

		(In paise)
Segment	2014-15	**2015-16**
Non-suburban:		
Upper class	126.25	**130.62**
Second Class-Mail/Express (incl. sleeper class)	34.98	**31.32**
Second Class-Ordinary	19.37	**19.92**
Non-suburban (all classes)	39.88	**41.8**
Suburban(all classes)	16.43	**17.73**
Overall average	36.78	**38.74**

Passenger revenue in different classes with corresponding number of passengers and Passenger Kms. in 2015-16 is given below:

Segment	No. of passengers		Passenger kms.		Revenue	
	Million	Percentage	Million	Percentage	₹ in cr.	Percentage
Non-suburban:						
Upper Class	145	1.79	105,315	9.21	13,755.86	31.06
Second Class Mail/Express#	1,321	16.29	634,604	55.52	22,816.35	51.52
Second Class Ordinary	2,183	26.92	257,867	22.56	5,135.84	11.6
Total	3,648	45	997,786	87.29	41,708.04	94.18
Suburban (all classes)	4,459	55	145,253	12.71	2,575.22	5.82
Grand Total	**8,107**	**100.00**	**1,143,039**	**100.00**	**44,283.26**	**100.00**

#Also includes Sleeper Class.

Passenger Services:

Train kilometres and vehicle kilometres along with density of traffic for some selected years were:

Year	Suburban (EMU)		Non-suburban		Train kms. per running track km. per day	
	Train kms. (Million)	Vehicle kms. (Million)	Train kms.+ (Million)	Vehicle kms.@ (Million)	Suburban (EMU)	Non-suburban+
1950-51	9.28	119.8	154	2,678	27.9	7.1
1960-61	14.05	196.8	190	3,594	28.7	8.2
1970-71	23.05	369.4	225	4,636	30.1	8.6
1980-81	35.55	601.5	258	5,582	36.6	9.7
1990-91	48.37	840.7	316	7,739	40.0	11.5
2000-01	56.04	1,029.5	397	11,035	47.1	13.8
2010-11	73.25	1,438.5	582	18,207	46.7	19.2
2013-14	81.77	1,824	652	21,718	44.6	21.0
2014-15	85.81	1,942	674	22,869*	45.8	21.6
2015-16	**86.81**	**1,970**	**684**	**23,358**	**47.4**	**21.6**

@Includes Mainline EMUs, DEMUs, DHMUs and suburban services other than EMU but excluding Rail Cars/Bus and Departmental. *revised.
+ Excludes Departmental but includes Rail Cars/Bus, MEMU, DEMU and DHMU services.

Passenger Service Improvements:

During the year 2015-16, Indian Railways introduced new trains extended the runs and increased the frequency of existing trains, as given below:

	Train introduced	Runs extended	Frequency increased	Total
Non-suburban	133 trains Incl. 39 MEMU/DEMU	109 trains Incl. 28 MEMU/DEMU	18 trains Incl. 2 MEMU/DEMU	260
Suburban	63	44 trains	4 trains	111
Total	**196**	**153**	**22**	**371**

Ticketless Travel:

During 2015-16, 24.39 lakh checks were conducted against ticketless/ irregular travel (including carriage of unbooked luggage). About 253.37 lakh cases were detected and ₹ 921.76 crore realized on this account.

Passenger Amenities:

The allocation under the Plan Head "Passenger Amenities" in 2015-16 was ₹1,752.50 crore (Budget Estimate) and ₹ 1,211.84 crore (Revised Estimate).

During the year 2015-16, 1,252 stations have far been identified for development under the Adarsh Stations Scheme, out of which 988 stations have already been developed.

During the year, 693 stations were provided with water coolers, 468 stations were electrified and 15 passenger lifts and 31 escalators were provided at 11 and 20 stations, respectively.

Passenger Reservation System (PRS):

1. Enhanced E-ticketing System:

In order to improve user experience while booking Reserved Rail Tickets online on www.irctc.co.in , a new system with enhanced capacity and new features has been launched. The system has capacity to book about 15000 tickets per minute. E-ticketing website for reserved tickets now handles about 60% of total reserved tickets. In order to improve website availability at the time of opening of booking of Tatkal tickets, staggering of Tatkal ticket booking time for AC and non-AC classes has been implemented. Mobile Apps on various platforms (Android, iOS and Windows) are also available for booking reserved tickets. Booking of e-tickets through International Credit/Debit Cards has also been enabled.

2. Mobile Application for train enquiry:

Train running status enquiry is now available through Mobile Applications. Railway Enquiry Application are available on Android, iOS and Windows platforms. Train running enquiry status is also available on enquiry.indianrail.gov.in Information about train schedule, trains between stations, cancelled trains, rescheduled trains and diverted trains is also available on the website.

3. Paperless Unreserved Ticketing through Mobile Phones:

Paperless Unreserved ticketing on mobile phones was launched at Mumbai and has since been extended to suburban sections of Chennai, Kolkata and Secunderabad and New Delhi-Palwal section of Northern Railway. This has eliminated the need for passengers to stand in queue for getting tickets for journey in unreserved compartments of trains The ticket is delivered on the Mobile Phone and is embedded with QR Code. This service has added to passenger convenience.

Paperless Platform tickets have also been launched at several major stations like Mumbai Central, Dadar, Lokmanya Tilak Terminus, Sealdah, Chennai Central, New Delhi, Nizamuddin etc.

4. Currency Coin-cum Card Operated Automatic Ticket Vending Machines (ATVMs):-

Currency Coin-cum Card Operated ATVMs was launched at New Delhi. About 450 such ATVMs are now functional over Indian Railway network. These machines issue unreserved tickets and accept Cash as well as Smart Cards for payment. In addition, about 2600 Smart Card based ATVMs have also been commissioned.

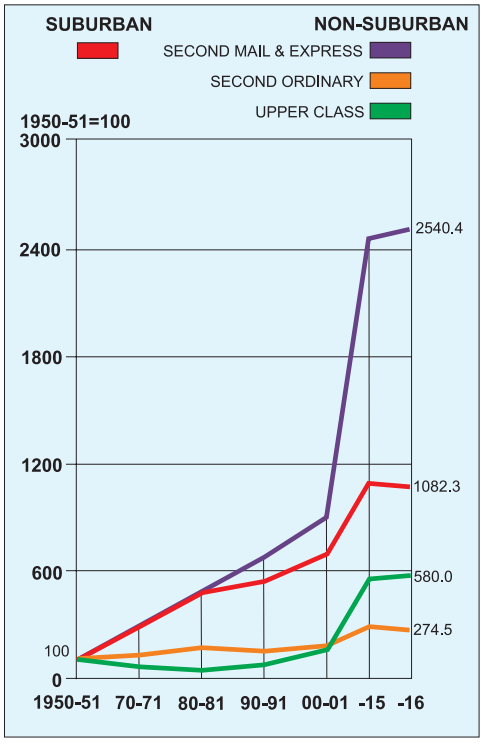
5. Parcel Management System (PMS):-

Computerized system for booking, labeling, tracking, loading/unloading and delivery of parcel packages is being implemented in place of the manual system. Computerized Parcel Management System has been implemented at Delhi-Howrah, Delhi-Mumbai, Delhi-Chennai, Howrah-Mumbai and Howrah-Chennai corridors.

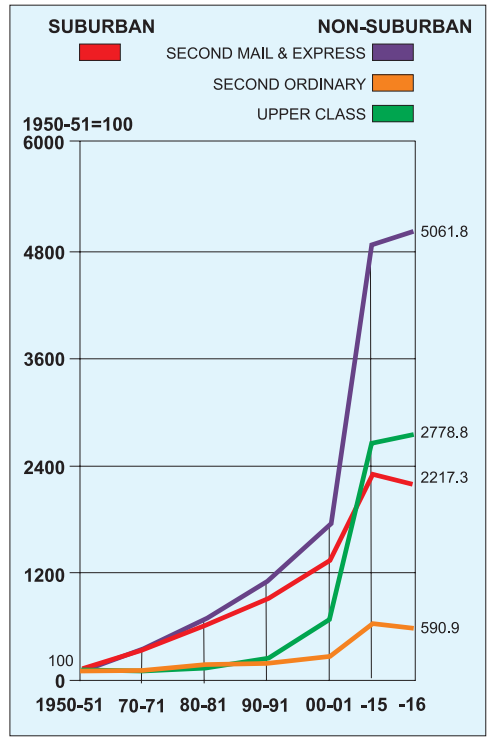
6. Complaint Management System:

An integrated Complaint portal www.coms.indialrailways.gov.in has been launched. This website provides a single point of contact for registering all types of railway related complaints and ensures quick redressal of

INDEX OF GROWTH OF ORIGINATING PASSENGERS



INDEX OF GROWTH OF PASSENGER KILOMETRES



grievances. Mobile App for registering Complaints and Suggestions has also been launched. Feature of Tracking Complaints and Suggestions is also provided in the App.

7. Launch of cancellation of PRS counter tickets (Fully Confirmed/ RAC/Waitlisted) through 139 and IRCTC website.

To facilitate passengers with PRS counter tickets to cancel their tickets within the prescribed time limit as per Refund Rule, facility for cancellation of such tickets through IRCTC website (www.irctc.co.in)/139 (by IVRS and SMS) has been launched.

Railway Users' Amenities:

Railway Users' Consultative Committees, at different levels, provide opportunities for formal consultations between the management and the rail users with a view to improve services for rail users. Zonal Railway Users' Consultative Committees (ZRUCCs), Divisional Railway Users' Consultative Committees (DRUCCs), Konkan Railway Users' Consultative Committee (KRUCC), Metro Railway Users' Consultative Committee (MRUCC), Suburban Railway Users' Consultative Committee and Station Consultative Committees at important stations provide useful inputs to Railway administration.

ZRUCCs KRUCC and MRUCC have been reconstituted for a two years term from 01.10.2015 to 30.09.2017. DRUCCs were reconstituted for a two years term with effect from 01.08.2014. However it has been made co-terminus with that of ZRUCCs. As such, the existing DRUCCs will continue to function till 30th September, 2017.

LHB Coaches:

Consequent upon the introduction of the first rake of indigenously designed LHB Coach in December 2003 and pursuant to the decision taken to convert more & more conventional coaches in LHB , 118 pairs of train services have till now been converted/inducted with LHB coaches including all the 22 pairs of Rajdhani Express train and 21 pairs of Shatabdi Express trains. Conversion of the rakes of the remaining train services to LHB design is in progress.

Improvement in Facilities inside Passenger Coaches:

1. Provision of dustbins in all coaches:

It has been now decided to provide suitable dustbins below the outside wash basin or on the end wall in all newly manufactured coaches including non-AC sleeper and second class coaches. Retrofitment on existing coaches has also been taken up in a phased manner.

2. Provision of mug and chain arrangement in all coaches:

Previously mug and chain arrangement was being provided only in the toilets of AC coaches. Recently instructions have been issued for provision of mug and chain arrangement in non-AC coaches as well.

3. Refurbishing of model rake to start Mahamana Express

The first train with Model Rake was flagged off on 22.01.2016. Some of the special features of the Model Rake include: Modular Panels, Superior material for panels, Ergonomically designed ladders, Aesthetically appealing toilet modules, Large size mirrors, Platform washbasin, Controlled discharged water taps, Odour control system, Exhaust fans in toilets, Dustbin inside the toilet, use of LED Lighting to enhance illumination while minimizing energy consumption, Fire extinguisher in all coaches, Provision of electrically operated chimney in Pantry Car and Stainless Steel panelling in Luggage Compartment are provided in this rake.

4. Proliferation of Automatic Fire and Smoke Detection System in Coaches.

With a view to improve fire safety in running trains, Automatic Fire and Smoke Detection System was provided on coaches of one rake of New Delhi-Bhubaneswar Rajdhani Express as a pilot project. The system provides advance warning in case of any fire hazard in running train and thus enables the passengers to protect them from fire. Subsequently, two more rakes, one of New Delhi-Jammu Tawi Rajdhani and another of Kacheguda-Tirupati/ Guntur AC Double Decker have been provided with this system. Based on the feedback, technical specification has been revised and air brake system has been interfaced with this system for stoppage of trains in emergency situations. Sanction exists for the provision of the system in a total 3250 Coaches including above trains.

5. Provision of Braille signage in passenger coaches

Presently coaches are provided with signages, instructions, seat Nos. etc, which are mostly in the form of vinyl stickers/metallic plates and have no Braille characters. It has now been planned to provide signages incorporating the information in Braille form also for the aid of visually impaired passengers in all the coaches. ICF/Chennai has developed technical specification in consultation with Blind Associations for implementation in different types of coaches. Provision of Braille signages has already been commenced in newly manufactured coaches. Besides, retrofitment of Braille signages in existing coaches is also being taken up in a phased manner.

6. Proposal for Integrated Solution for elderly and Disabled in Indian Railway Special Coach Design:

Indian Railways have manufactured about 3450 SLRD/SRD coaches

which have a suitably designed compartment & toilet adapted to the needs of disabled / wheel chair borne passengers. In SLRD coaches, wider entrance door for wheel chair borne passengers, wider berths, wider compartments, space for provision of Wheel chair, larger lavatory and lavatory doors have been provided. Inside the toilets, additional grab rails on the side walls for support, wash basin and mirror at lower height have been provided. It is endeavored to have at least one such coach in each Mail/Express train. Further, the fully air conditioned Garib Rath trains have been provided with an Air conditioned disabled friendly compartment & toilets in the power cars.

Cleanliness and Hygiene:

1. Intensive mechanized cleaning of coaches

Intensive mechanized cleaning of coaches in the coaching depots through professional agencies is being carried out. Heavy duty machines such as high pressure jet cleaners, floor scrubbers, vacuum suction cleaners etc. are deployed for the purpose. This has already been implemented in 133 coaching depots on different Zonal Railways by 31.03.2016.

2. Clean Train Stations scheme

To bring about improvement in enroute cleaning of trains, 'Clean Train Stations' Scheme was launched for mechanized cleaning attention to passing through trains during their halts at selected stations. 37 such Clean Train Stations had been made operational by 31.03.2016.

3. On Board House Keeping Scheme (OBHS)

On Board House Keeping Scheme (OBHS) has been prescribed in all Rajdhani, Shatabdi, Duronto & other important long distance Mail/Express trains for frequent cleaning of coach toilets, doorways, aisles & passenger compartments during the run of the trains. This scheme has been implemented on about 671 pairs of trains till the end of the year 2015-16. The scheme is further planned to be expanded to cover all long distance Mail/Express trains excluding purely overnight trains.

4. 'Clean my coach' service

Clean My Coach' service has been introduced in March 2016. As per the scheme, for any cleaning requirement in the coach, passenger sends a Short Message Service (SMS) on a specified mobile number which is immediately acknowledged along with a code. A message is also sent by the server to the mobile number of On board Housekeeping Service (OBHS) staff travelling on the same train along with the details of the passenger such as coach number, berth number. OBHS staff contacts the passengers, carries out the cleaning work as per demand.

Setting up of mechanized laundry for washing of Linen:

To improve upon the quality of washing of linen supplied to the

passengers in trains, Indian Railways have identified 71 major coaching depot locations for setting up of mechanized laundries. 44 such laundries have been commissioned by the year 2015-16. Action is underway for commissioning laundries at other identified coaching depots.

Catering Services:

A new Catering Policy 2010 has been issued on 21.07.2010 which has revised the role of agency for management of catering services on IR. IRCTC would continue to be a service provider to the IR and shall be responsible for managing the premium and high end outlets like Food Plazas, Food Courts and Fast Food Units including institutional catering outside the Railways. Further, as announced in Rail Budget 2016-17, IRCTC would begin to manage catering services in a phased manner.

During 2015-16, catering facilities were provided through:

- Pairs of trains with pantry cars/mini pantries 347
- Food Plaza/Fast Food units 198
- Automatic Vending Machines 370
- Jan Ahaar Units 39
- Milk Stalls 800
- Other static catering units 8446
- Book Stalls 1049
- Curio Stalls 358
- Exclusive Chemist stalls 19

Mass Rapid Transit System for Metropolitan Cities:

The various MRTS projects in different metropolitan cities have been summarized below in tabular form:-

S. No.	Section	Kms.	Latest cost (₹ in crore)	Year of sanction	Year of completion	Sharing ratio
Kolkata :						
1	Extension between Noapara-Netaji Subhash Chandra Bose Airport(6.40 km), Dum Dum-Noapara (2.54 km) and Noapara-Baranagar (1.93 km)**	10.87	595.89	2009-10	Not fixed#	Railway
2	Noapara-Barasat via Bimanbandar	18.00	3159.59	2010-11	Not fixed#	Railway
3	Baranagar-Barrackpore & Dakshineshwar	14.50	2069.60	2010-11	Not fixed#	Railway
4	NSCB Airport-New Garia via Rajarhat	32.00	4259.50	2010-11	Not fixed#	Railway

5	Joka-Binay Badal Dinesh Bagh via Majerhat including Joka-Diamond Park Phase-I.	18.72	2913.50	2010-11 & 2012-13	Not fixed#	Railway
6	Circular Railway including Extension from Remount Road to Santoshpur via Garden Reach (8.80 km).	8.80	268.52	2010-11	Not fixed#	Railway
7	East-West Metro corridor, Kolkata from Howrah - Salt lake-Maidan	14.67	8996.96	2012-13	2019-20	74:26 (Railway.: MoUD)
Mumbai :						
1	Belapur-Seawood-Uran	27.00	1781.98	1996.97	Not fixed#	1:2 (Railway. : CIDCO)
2	Mumbai Urban Transport Project (MUTP) Ph.-II	63.89	8579.46	2008-09	2020-21	1:1 (Railway & State Government))
3	Running of 12 car trains on Harbour lines	-	714.10	2012-13	2016-17	1:1 (Railway & State Government)
Chennai :						
1	Extension of MRTS Phase-II from Velachery to St. Thomas Mount	5.00	495.74	2006-07	Not fixed#	1:2 (Railway & State Government)
Hyderabad/Secunderabad:						
1	Hyderabad/Secunderabad Multi Model Transport System (MMTS) Phase-II	101.05	816.55	2012-13	2017-18	1:2 (Railway & State Government)

**Dum Dum-Noapara has been completed on 10.07.2013.

#Target not fixed due to non availability of land.

Escalator at Howrah Station, ER

Freight Operation

Revenue earning freight traffic handled during 2015-16 was 1101.51 million tonnes. NTKMs earned during the year were 654 billion. Total loading and freight output, inclusive of non-revenue traffic, were 1108.62 million tonnes and 656 billion NTKMs respectively. Commodity-wise loading of revenue earning traffic was as follows:

	Tonnes carried* (Millions)		Absolute Variation over last year	Percentage to total
	2014-15	**2015-16**		
Coal				
i) for steel plants	53.91	**52.06**	-1.85	4.73
ii) for washeries	0.99	**1.09**	0.1	0.10
iii) for thermal power houses	367.29	**371.81**	4.52	33.75
iv) for other public users	123.62	**126.87**	3.25	11.52
Total	545.81	**551.83**	6.02	50.10
Raw material for steel plants except iron ore	18.28	**20.29**	2.01	1.84
Pig iron and finished steel				
i) from steel plants	28.25	**29.59**	1.34	2.69
ii) from other points	14.59	**15.20**	0.61	1.38
Total	42.84	**44.79**	1.95	4.07
Iron ore				
i) for export	2.49	**2.13**	-0.36	0.19
ii) for steel plants	69.43	**78.63**	9.2	7.14
iii) for other domestic users	40.85	**36.18**	-4.67	3.28
Total	112.77	**116.94**	4.17	10.62
Cement	109.80	**105.35**	-4.45	9.56
Foodgrains	55.47	**45.73**	-9.74	4.15
Fertilizers	47.41	**52.23**	4.82	4.74
Mineral Oil (POL)	41.10	**43.24**	2.14	3.93
Container service				
i) Domestic containers	10.50	**9.04**	-1.46	0.82
ii) EXIM containers	37.88	**36.79**	-1.09	3.34
Total	48.38	**45.83**	-2.55	4.16
Balance other goods	73.40	**75.28**	1.88	6.83
Total	1095.26	**1101.51**	6.25	100

* Excludes loading on Konkan Railway.

The following tables show the growth of freight traffic over the years:

I. Revenue earning freight traffic (excl. KRCL)

Year	Tonnes (Millions)	Index (1950-51 =100)	Net Tonne Kms (Millions)	Index (1950-51 =100)	Lead (Kms)	Index (1950-51 =100)
1950-51	73.2	100.0	37,565	100.0	513	100.0
1960-61	119.8	163.7	72,333	192.6	603	117.6
1970-71	167.9	229.4	110,696	294.7	659	128.5
1980-81	195.9	267.6	147,652	393.1	754	147.0
1990-91	318.40	435.0	235,785	627.7	741	144.4
2000-01	473.50	646.9	312,371	831.5	660	128.7
2012-13	1,008.09	1,377.2	649,645	1,729.4	644	125.5
2013-14	1,051.64	1,436.7	665,810	1,772.4	633	123.4
2014-15	1,095.26	1,496.3	681,696	1,814.7	622	121.2
2015-16	**1,101.51**	**1,504.80**	**654,481**	**1,742.26**	**594**	**115.79**

II. Movement of bulk commodities in the last four years

Sl. No.	Commodity group	2012-13		2013-14		2014-15		2015-16	
		Million Tonnes	Percentage	Million Tonnes	Percentage	Million Tonnes	Percentage	Million Tonnes	Percentage
1.	Coal	496.42	49.24	508.06	48.31	545.81	49.83	551.83	50.1
2.	Foodgrains	49.03	4.86	55.10	5.24	55.47	5.06	45.73	4.15
3.	Iron & Steel	35.31	3.50	38.95	3.70	42.84	3.91	44.79	4.07
4.	Iron ore	111.4	11.05	124.27	11.82	112.77	10.30	116.94	10.62
5.	Cement	105.87	10.50	109.80	10.44	109.80	10.03	105.35	9.56
6.	POL (Mineral oils)	40.61	4.03	41.16	3.91	41.10	3.75	43.24	3.93
7.	Fertilizers (Chemical manures)	46.21	4.58	44.70	4.25	47.41	4.33	52.23	4.74
8.	Limestone and Dolomite	19.64	1.95	20.71	1.97	21.20	1.94	23.53	2.14
9.	Stones (including gypsum) other than marble	11.77	1.17	11.61	1.10	14.98	1.37	15.04	1.37
10.	Salt	4.77	0.47	4.65	0.44	4.99	0.46	5.02	0.46
11.	Sugar	2.95	0.29	3.00	0.29	2.69	0.25	3.39	0.31
	Total	**923.98**	**91.66**	**962.01**	**91.48**	**999.06**	**91.23**	**1007.09**	**91.43**
12.	Commodities other than above	84.11	8.34	89.63	8.52	96.20	8.77	94.42	8.57
	Grand Total	**1008.09**	**100.00**	**1051.64**	**100.00**	**1,095.26**	**100.00**	**1101.51**	**100.00**

III. Freight Train Kilometres and Wagon Kilometres

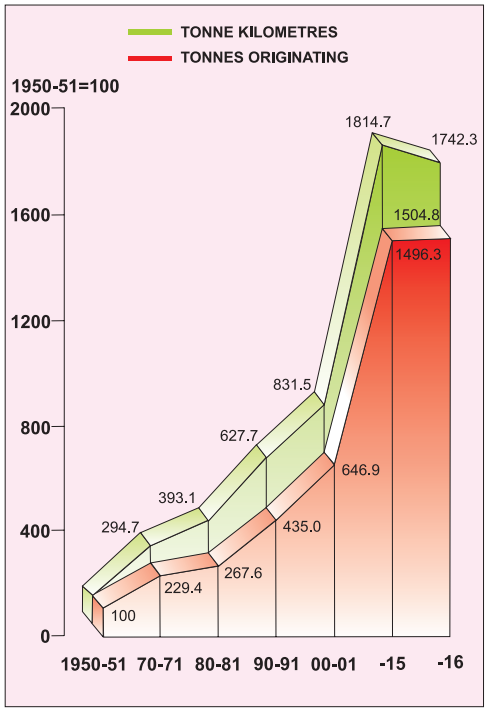
Year	Freight train kms.		Wagon kilometres@ (in terms of 4- wheelers)	
	Total (Million)	Per running track km per day	Total (Million)	Percentage of loaded to total
1950-51	112	5.2	4,370	70.7
1960-61	161	6.9	7,507	70.5
1970-71	202	7.7	10,999	69.7
1980-81	199	7.2	12,165	69.5
1990-91	245	8.5	19,230	65.5
2000-01	261	8.7	27,654	60.9
2010-11	368	11.6	17,749	66.5
2013-14	419	12.8	19,546	65.1
2014-15	402	12.1	18,930	65.2
2015-16	**393**	**11.7**	**18,708**	**64.0**

@ From 2010-11 onward figure in terms of 8 - wheelers

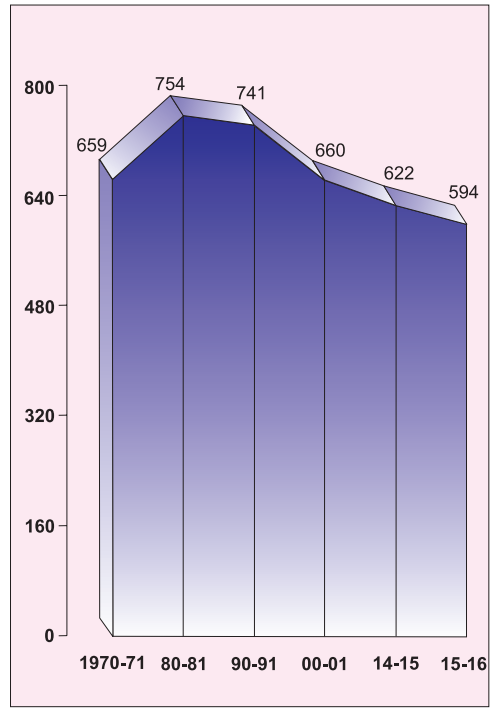
IV. Tonnes Originating, Net Tonne Kms. and Earnings from bulk commodities in 2015-16

S. No.	Commodity group	Tonnes originating		Net tonne kilometres		Earnings	
		In million	%age to total	In Million	%age to total	₹ in crore	%ag to total
1	Coal	551.83	50.1	280,700	42.89	49,349.65	46.15
2	Foodgrains	45.73	4.15	60,126	9.19	7,754.27	7.25
3	Iron & steel	44.79	4.07	40,443	6.18	7,182.29	6.72
4	Iron ore	116.94	10.62	32,420	4.95	6,896.27	6.45
5	Cement	105.35	9.56	55,959	8.55	8,851.47	8.28
6	POL (Mineral oils)	43.24	3.93	29,326	4.48	5,926.97	5.54
7	Fertilizers (Chemical manures)	52.23	4.74	43,700	6.68	6,553.41	6.13
8	Limestone & dolomite	23.53	2.14	13,056	1.99	2,255.21	2.11
9	Stones (incl.gypsum) other than marble	15.04	1.37	7,415	1.13	1,292.82	1.21
10	Salt	5.02	0.45	7,782	1.19	760.56	0.71
11	Sugar	3.39	0.31	6,047	0.92	619.31	0.58
	Total	**1007.09**	**91.43**	**576,974**	**88.16**	**97,442.23**	**91.12**
12	Commodities other than above	94.42	8.57	77,507	11.84	9,498.32	8.88
	Grand Total	**1101.51**	**100.00**	**654,481.00**	**100.00**	**106,940.55**	**100.00**

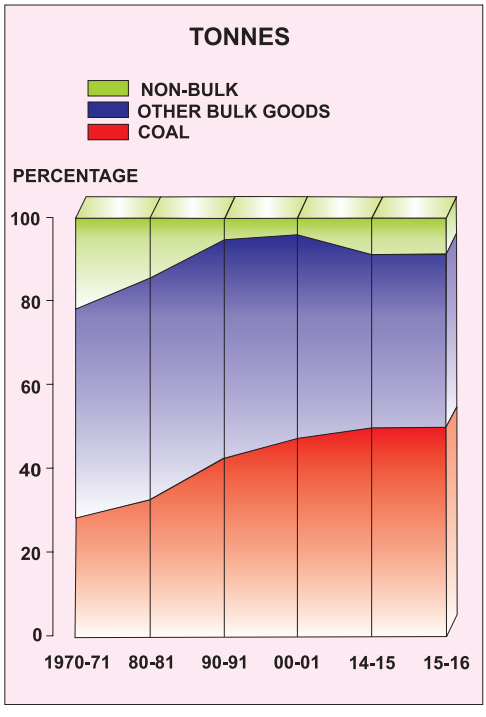
INDEX OF GROWTH OF FREIGHT
(REVENUE TRAFFIC)

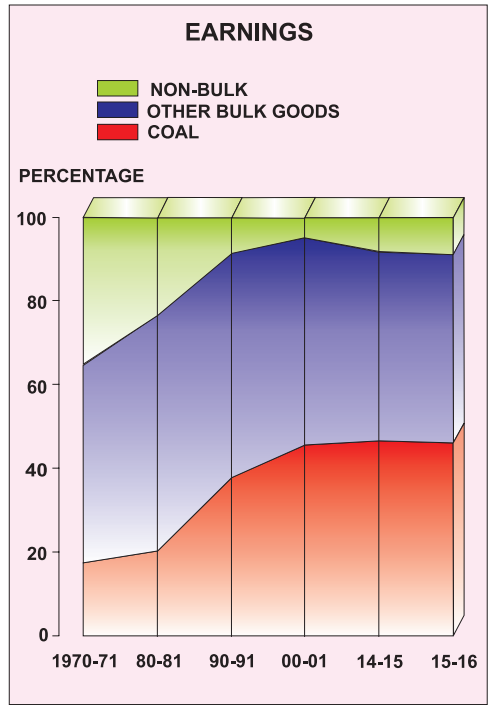


AVERAGE LEAD OF FREIGHT (KMS.)
(REVENUE TRAFFIC)



SHARE OF BULK COMMODITIES IN FREIGHT TRAFFIC





V. Some selected efficiency indices of freight operation during the last four years

			2012-13	2013-14	2014-15	**2015-16**
Net tonne kilometres per wagon per day@		BG	8,453	8,547	8,113*	**7,510**
		MG	905	1,271	1,029	**365**
Wagon kilometres per wagon per day@		BG	265.5	264.5	220.0*	**214.5**
		MG	47.9	52.8 &	27 *	**16**
Net tonne kilometres per engine hour	Diesel	BG	15,933	15,574	16,010*	**14,926**
		MG	2,390	3,453	5,494*	**2,234**
	Electric	BG	24,133	21,319	20,412*	**19,297**
Net tonne kilometres per engine day on line	Diesel	BG	3,03,200	2,72,634	2,62,123*	**2,42,570**
		MG	2,40,88	31,183	17,833*	**3,083**
	Electric	BG	4,49,110	4,08,790	3,34,934	**3,34,273**

* revised @ From 2010-11 onward figure in terms of 8 - wheelers

VI. Share of Tonnage, Earnings and Net tonne kms. of 30 selected commodities in 2015-16

S No	Commodity group	Tonnes Originating		Earnings		Net Tonne Kms.	
		in thousand	%age to Total	₹ in crore	%age to Total	in millions	%age to Total
1	Total coal	5,51,830	50.10	49,349.65	46.15	2,80,700	42.89
2	Iron ore	1,16,943	10.62	6,896.27	6.45	32,420	4.95
3	Cement	1,05,347	9.56	8,851.47	8.28	55,959	8.55
4	Chemical manures	52,227	4.74	6,553.41	6.13	43,700	6.68
5	Food grains	45,733	4.15	7,754.27	7.25	60,126	9.19
6	Iron & steel	44,789	4.07	6,896.27	6.71	40,443	6.18
7	Mineral oils	43,238	3.93	5,926.97	5.54	29,326	4.48
8	Total exim container	36,794	3.34	3,661.90	3.42	33,036	5.05
9	Limestone & dolomite	23,533	2.14	2,255.21	2.11	13,056	1.99
10	RMC carried in General Service Wagons	11,194	1.02	685.33	0.64	3,355	0.51
11	Stone other than marble and gypsum	10,759	0.98	724.72	0.68	418	0.64
12	Total domestic container	9,040	0.82	1,181.77	1.11	12,394	1.89
13	Ores other than manganese and iron	7,538	0.68	468.46	0.44	2,284	0.35
14	Non-ferrous metal	5,207	0.47	565.48	0.53	2,816	0.43

15	Salt	5019	0.46	760.56	0.71	7782	1.19
16	Cement manufactured	4616	0.42	379.57	0.35	2342	0.36
17	Gypsum	4283	0.39	568.10	0.53	2816	0.43
18	Sugar	3391	0.31	619.31	0.58	6047	0.93
19	Jute manufactured	3366	0.31	388.98	0.36	2698	0.41
20	Lime	2510	0.23	476.20	0.45	3485	0.53
21	Edible oils	1810	0.16	243.90	0.23	2127	0.32
22	Fruits & vegetable fresh	1179	0.11	127.55	0.12	1794	0.27
23	Manganese ores	1068	0.10	96.96	0.09	549	0.08
24	Caustic soda	977	0.09	69.06	0.06	423	0.06
25	Wood unwrought (other than firewood)	928	0.08	67.23	0.06	762	0.12
26	Soda ash	501	0.05	113.84	0.11	829	0.13
27	Bamboos	499	0.05	36.78	0.03	537	0.08
28	Fodder oil cake	265	0.02	68.04	0.06	676	0.10
29	Sand	239	0.02	50.05	0.05	430	0.07
30	Dry Grass	212	0.02	42.10	0.04	492	0.08

Freight Rates:

During the year 2015-16, Freight rates of all classes were increased by 10%. However, the classification of following commodities was reduced as under:-

S. No.	Commodity	Existing class	Revised Class
1	Salt for Human consumption	110	100
2	Cement	150	140
3	Coal and Coke	150	145
4	Limestone, Dolomite & Manganese ore	160	145
5	Iron or Steel	180	165
6	Pig Iron	160	150
7	Iron ores	180	165
8	Petroleum Products	200	180

The distance slabs beyond 1500 kms has been revised from 250 kms to 125 kms.

Freight Marketing :

Private Freight Terminals (PFT):

To facilitate rapid development of the network of freight terminals with private investment so as to provide efficient and cost effective logistics services with warehousing solution to end users, a new scheme namely Private Freight Terminal (PFT) was introduced and further liberalized in 2015. Approval for development of 81 PFTs has been given. 37 PFTs have already been notified, which are functioning.

Liberalized Wagon Investment Scheme (LWIS) :

The scheme allows investment by end users (viz. producers, manufactures and consumers of goods) in Special Purpose Wagons (SPW) and High Capacity Wagons (HCW). 3 rakes have been inducted and approval has been given for procurement of 5 more rakes during the financial year 2015-16.

Wagon Leasing Scheme:

The Wagon Leasing Scheme (WLS) which was introduced on 15.04.2008 aims for induction of rakes on lease basis through PPP route. As per the policy, the procurement of wagons through leasing route is permitted for only Special Purpose Wagons (SPW), High Capacity Wagons (HCW) and wagons for container movement. The leasing companies lease out rakes to end users, logistics providers. 6 rakes have been inducted during the financial year 2015-16.

Automobile Freight Train Operator Scheme (AFTO):

With a view to increase IR's market share in transportation of automobile sector, 'Automobile Freight Train Operator Scheme (AFTO)' was launched, which permits procurement and operation of special purpose rakes by private parties. During 2015-16, 3 rakes of BCACBM wagons have been inducted.

Special Freight Train Operator Scheme (SFTO) :

To increase Rail share in the non-traditional commodities like molasses, edible oil, fly ash, caustic soda, chemicals, petrochemicals, alumina & bulk cement Special Freight Train Operator Scheme (SFTO)Scheme has been launched. During 2015-16, 3 rakes of BRNA wagons have been inducted.

Claims:

IR paid ₹ 11.56 crore as claim compensation for goods/parcel/luggage in the year 2015-16 as compared to ₹ 6.69 crore paid in 2014-15. The trend of claims settlement in the preceding five years is given below:

Year	No. of claims received	No. of claims paid	Gross amount of compensation paid (₹ in crore)
2011-12	23,587	4,217	8.98
2012-13	18,715	3,305	26.15
2013-14	18,133	2,927	2.33
2014-15	15,450	2,561	6.69
2015-16	**12,607**	**1,468**	**11.56**

Asset Utilisation

Some of the major efficiency indicators of IR's operational performance over the years is given in the following tables:

A. Engine kilometres per day per engine in use

(i) Goods

Year	Broad Gauge			Metre Gauge		
	Steam	Diesel	Electric	Steam	Diesel	Electric
1950-51	150	-	191	140	-	98
1960-61	155	300	156	140	273	171
1970-71	121	347	316	133	280	245
1980-81	89	303	274	107	276	206
1990-91	52	445	398	88	399	224
2000-01	-	398	450	18	345	203
2010-11	-	384	478	-	102	-
2012-13	-	432	464	-	121	-
2013-14	-	429	473	-	129	-
2014-15	-	381*	414*	-	152*	-
2015-16	**-**	**367**	**380**	**-**	**65**	**-**

(ii) Passenger

Year	Broad Gauge			Metre Gauge		
	Steam	Diesel	Electric	Steam	Diesel	Electric
1950-51	249	-	397	211	-	130
1960-61	274	250	363	220	274	177
1970-71	250	669	437	228	383	376
1980-81	210	610	453	199	541	405
1990-91	189	673	482	185	569	382
2000-01	-	577	542	36	447	385
2010-11	-	594	671	34	390	-
2013-14	-	615	697	30	377	-
2014-15	-	605*	712*	29	361	-
2015-16	**-**	**607**	**662**	**29**	**364**	**-**

Note: In view of the change in method of compilation of diesel and electric loco usage since 1981-82, the figures of earlier years are not strictly comparable.
* revised

B. GTKms. (excluding weight of engine and departmental traffic) per kg. of tractive effort:

Year	Broad Gauge	Metre Gauge
1950-51	1,525	1,191
1960-61	1,864	1,444
1970-71	2,147	1,714
1980-81	2,372	1,708
1990-91	3,873	2,263
2000-01	4,498	1,628
2013-14	4,738	1,279
2014-15	4,642	1,337
2015-16	**4,314**	**1,292**

C. Density:

The density of traffic in terms of NTKms, PKms. and GTKms per route km. and per running track km. are given in the following two tables.

(Millions)

Year	Net Tonne Kms. Per Route Km.		Passenger Kms. Per Route Km.		Gross Tonne Kms. Per Route Km.	
	B.G.	M.G.	B.G.	M.G.	B.G.	M.G
1950-51	1.50	0.25	1.77	0.85	5.24	1.20
1960-61	2.76	0.54	2.03	0.89	8.32	2.18
1970-71	3.61	0.81	2.88	1.25	10.38	2.87
1980-81	4.34	0.80	5.15	1.72	12.55	2.76
1990-91	6.30	0.97	7.12	1.97	18.13	3.17
2000-01	6.96	0.24	9.49	2.08	21.95	1.79
2010-11	11.35	0.09	17.36	2.91	31.88	1.37
2013-14	11.45	0.11	19.30	3.04	33.41	1.48
2014-15	11.60	0.10	19.24	2.98	33.75*	1.31
2015-16	**10.83**	**0.02**	**18.66**	**3.40**	**32.35**	**1.28**

*revised

(Millions)

Year	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
2013-14	8.13	0.10	13.35	2.84	23.73	1.38
2014-15	8.19	0.09	13.59	2.79	23.85*	1.23*
2015-16	**7.66**	**0.01**	**13.19**	**3.16**	**22.86**	**1.19**

*revised

D. Coach Utilisation:

In 2015-16 the vehicle Kms. per vehicle day was 569 on BG and 154 on MG.

Year	Vehicle Kms. Per Vehicle Day	
	BG	MG
1950-51	264	204
1960-61	252	177
1970-71	282	191
1980-81	314	186
1990-91	408	254
2000-01	461	269
2010-11	529	203
2013-14	566	181
2014-15	581*	165*
2015-16	**569**	**154**

* revised

E. Average freight train load:

The average net load per train in 2015-16 was 1,664 tonnes on BG and 498 tonnes on MG. The average gross load per train was 2,955 tonnes on BG and 919 tonnes on MG.

Year	Average Train Load (tonnes)			
	Net Load		Gross load (including weight of engine)	
	B.G.	M.G.	B.G.	M.G.
1950-51	489	185	1,068	435
1960-61	656	298	1,354	648
1970-71	737	378	1,507	753
1980-81	884	487	1,721	871
1990-91	1,079	562	2,122	962
2000-01	1,233	414	2,533	806
2010-11	1,702	488	3,063	902
2013-14	1,592	565	2,822*	863
2014-15	1,693*	887*	2,951*	1,338*
2015-16	**1,664**	**498**	**2,955**	**919**

* revised

F. Average freight train speed (Kms./hour):

Traction-wise and gauge-wise average speed of goods trains over the years is indicated in the following table:

Traction-wise and gauge-wise average speed of goods trains over the years is indicated in the following table:

Year	Broad Gauge			Metre Gauge
	Diesel	Electric	All traction	All traction
1950-51 -		20.8	17.4	15.0
1960-61	22.2	19.5	16.1	13.7
1970-71	22.9	25.2	17.9	14.7

Year	Broad Gauge			Metre Gauge
	Diesel	Electric	All traction	All traction
1980-81	21.3	22.8	19.7	15.1
1990-91	22.6	23.1	22.7	17.6
2000-01	22.4	25.4	24.1	19.6
2010-11	23.5	27.0	25.6	14.7
2013-14	24.3	26.9	25.9	14.5
2014-15	22.7*	24.5*	23.8*	18.2*
2015-16	**23.0**	**23.7**	**23.4**	**19.9**

* revised

G. Net tonne Kms. per engine hour and per goods train hour:

During 2015-16, NTKMs per engine hour stood at 17,506 for BG and 2,177 for MG. NTKMs per goods train hour for BG and MG were 38,681 and 9,880 respectively.

The table below shows the unit output measured by these indices in selected years:

Year	Net tonne Kms. per engine hour		Net tonne Kms. per goods train hour	
	B.G.	M.G.	B.G.	M.G.
1950-51	3,283	1,238	8,590	2,884
1960-61	4,170	1,766	10,808	4,232
1970-71	4,904	2,525	13,492	5,824
1980-81	6,295	3,345	17,677	7,562
1990-91	10,393	5,027	24,787	10,551
2000-01	12,850	3,773	29,752	8,539
2010-11	20,805	2,407	43,905	5,523
2012-13	19,468	2,386	41,112	5,585
2013-14	18,804	3,453	40,805	7,937
2014-15	18,605*	5,467	40,046*	12,603
2015-16	**17,506**	**2,177**	**38,681**	**9,880**

* revised

H. Wagon Utilisation:

On an average, a wagon moved 214.5 kms. per day on BG 16 kms. on MG in 2015-16. NTKMs per wagon per day on BG was 7,510. NTKMs per annum per tonne of wagon capacity on BG and MG were 45,193 and 6,120 respectively. These indices of wagon utilization are given below:

Year	(In terms of 4-wheelers)					
	Net tonne kms. per tonne of wagon capacity per annum		Wagon kms. per wagon per day		Net tonne kms. per wagon per day	
	B.G.	M.G.	B.G.	M.G.	B.G.	M.G.
1950-51	11,833	9,021	62.3	50.2	710	304
1960-61	16,558	10,125	76.9	51.6	998	405
1970-71	15,117	12,583	73.4	58.4	908	524
1980-81	16,285	11,013	73.4	47.3	986	522
1990-91	23,418	18,629	110.5	69.7	1,407	810
2000-01	33,289	7,981	179.0	43.8	2,042	394

Year	(In terms of 4-wheelers) Net tonne kms. per tonne of wagon capacity	per annum	Wagon kms. per wagon per day		Net tonne kms. per wagon per day	
2010-11 +	57,953	7,300	262.1	31.6	9,247	663
2013-14	52,550	13,894	264.5	52.8	8,547	1,271
2014-15	49,362*	11,364*	220.0*	27*	8,113*	1,029
2015-16	**45,193**	**6,120**	**214.5**	**16**	**7,510**	**365**

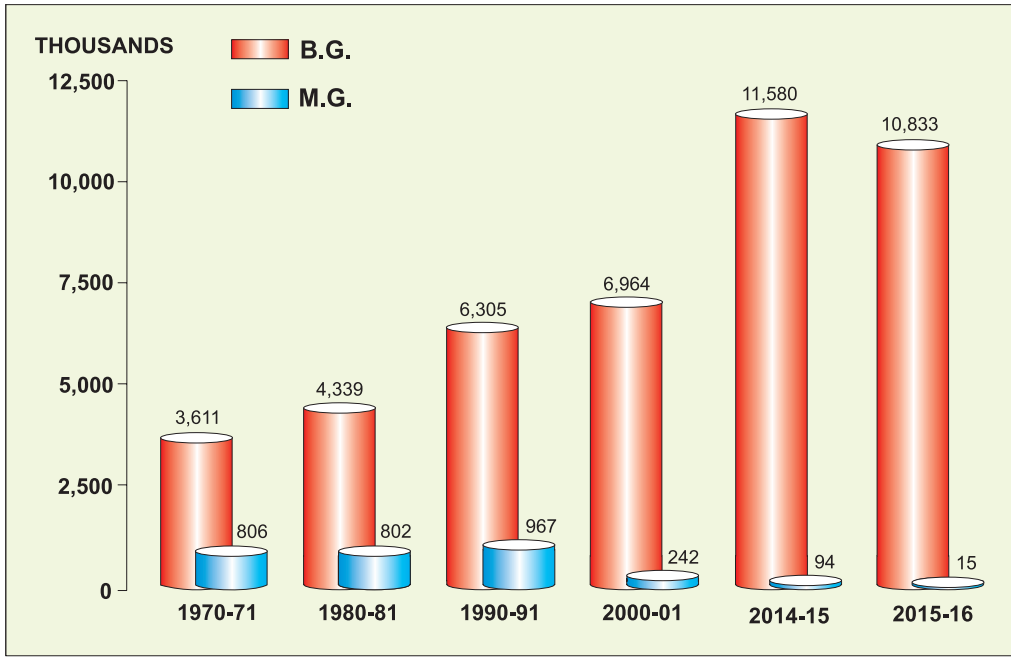
(+) in terms of 8 wheelers
* revised

I. Wagon turn-round (in days):

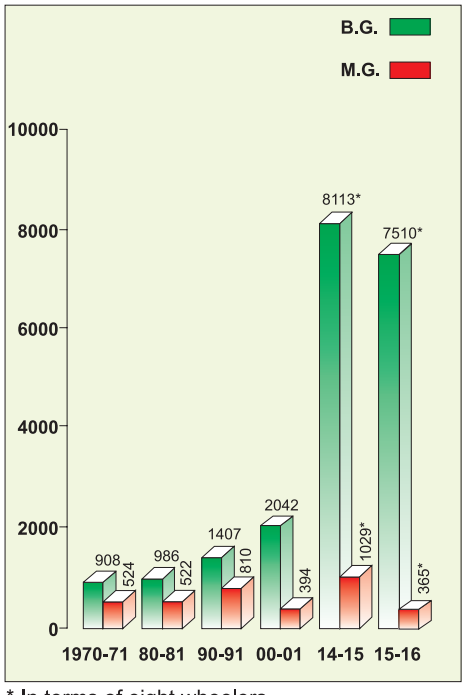
The turn-round time of wagons, representing operational cycle time is given in the following table:

Year	B.G.	M.G.
1950-51	11.0	NA
1960-61	11.2	7.2
1970-71	13.3	10.1
1980-81	15.2	15.3
1990-91	11.5	13.3
2000-01	7.5	12.9
2010-11	4.97	NA
2013-14	5.13	NA
2014-15	4.98	NA
2015-16	**5.18**	**NA**

NTKMS PER ANNUM PER ROUTE KM.

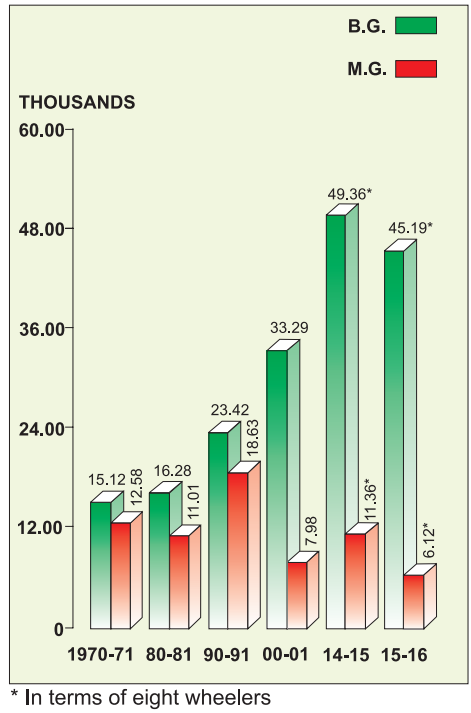


NET TONNE KILOMETRES PER WAGON PER DAY



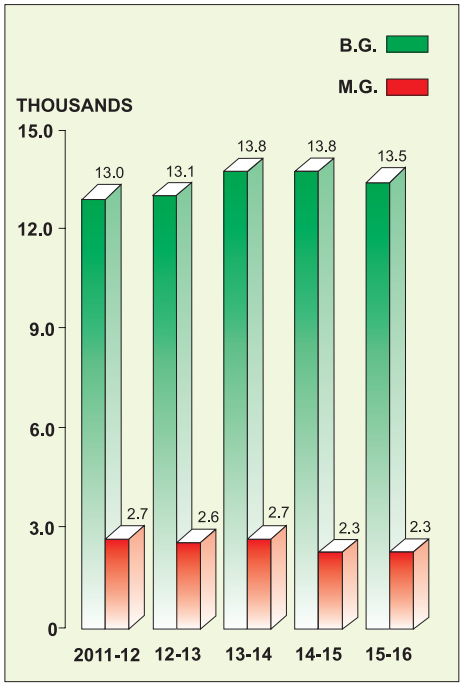
* In terms of eight wheelers

NET TONNE KILOMETRES PER ANNUM PER TONNE OF WAGON CAPACITY

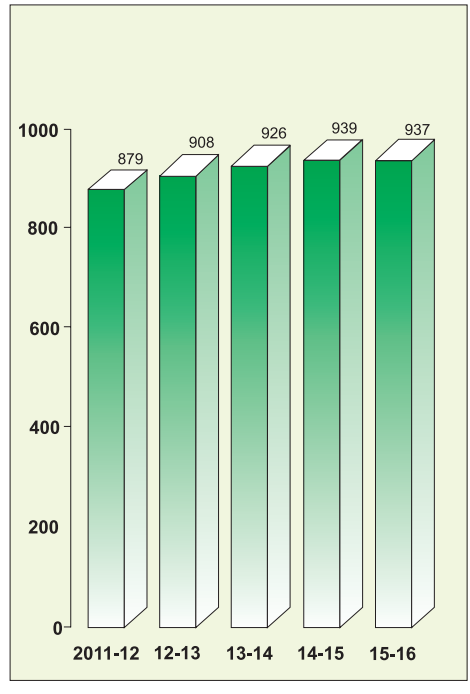


* In terms of eight wheelers

TRAIN KILOMETRES PER RUNNING TRACK KM



TRAIN KILOMETRES PER EMPLOYEE



Safety

There were 106* consequential train accidents in 2015-16 as compared to 131* in 2014-15. Train accidents per million train kilometres, an important index of safety, is 0.10 in 2015-16 as compared to 0.11 in 2014-15.

Comparative position of train accidents during last the five years is as under:

Year	Collisions	Derailments	Level Crossing Accidents	Fire in trains	Misc. accidents	Total*	Train accidents per million train Kms.
2011-12	09	55	61	04	02	131	0.12
2012-13	06	48	58	08	-	120	0.11
2013-14	04	52	51	07	03	118	0.10
2014-15	05	60	56	06	04	131	0.11
2015-16	03	64	35	00	04	106	0.10

*excludes Konkan Railway.

Casualties and Compensation:

The number of passengers injured or killed in train accidents and compensation paid in the last five years are given below:-

Year	No. of passengers		Casualties per million* Passengers carried	Compensation paid# (₹ in Lakhs)
	Killed	Injured		
2011-12	100	586	0.08	498.00
2012-13	60	248	0.04	319.63
2013-14	42	94	0.02	149.22
2014-15	118	324	0.05	127.00
2015-16	40	126	0.02	263.00 (Approx.)

* excludes Konkan Railway

Compensation paid during a year relates to the cases settled and not to accidents/ casualties during that year.

Causes of Train Accidents:

Out of 106 train accidents which occurred on IR during 2015-16, 92(86.79%) were due to human failure, including 54 (50.94%) due to the

failure of railway staff and 38(35.85%) due to failure of other than railway staff. Most of the accidents due to failure of other than railway staff have occurred at unmanned level crossings where the liability is primarily that of road users. 2(1.84%) accidents were caused due to 'equipment failure', 1(0.94%) due to sabotage, 9(8.49%) on account of incidental factors and causes of 1(0.94%) accidents could not be established and 1(0.94%) accident was due to the combination of factor.

Damage to Railway property

The cost of damage to railway property and duration of interruption to through communication caused by consequential train accidents during 2014-15 and 2015-16 were as under:

Year	Cost of damage		Interruption to through communication (Hours)
	Rolling stock Inclusive of engines (₹ in lakh)	Permanent way (₹ in lakh)	
2014-15	6,313.06	894.45	946.27
2015-16	**5089.42**	**834.33**	**923.05**

Note: The above figures exclude Konkan Railway.

Measures to improve safety

- **Safety Action Plans-** were continually executed to reduce accidents caused by human errors. A multi-pronged approach with focus on introduction of newer technologies, mechanization of maintenance, early detection of flaws, etc. to reduce human dependence in the first place, alongwith upgrading the skills of the human resources were the prime drivers for accident prevention.
- **Periodical safety audits-** of different Divisions by multi-disciplinary teams of Zonal Railways as well as inter-railway safety audits were conducted on regular basis. During 2015-16, 84 internal safety audits and 32 inter-railway safety audits were carried out.
- **Training facilities-** for drivers, guards and staff connected with train operation have been upgraded. Disaster Management Modules have also been upgraded. During 2015-16, 95,015 safety category employees attended refresher training.

Measures to avoid collisions

To increase Efficiency and to enhance Safety in train operations, Advanced Signaling System with Panel/Route Relay/Electronic Interlocking (PI/RRI/

EI) along with Multi Aspect Colour Light Signals have been progressively provided at 5,393 stations i.e. about 86% of Broad Gauge stations of Indian Railways, replacing outdated Multi Cabin Mechanical Signaling system involving a large number of human interfaces. Route Relay Interlocking/ Electronic Interlocking at 13 major stations namely Majeri, Malda Town, Sultangarh, Tuglakabad, Badarpur, Lumding, Ernakulam, Hatia, Katrasgarh, Etawah, Naini, Hanumangarh, Itarsi, Panel Interlocking at 151 Stations and Electronic Interlocking at 155 stations have been provided during the year 2015-16.

To avoid collisions technological aids are briefly enumerated below:

- **Complete Track Circuiting:** Complete Track Circuiting has been done upto 99.82% on A, B and C routes. Fouling Mark to Fouling Mark track circuiting on 'A', 'B' 'C', 'D Special' and 'E Special' routes, where permissible speed is more than 75 kilometres per hour has been completed.
- **Block Proving Axle Counter (BPAC):-** To enhance safety, automatic verification of complete arrival of train, Block Proving Axle Counter (BPAC) is being provided at stations having centralized operation of points and signals.
- **Automatic Block Signalling:** For augmenting Line Capacity and reduce headway on existing High Density Routes on Indian Railways, Signalling provides a low cost option by provision of Automatic Block Signalling. As on 31.03.2016, Automatic Block Signalling has been provided on 2,752 Route Kms.
- **Train Protection and Warning System (TPWS):** Train Protection and Warning System (TPWS) based on European technology ETCS L-1 is a proven ATP System to avoid train accidents/ collisions on account of human error of Signal Passing At Danger (SPAD) or over-speeding. As a pilot project, TPWS has been provided on Chennai-Gummidipundi Suburban Section of Southern Railway (50 RKms). In another pilot project on Hazrat Nizamuddin – Agra Section of Northern/North Central Railway (200 RKms), commercial trials with 35 locomotives in nominated trains have been completed. Gatiman Express running at 160 Kmph on Delhi-Agra section has been equipped with TPWS. TPWS has also been provided on Dum Dum-Kavi Subhash section of Kolkata Metro (25 RKMs) and introduced in commercial service on all the EMU rakes. Work for provision of track side equipments of TPWS on Basin Bridge-Arakonam Section (67 RKms) of Southern Railway is under progress.

Based on experience gained, TPWS has been approved for 3,330 Route Kilometers (RKMs) covering Automatic Signalling Sections of Indian Railways (IR). In first phase the implementation of TPWS works has been taken up on 1,244 RKms, automatic Signalling sections on Zonal Railways where EMU services ply with onboard equipments on EMUs rakes only. Further, Railways have been advised for implementation of the balance sanctioned work of TPWS on 2,086 Rkms on HDN-1/HDN-2/HDN-3 Routes.

Train Collision Avoidance System (TCAS)

- TCAS is being developed indigenously by RDSO for Collision Prevention as well as Protection against Signal Passing At Danger (SPAD) by loco pilot. RDSO has finalized the Specification after successful proof of concept trials. Extended field trials with multi-vendor, interoperability features are being conducted by RDSO on 250 km section on South Central Railway. After completion of field works in the pilot section (250 Rkm), extended field trials on 2 pair of trains have commenced on 15.02.16. System's performance under field conditions is being monitored and corrective action being taken based on regular analysis of trial results by RDSO. Operational deployment of TCAS on Railways on Absolute Block Signalling sections will be considered after conclusion of the extended field trials successfully and safety validation of system to Safety Integrity Level-4 (SIL-4) by an Independent Safety Assessor (ISA).
- **Train Management System (TMS)** TMS helps in real-time monitoring of trains in the control room. The arrival status of local trains is displayed on indicators installed on platforms in the form of a countdown (in minutes) to the train's arrival on the platform accompanied by automatic announcements on platforms. TMS has been provided on Mumbai suburban section of Western and Central Railway. TMS work is near completion on Howrah Division of Eastern Railway.
- **Accidents at Level Crossings** have been a major area of concern. Indian Railways have provided interlocking with Signals at 10,776 Level Crossing Gates to enhance the safety at Level Crossings. Initiative has been taken to Interlock Level Crossing gate with Train Vehicle Units of 20,000 and above.

Measures to Reduce Derailments

- **Upgradation of Track Structure** consisting of pre-stressed Concrete (PSC) sleepers, 52 Kg/ 60 Kg high strength (90 Kg/ mm2 ultimate tensile strength) rails on concrete sleepers, fanshaped layout on PSC sleepers,

Steel Channel Sleepers on girder bridges has been adopted on most of the routes.

- **Standardization of track structure with 60 Kg Rails and PSC Sleepers:** Track structure is being standardized with 60 kg rails and PSC sleepers on all the Broad Gauge routes, especially on high density routes to reduce fatigue of rails under higher axle-load traffic. New track construction and replacement of over-aged tracks is being done by PSC sleepers only.
- **Long welded rails:** For improving maintenance and better asset reliability, Railways are consistently eliminating fish plated joints on tracks by welding the joints to convert all single rails into long welded rails to the extent possible. During relaying/construction of new lines/ gauge conversion also, long welded rails are laid on concrete sleepers to the extent possible. Mobile Flash Butt welding is being done on priority in construction projects and through weld renewal works. Mobile Butt welding plants are being arranged in Zonal railways for welding work of construction/Open line. Turnouts are also being improved systematically. Now Thick Web Switches are being used to improve asset reliability and to cope with higher axle load and increased volume of traffic. Now Weldable Cast Manganese Steel Crossings have been planned to be provided on identified routes in a phased manner to improve asset reliability and to cope with higher axle load and increased volume of traffic.
- **Flash Butt Welding :** There is progressive shifting to Flash Butt Welding which is superior in quality as compared to Alumino Thermic (AT) welding.
- **Ultrasonic testing of rails and welds:** Other measures taken in this direction include use of modern diagnostic aids like Digital Ultrasonic Rail Flaw Detectors (USFD), track recording cars, use of on-track machines for maintenances of track to higher standards controlling/reducing rails and weld failures and ensuring quality of rails during manufacture. Analogue type USFD machines have been replaced with digital type machines which have the facility of freezing scan and storing data during rail and weld testing. Vehicle Borne USFD Testing of Rails/Welds is also planned to test about 30400 Track km length on Rajdhani route which is capable of on line recording of data and run over run analysis, by which defect growth rate can be monitored and timely action taken to remove such defects before it actually fails.

- **Tie Tamping and Ballast Cleaning Machines:** There has been progressive use of Tie Tamping and ballast cleaning machines for track maintenance. Also, sophisticated Track Recording Cars, Oscillograph Cars and Portable Accelerometers are being used progressively.
- **Rail Grinding Machines:** Two Rail Grinding Machines are working on high density routes of Indian Railways for enhanced reliability of Rails.
- **Electronic monitoring of track geometry** is carried out to detect defects and plan maintenance.

Coaches

- **Centre Buffer Coupler:** Progressive fitment of tight lock Center Buffer Couplers (CBC) in lieu of screw coupling on new manufacturing of ICF design coaches has been carried out with a view to prevent the coaches from climbing over each other in an unfortunate event of an accident. So far, 4,400 LHB coaches, 425 Hybrid Stainless Steel Coaches & 1,340 conventional ICF design coaches have been manufactured with CBC. Design of CBC has been upgraded to mitigate the problem of jerks during acceleration/ deceleration of trains.
- **Crashworthy features of Passengers Coaches:** To improve upon the standards of safety, a "crashworthy" ICF coach design, in conjunction with a Centre Buffer Coupler (CBC) , was evolved. Such a design enables absorption of significant amount of energy during the impact/collision. About 530 such crashworthy ICF design coaches have been manufactured so far. LHB AC Double Decker coaches introduced first time on Indian Railway have also been provided with enhanced crashworthy features. On similar lines, principal design for a crash worthy LHB coach shell has been manufactured and crash test for design validation on this coach has been completed at RDSO. Enhancing crashworthiness of coaches therefore remain continuous endeavour of Indian Railways which minimizes injury/loss of life in the event of collision when compared with ICF designed conventional coaches.
- **Progressive use of Air Springs:** For enhancing safety and reliability of passenger coaches, the suspension systems are being redesigned with air springs at secondary stage capable to maintain constant height at variable loads. Air springs have been developed and are being fitted on all the newly built EMU & DMU coaches for sub-urban trains. Air springs have now been developed for mainline coaches as well and have been fitted in limited number of coaches. In future, more coaches inducting LHB coaches have been planned for provision of Air spring.

- **Proliferation of LHB coaches for improving Safety:** LHB type coaches have interior crashworthy and anti climbing features. There is plan for complete switchover to production of LHB type coaches in future. Hitherto these coaches were inducted into premier services such as Rajdhani, Shatabdi and Durantoes but now these are also being inducted into Mail & Express trains as well.
- **Provision of Automatic entrance doors and Bi directional swing doors in coaches:** Provision of Automatic entrance doors have been planned on coaches to prevent accidental falling of passengers from running trains. One air-conditioned EMU (Electric Multiple Unit) rake with Automatic doors, similar to Metro coaches for Mumbai, Western Railway has been manufactured at Integral Coach Factory (ICF) Chennai. ICF has turned out coaches for Kolkata Metro with Automatic door closure mechanism. Automatic entrance doors have been provided in the design of coaches of one Linke Hofmann Busch(LHB) rake with a higher speed potential of up to 200 kmph. Besides, for faster evacuation in case of emergency, AC compartment doors have been made with Bi-directional swing and fitment started in newly manufactured coaches. Retro fitment is also being done in all AC coaches in a progressive manner.

Measures taken to prevent Fire in Trains

- **Improving Fire Retardancy in Coaches:-** Coaches are being provided with fire retardant furnishing materials such as Fire retardant curtains, partition paneling, roof ceiling, flooring, seat and berths along with cushioning material and seat covers, Windows and UIC Vestibules etc. The specifications of these items are being upgraded from time to time as a part of continual improvement. In the recent past, another parameter called 'Heat Release Rate (HRR)' has been added in the material specification of all major interior furnishing materials used in coaches as per latest European norms.
- **Introduction of Automatic Fire and Smoke Detection System:** A pilot project for field trial with Automatic Fire and Smoke Detection system was taken up in one rake of New Delhi- Bhubaneswar Rajdhani. Besides, one LHB rake in New Delhi –Jammu Tawi Rajdhani train and one rake of LHB AC Double Decker rake running between Kacheguda-Tirupati/Guntakal of South Central Railway have been provided with Automatic Fire and Smoke Detection system. In the latest specification Air brake system has been interfaced with Fire and Smoke detection system for stoppage of trains in emergency situations. Provision on 2750

coaches (around 110 rakes) has been further sanctioned by IR. Besides, AC coaches trial on Non AC coaches has also been planned.

- **Provision of Fire Extinguishers:** Dry chemical powder type fire extinguishers are being provided in all mainline trains. These are portable fire extinguishers and easy to use by on board staff or passengers in case of emergency. Fire extinguishers are being provided in all Air-conditioned coaches, Second class- cum-guard and luggage van, Pantry cars and train locomotives. In other Non–AC passenger coaches, trial fitment has been done on 100 coaches.
- **Provision of Water mist type Fire Suppression in pantry cars and power cars:** Power cars and Pantry cars are relatively more prone to fire and therefore Fire suppression system based on water-mist technology is being tried out on limited numbers of coaches before large scale proliferation.
- **Inspection of Electrical & LPG Fittings in Pantry Cars:** Detailed instructions have been issued to zonal railways for observance of safe practices in handling of pantry cars and for ensuring periodical inspection of electrical and LPG fittings in the pantry cars.
- **Publicity Campaigns:** Intensive publicity campaigns to prevent the travelling public from carrying inflammable goods are regularly undertaken.

Measures to Curb Accident at Unmanned Level Crossings:

Various measures taken by Indian Railways to prevent accidents at level crossings, are as under:

- **Containing the proliferation of Level Crossings (LCs) at source:** A policy decision has been taken not to permit any new LC either on existing line or any new line/ gauge conversion to be commissioned henceforth. However, in exceptional cases, retention of unmanned LCs on new line or gauge conversion can be permitted with the approval of Railway Board.
- Ministry of Railways have decided to progressively eliminate all unmanned level crossings by:
  - (i) **Closure –** Closing unmanned level crossings having NIL/ Negligible Train Vehicle Unit (TVU).
  - (ii) **Merger –** Merger of unmanned level crossing gate to nearby manned or unmanned gates or subway or Road Under Bridge (RUB) or Road Over Bridge (ROB) by construction of diversion road.

(iii) **Provision of Subways/ RUBS**

(iv) **Manning -** The unmanned level crossings which cannot be eliminated by above means, will be progressively manned based on rail- road traffic volume, visibility conditions.

(a) Level Crossing: Level crossings are meant to facilitate the smooth running of traffic a in regulated manner governed by specific rules & conditions, Status of level crossings on IR as on 01.04.2016 is as under:

Total Number of level crossings	:	28,607
Number of manned level crossings	:	19,267 (67%)
Number of unmanned level crossings	:	9,340 (33%)

Indian Railways has decided to progressively eliminate the level crossings for the safety of Road users and train passengers. During the year 2015-16, 1,253 Nos. of unmanned level crossings and 390 Nos. of manned level crossings have been eliminated.

During the year 2016-17 (upto September, 2016), 505 Nos. of unmanned level crossings and 218 Nos. of manned level crossings have been eliminated.

(b) Road Over/Under Bridges: To improve safety of train operation and reduce inconvenience to road users, level crossings are being replaced by Road Over/Under Bridges/Subways (ROBs/RUBs) in a phased manner based on the quantum of traffic.

There are 2,117 of sanctioned works of ROBs/RUBs appearing in Pink Book 2016-17 which contains 1,592 ROBs and 6065 RUBs/Subways. These are at various stages of planning, estimation and execution.

During the year 2015-16, 194 ROBs and 830 RUBs/Subways have been constructed under cost sharing, railway cost/accommodation works, Deposit/BOT term and by NHAI over Indian Railway.

During the year 2016-17 (upto September, 2016), 64 ROBs and 404 RUBs/Subways have been constructed over Indian Railways.

Major Achievements: In the Budget 2016-17, 949 ROBs/RUBs and other Safety works have been sanctioned at a total cost of ₹14,091 crores. These works will result in elimination of 1,621 Level Crossings (LCs) including 973 unmanned LCs.

(c) Bridge Inspection and Management System: Modern Bridge Inspection techniques have been adopted, which includes testing by non-destructive testing equipments, under water inspections, monitoring the water level with the help of water level system etc. Bridge Management system is also being developed which will have the facility for uploading

of photographs, Bridge design data, inspection details etc.

(d) Patrolling of Railway Tracks: During adverse weather conditions patrolling of railway tracks including night patrolling is carried out at vulnerable locations regularly.

Administrative Measures

- **Constant Review of Safety Performance at Board's apex level:** Safety performance is invariably reviewed as a first item on Agenda of Board Meeting at the apex level. All accidents are analyzed in detail so that remedial measures can be initiated.
- **Safety Review Meetings with Zonal Railways:** Chairman and Board Members have conducted Safety Review Meetings with General Managers and PHODs of zonal railways during their visits.
- **Intensive Footplate Night Inspections:** Intensive footplate inspections including night inspections have been conducted at the level of SAG and Branch officers and supervisors in the field.
- **Regular Safety Drives:** Safety drives have been launched from time to time, covering the lessons learnt from recent train accidents so as to prevent similar accidents in future.

A view of Construction of ROB on North Western Railway

The Network

Indian Railways (IR) is one of the world's largest rail network with 66,687 route kilometres of route lengths. The size of the network - gauge-wise and zone-wise as on 31 March, 2016 is as follows:

Gauge	Route Kms.	Running Track Kms	Total Track Kms
Broad Gauge (1676 mm)	60,510	85,614	1,12,388
Metre Gauge (1000 mm)	3,880	4,170	4,747
Narrow Gauge (762 mm and 610 mm)	2,297	2,297	2,495
Total	**66,687**	**92,081**	**1,19,630**

Zones /Headquarters	Route Kms	Running Track Kms	Total track Kms
Central, Mumbai	4,063	6,237	8,491
Eastern, Kolkata	2,712	4,790	7,461
East Central, Hajipur	3,925	5,637	8,199
East Coast, Bhubaneshwar	2,723	4,026	5,440
Northern, New Delhi	7,301	9,560	12,966
North Central, Allahabad	3,364	4,968	6,101
North Eastern, Gorakhpur	3,869	4,579	5,321
Northeast Frontier, Maligaon, (Gauwahati)	4,072	4,470	6,025
North Western, Jaipur	5,550	7,015	7,430
Southern, Chennai	5,074	7,003	8,647
South Central, Secunderabad	6,028	8,216	10,107
South Eastern, Kolkata	2,715	5,062	6,834
South East Central, Bilaspur	2,506	3,659	5,048
South Western, Hubli	3,321	3,941	4,931
Western, Mumbai	6,440	8,022	10,239
West Central, Jabalpur	2,997	4,841	6,295
Metro Railway, Kolkata	27	55	95
Total	**66,687**	**92,081**	**1,19,630**

State-wise Route Kms/ Running Track Kms. /Total Track Kms.:

Following table shows Route Kms., Running Track Kms. & Total Track Kms. of railway lines across various States/Union Territories at the end of 2015-16.

State/Union Territory	Route Kms.	Running Track Kms.	Total Track Kms.
Andhra Pradesh	3,703	5,598	7,132
Arunachal Pradesh	12	12	26
Assam	2,443	2,555	3,447
Bihar	3,731	5,107	6,870
Chhatisgarh	1,213	1,887	2,676
Delhi	183	339	699
Goa	69	69	98
Gujarat	5,259	6,275	7,691
Haryana	1,711	2,376	3,110
Himachal Pradesh	296	301	358
Jammu & Kashmir	298	366	490
Jharkhand	2,394	3,866	5,968
Karnataka	3,281	4,076	5,140
Kerala	1,045	1,680	2,042
Madhya Pradesh	5,000	7,498	9,337
Maharashtra	5,745	8,172	11,053
Manipur	1	1	6
Meghalaya	9	9	13
Mizoram	2	2	6
Nagaland	11	11	22
Odisha	2,572	3,877	5,038
Punjab	2,269	2,729	3,579
Rajasthan	5,893	7,589	8,579
Tamil Nadu	4,027	5,206	6,453
Telangana	1,737	2,441	3,058
Tripura	193	193	243
Uttarakhand	340	400	509
Uttar Pradesh	9,077	12,156	15,291
West Bengal	4,135	7,252	10,604
Union Territory			
Chandigarh	16	16	66
Pondicherry	22	22	26
Total	**66,687**	**92,081**	**1,19,630**

Note: The remaining States/Union Territories have no railway line.

The table below shows the changing size of IR's electrified rail network over the years.

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	1,04,480
1990-91	9,968	62,367	18,954	78,607	25,305	1,08,858
2000-01	14,856	63,028	27,937	81,865	36,950	1,08,706
2010-11	19,607	64,460	36,007	87,114	49,489	1,13,993
2013-14	21,614	65,808	39,661	89,919	53,509	1,16,765
2014-15	22,224	66,030	41,038	90,803	55,266	1,17,996
2015-16	**23,555**	**66,687**	**43,357**	**92,081**	**57,738**	**1,19,630**

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

With its more than 150 year old history, IR is a state-owned public utility of the Government of India under the Ministry of Railways.

As a national common carrier transporting passenger and goods over its vast network, Indian Railways has always 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 viz. ores and minerals, iron and steel, cement, mineral oils, food grains and fertilizers, containerized cargo etc., the importance of Indian Railways for agriculture, industry and the common man is well recognized. Indian Railways carried 22.2 million passengers and 3.03 million tonnes of freight each day during 2015-16.

IR, functioning as Ministry of Railways, is headed by the Minister for Railways. The apex body entrusted with the management of this mega enterprise is led by the Chairman, Railway Board (CRB). Members of the Railway Board include Financial Commissioner, Member Traffic, Member Engineering, Member Rolling Stock, Member Traction and Member Staff who represent their respective functional domains. For administrative purposes, IR is divided into 17 Zones, each headed by a General Manager. Zonal Railways are further divided into smaller operating units called Divisions. There are 68 Operating Divisions in IR at present, each under a Divisional Railway Manager. In addition, there are a number of Production Units, Training Establishments, Public Sector Enterprises and other Offices working under the control of Railway Board.

Track and Bridges

As on 31.3.2016, the Indian Railways had			(in Kms.)
(i)	Route length	-	66,687
(ii)	Running Track length	-	92,081
(iii)	Total Trackage	-	1,19,630
The following works were carried out upto 31.3.2016			
(i)	Track renewal	-	2,794
(ii)	Constructed of New Line	-	813.1
(iii)	Gauge conversion from MG/NG to BG	-	1,042
(iv)	Track converted from single to double line	-	973

New lines:

During 2015-16, new lines over a length of 813 km, were constructed and commissioned on the following projects/sections:

Railway	Section	Length (in Kms.)
Eastern	Jamalpur-Munger	8.1
	Banka-Chandan	40.36
	Arambagh-Goghat	9.45
	Barapalasi-Hansdiha	28.15
East Coast	Begunia-Rajsunakhala-Bolagarh	10
East Central	Patna Bridge	28
	Munger Bridge	15
	Hazaribagh-Barkakana	57
Northern	Pandu Pindara-Bhambewa Gohana	40
	Gohana-Sonipat	40
North Central	Etawah-Mainpuri	58
	Agra-Etawah	110
Northeast Frontier	Agartala-Udaipur	44
	New Changrabandha-New Coochbehar	70
North Western	Makrana-Bidiyad	9
South Central	Nossam-Banaganapalli	45
	Mellacheruvu-Mattampally	10
	Lingampet Jagityal-Mortad	51
South East Central	Dallirajhara-Gudum	17
Western	Indore-Rau	12
	Gandhidham-Tuna Port	11

West Central	Mawai-Kharakpur	23
	Kharagpur-Chatarpur	47
	Chatarpur-Khajuraho	30
	Total	**813.1**

Gauge Conversion:

During 2015-16, 1,042 Kms. of track was converted from MG to BG, as detailed below:

Railway	Section	Length (in Kms.)
Eastern	Ahmadpur-Kirnahar-Jnandas Kandra	40
East Central	Banmankhi-Purnia	37
North Eastern	Thawe-Chhapra	107
	Gainsari - Barhni	24
Northeast Frontier	Kumarghat-Agartala	109
	New Mal-Changrabandha	62
	Arunachal-Jiribam & Karimganj-Maishashan	50
	Badarpur-Kumarghat	118
	Katakhal-Bhairabi	84
North Western	Suratpura-Hanumangarh	174
	Sikar-Loharu	122
Southern	Pollachi-Palakkad	54
	Pollachi-Podanur	40
South East Central	Jabalpur(Kachhpura)-Sukrimangela	6
Western	Laxmibainagar-Indore (4 kms) & Rau-Mhow (11 kms)	15
	Total	**1,042**

Doubling:

During 2015-16, 973 Kms. of double/multiple lines were completed and commissioned, as detailed below:

Railway	Section	Length (in Kms.)
Central	Kasu-Nagothane	13
	Godhani cord cabin (for goods traffic)	6
	Hotgi-Tilati	9.35
Eastern	Nalhati-Morgram	18.8
	Morgram-Sagardighi	7.62
	Taljhari-Maharajpur	14.2
	Maharajpur-Sahibganj	13.9
	Nabadwipdham-Purbasthali	9.15
	Dhatrigram-Nabadwipdham	14.6
	Barharwa-Bonidanga	4.73
	Plassey-Beldanga	17.9
East Central	Chandrapura-Rajabera-Bhandaridah	10

Railway	Section	Length (in Kms.)
East Coast	Jharsuguda Road-Jharsuguda Jn.	2.07
	Handapa-Boinda	7.7
	Sakhigopal-Puri	16.3
	Alamanda-Korukonda	7.1
	Korukonda-Vizianagaram	10.7
	Sukinda Road-Jajpur Keonjhar Rd.	10.5
	Cuttack-Barang	14.3
	Sukinda Road-Baghuapal	8.5
	Baghuapal - Tomka	8.5
Northern	Palwal-Asaoti	10
	Shiv Nagar-Bandhua Kalan	13.2
	Sultanpur-Pakhrauli	9.25
	Pakhrauli-Bhadaiyan-Lambhua	15.2
	Budhlada-Mansa	16
	Mansa-Maisarkhana- Kotfateh	34
	Ambala Cantt-Dhapper	22.7
	Khukrana-Panipat	8
	Chhan Arorian - Budhi	8
	Chakki Bank - Bharoli	3.5
	Jalandhar Cantt - Suchipind	3.5
	Samba-Vijaypur-Jammu involving Doubling across Basantar Bridge	6.5
North Frontier	Belakoba – Raninagar Jalpaiguri	8
North Western	Swarupganj-Keshavganj	27
	Mori Bera-Kothar	6.32
	Kothar-Nana	6.3
	Nana-Keshavganj	8.7
Southern	Chengalpattu-Ottivakkam-Karunguzhi	20
	Vriddhachalam Jn to Ulundurpet	19
	Ulundurpet - Parikkal	11
	Parikkal - Tiruvennainallur Rd.	9
	Manaparai-Samudram	10
	Samudram-Kolatur	7
	Kolatur-Punggudi	10
	Punggudi-Tiruchchirappalli	9
South Central	Raghavapuram-Peddampet & Manchiryal-Mandamari	25
South Eastern	Barda-Basulya Sutahata	5.9
	Bimalgarh-Patasahi	8
	Mahisadal-Barda	8.5
	Sini-Gamharia	16
	Jharsuguda - Jharsuguda Road	2.5
	Rajkharswan-Pandrasali	12
	Tamluk-Keshabpur	2.5

Railway	Section	Length (in Kms.)
South East Central	Champa-Kharsia	37
	Jaithari- Nigaura	10.1
	Venkatnagar-Harri	10.8
	Nigaura-Venkatnagar	7.3
South Western	Hosdurga-Chikjajur (4 Stations)	30
	Ramnagaram-Mysuru (5 Stations)	28
	Yesvantpur-Yelahanka & Chennasandra-Yelahanka	20
	Harlapur-Sompur	8.83
	Sompur-Bannikoppa	7.65
Western	Vyara-Madhi	15
	Dharangaon-Paldhi	17
	Madhi-Bardoli	14
	Bala road-Surendranagar	9.53
	Lakhtar-Bala Road	11.6
	Lilapur Road-Lakhtar	12.3
	Jatpipli-Vasadva	11.4
	Chuli-Sukhpur	10.6
West Central	Ghatpindrai-Belkheda	5.56
	Kalhar-Mandi Bamora	8.8
	Kalhar-Bareth	9.6
	Sukhi Sewaniya Nishatpura	9.6
	Gulabganj-Sumer	7.4
	Sumer-Sorai	8.3
DFC	Durgawauti- Karwandiya	56
Total		**973**

Gauge-wise Details:

Broad gauge, though forming 90.74 of the route, generated 99.9% of the freight output (NTKms) and 98.77% of the passenger output (Pkms).

Route length as on 31.03.2016 on each gauge, indicating double/ multiple line, single line and electrified route, is given below:

Gauge	Single line			Double/multiple line			Grand Total
	Electr-ified	Non electrified	Total	Electr-ified	Non electrified	Total	
Broad (1676 mm)	6,544	32,729	39,273	17,011	4,226	21,237	60,510
Metre (1000 mm)	-	3,880	3,880	-	-	-	3,880
Narrow (762mm/610 mm)	-	2,297	2,297	-	-	-	2,297
Total	**6,544**	**38,907**	**45,450**	**17,011**	**4,226**	**21,237**	**66,687**

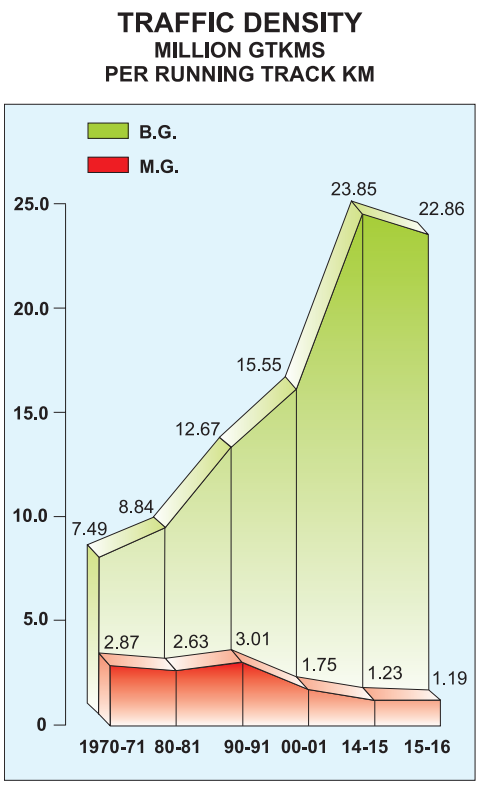
Almost all Double/Multiple Track sections and Electrified Routes are Broad Gauge. Metre and Narrow Gauges are mostly single line and non-electrified. Between 1950-51 and 2015-16, traffic density (million GTKms. per running track km.) increased from 4.29 to 22.86 on BG.

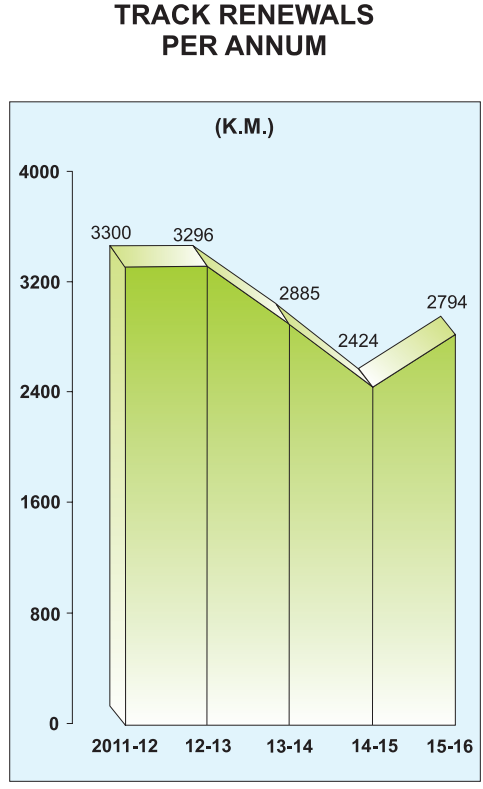
Track Renewal and Maintenance:

During 2015-16, 2,794 Kms. of track renewal was carried out. The year -wise details of track renewals done and expenditures incurred thereon are as under:

Year	Gross Expenditure (₹ in crore)	Track Renewal done (Kms.)
2013-14	4,985.35	2,885
2014-15	5,371.55	2,424
2015-16	**5,586.03(Prov.)**	**2,794**

IR is working towards progressive mechanization and modernization of laying and maintenance of track. Induction of high output tamping machines for packing of plain track as well as turnouts, ballast cleaning machines and shoulder ballast cleaning machines for improving drainage of track, dynamic





track stabilizer for controlled consolidation of newly laid/maintained track, point and crossing changing machines for laying concrete sleeper turnouts, etc. is a step in this direction. During 2015-16, 37 track machines were procured taking the total at the end of the year to 807. Track recording cars are deployed for electronic monitoring of track parameters at periodic intervals to enable planning of maintenance. During 2015-16, a total of 1,36,793 Kms track recording was carried out.

Track Upgradation:

Track constitutes the basic infrastructure of a railway system and bears the burden of coping with ever increasing traffic. High speed and heavy axle load operation on IR has necessitated upgradation of the track structure. Several policy initiatives have been taken to modernize the track.

Track structure is upgraded at the time of renewals. Sleepers are being upgraded from wooden, steel and CST-9 to PSC sleepers. Heavier section and high tensile strength rails are being used. Presently, 52 kg/60 kg 90 UTS rails are being used in place of 90R/52 kg 72 UTS rails. Similarly, long rail panels or welded rails are predominantly used in place of earlier fish plated joints. As on 31.3.2016 on BG main lines of IR, about 89.12% of the length is covered by long welded rails, 98.96% with PSC sleepers and 95.20% with 52 kg/60 kg 90 or higher UTS rails.

Welded Rails:

On most of BG track, rails have been converted into long welded rails, short welded rails of 39m length and single rails are limited to locations where welded rails are not permitted on technical grounds. As on 31.3.2016, total length of welded track on main lines of IR was 88,733 kms out of which 74,094 kms was with long welded rails and 9,558 kms. with short-welded rails.

Concrete Sleepers:

Concrete sleepers are economical and functionally best suited for high speed and heavy density traffic. Adequate capacity has been developed for production of concrete sleepers to meet the present requirement of IR and only concrete sleepers are being used for all renewals, new lines, doubling, gauge conversion etc.

Bridges:

IR has 1,40,919 bridges, out of which 664 are important, 11,653 are major and 1,28,602 are minor bridges. In 2015-16, 705 bridges were strengthened/rehabilitated/rebuilt.

Road Over/Under Bridges:

To improve safety of train operation and reduce inconvenience to road users, busy level crossings are being replaced by Road Over/Under Bridges (ROBs/RUBs) in a phased manner based on the quantum of traffic.

There were 2,117 numbers of sanctioned works appearing in Pink Book 2016-17 which contains 1,592 ROBs and 6,065 RUBs/Subways. These are at various stages of planning, estimation and execution.

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IR has decided to progressively eliminate the level crossing for the safety of Road - users and train passengers. During the year 2015-16, 1,253 unmanned level crossings and 390 manned level crossings have been eliminated.

Land Management:

As on 31.03.2016 IR owns about 4.73 lakh hectares of land. About 90% of this land is under Railways' operational and allied usages such as laying of new lines, doubling, gauge conversions, track, stations, workshops, staff colonies, etc. The break-up of the land is as under:-

Description	Area (in lakh hectares)
Track and structures including stations, colonies, etc.	3.64
Afforestation	0.40
'Grow More Food' scheme	0.03
Commercial licensing	0.04
Other uses like pisciculture	0.09
Encroachment	0.01
Vacant land	0.52
Total	**4.73**

Creation of various infrastructure facilities for development of future rail network largely depends on the availability of land. Therefore, preservation and meaningful interim use of railway land is the main objective of IR's land-use policy.

In pursuance of Railways' commitment towards environmental improvement through afforestation and also with a view to safeguard the precious railway land against unauthorized occupation, tree plantation is being undertaken on vacant railway land with active participation of railway employees. In some States, railway land in mid-sections has been entrusted to the Forest Departments for plantation so as to ensure purposeful utilization and prevention against encroachments.

Besides, railway land is also licensed to railway employees belonging to Group 'C' and 'D' category under 'Grow More Food' scheme, for growing vegetables, crops etc.

Licensing of railway land is permitted for the purposes directly connected with railway working. Plots of railway land at stations, goods sheds and sidings are licensed to other parties for stacking/storing of goods either received or to be dispatched by rail. Railway land is also leased to Kendriya Vidyalaya Sangathan to open the Kendriya Vidyalayas. Apart from this, land is also leased to Central/State Governments/Public Sector Undertakings on long term basis for public utility purpose like ROB/RUB, etc.

Railways have also taken up commercial use of such land which may not be required by the Railways for its immediate future use. Through an amendment to Railways Act, 1989, Rail Land Development Authority (RLDA), under the Ministry of Railways has been constituted on 1st November, 2006 to undertake all tasks related to commercial development on railway land/ air-space under the control of Ministry of Railways. At present, 48 sites have been entrusted to the Authority, for commercial development.

Necessary action for development of these sites is under process by RLDA. Besides commercial development of vacant Railway land, RLDA has also been assigned the task of development of Multi Functional Complexes (MFCs) for providing/augmenting much needed facilities to rail users at 197 identified stations.

Electrification

I Executive Summary of Railway Electrification

With a view to reduce the Nation's dependence on imported petroleum based energy and to enhance energy security of the Country, as well as to make the Railway System more eco-friendly and modernized, Indian Railways have been progressively electrifying its rail routes.

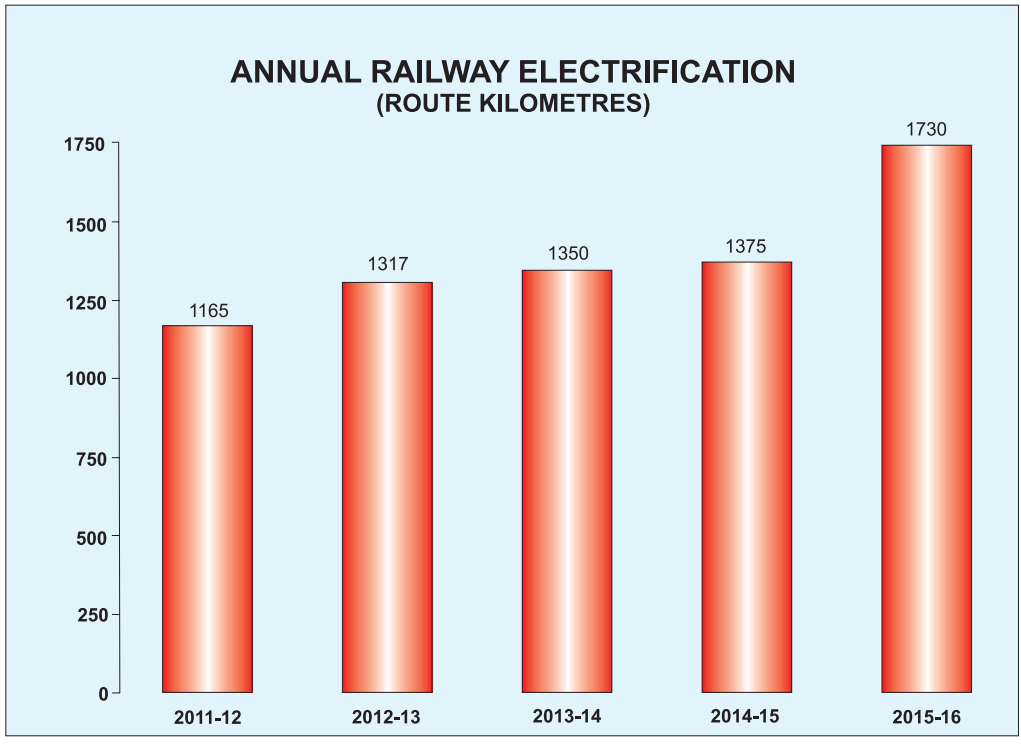
Upto March 2016, 23,555 Route kilometers which is 35.32% of the total Railway network has been electrified. On this electrified route 64.80% of freight traffic & 51.30% of Passenger traffic is hauled with fuel cost on electric traction being merely 38.70% of the total traction fuel cost on Indian Railways. In XIIth plan(2012-17), the target has been further enhanced to 6,500 RKMs, out of which, 5,772 RKMs have been electrified in the last four years of XIIth plan i.e. (in 2012-16) as against the proportionate target of 5,200 RKMs.

II Plan Period wise Progress of Railway Electrification

Plan Period	RKM Electrified
Pre-Independence - 1925-1947	388
1st Five Year Plan - 1951-56	141
2nd Five Year Plan - 1956-61	216
3rd Five Year Plan - 1961-66	1,678
Annual Plan - 1966-69	814
4th Five Year Plan - 1969-74	954
5th Five Year Plan - 1974-78	533
Inter Plan - 1978-80	195
6th Five Year Plan - 1980-85	1,522
7th Five Year Plan - 1985-90	2,812
Inter Plan - 1990-92	1,557
8th Five Year Plan - 1992-97	2,708
9th Five Year Plan - 1997-02	2,484
10th Five Year Plan - 2002-07	1,810
11th Five Year Plan - 2007-12	4,556
1st year of 12th Five Year Plan	1,317
2nd year of 12th Five Year Plan	1,350
3rd year of 12th Five Year Plan	1,375
4th year of 12th Five Year Plan	**1,730**

III Sections Opened for Electric Traction After Inspection by Commissioner of Railway Safety in 2015-16.

Section	Railway	State	RKM
Garudabilli-Parvatipuram-Singapur Road	ECoR	Andhra Pradesh & Odisha	122
Dharmavaram-Gooty	SCR	Andhra Pradesh	92
Barauni-Mansi	ECR	Bihar	65
Alwar-Rewari	NWR	Haryana, Rajasthan	72
Garwa Road-Meralgram	ECR	Jharkhand	22
Wadi Yard	SCR	Karnataka	2
Kozhikkode-Kannur-Charvattur	SR	Kerala	140
Puntamba-Sarola-Daund	CR	Maharashtra	174
Badnera-Walgaon	CR	Maharashtra	18
Dhumrikhurd-Ramtek	SECR	Maharashtra	14
lb-Jharsuguda-Lapanga	ECoR	Odisha	22
Angul-Kerejanga	ECoR	Odisha	14
Ramganj Mandi-Jhalawar	WCR	Rajasthan	26
Coimbatore-North Mettupalayam	SR	Tamilnadu	33
Ghaziabad-Meerut city-Saharanpur	NR	Uttar Pradesh	158
Ghaziabad-Moradabad	NR	Uttar Pradesh	135
Bhatni-Gorakhpur- Domingarh	NER	Uttar Pradesh	72
Varanasi-Lohta-Janghai-Unchahar incl. Phaphamau-Prayag-Allahabad	NR	Uttar Pradesh	207
Gonda-Basti	NER	Uttar Pradesh	87
Laksar-Haridwar	NR	Uttarakhand	27
Total			**1,502**



IV Completion of Electrification from Varanasi–Lohta–Janghai Unchahar including Phaphamau–Prayag–Allahabad to connect two electrified routes i.e Kanpur–Allahabad–Mughalsarai and Lucknow–Sultanpur–Varanasi–Mughalsarai on electric traction.

In the year 2015-16, Railway Electrification of Varanasi-Phaphamau-Unchahar including Phaphamau-Prayag-Allahabad of Northern Railway, covering 207 route kilometers and passing through the State of Uttar Pradesh has been completed. This important rail route connects Allahabad on electrified (Kanpur–Allahabad-Mughalsarai) trunk route with Varanasi on electrified (Lucknow-Sultanpur-Varanasi-Mughalsarai) rail route. This has resulted in seamless flow of electric trains in this section as traction changes/detentions at Allahabad and Varanasi ends are eliminated.

V Completion of Electrification of Alwar-Rewari i.e. an extension of electrified Mathura-Alwar route.

In the year 2015-16, Railway Electrification of Alwar-Rewari rail line of North Western Railway, covering 72 route kilometers and passing through the States of Rajasthan and Haryana has been completed. This important rail route is an extension of electrified Mathura-Alwar and Phulera-Jaipur-Alwar(under electrification) rail routes and connects Delhi–Rewari–Ajmer-Ahmedabad which is also under electrification.

VI Completion of Electrification of Ghaziabad-Meerut-Saharanpur rail line to connect two electrified routes i.e Ambala–Saharanpur–Moradabad and Delhi–Ghaziabad–Kanpur on electric traction.

In the year 2015-16, Railway Electrification of Ghaziabad-Meerut-Saharanpur rail line of Northern Railway, covering 161 route kilometers and passing through the State of Uttar Pradesh has been completed. This important rail route connects Ghaziabad on electrified (Delhi-Ghaziabad-Kanpur) trunk route with Saharanpur on electrified (Ambala-Saharanpur-Moradabad-Lucknow) rail route. This has resulted in seamless flow of electric trains in this section as traction changes/detentions at Ghaziabad and Saharanpur ends are eliminated.

VII Completion of Electrification of Ghaziabad–Moradabad rail line to connect two electrified routes i.e Ambala–Moradabad–Lucknow and Delhi–Ghaziabad–Kanpur.

In the year 2015-16, Railway Electrification of Ghaziabad-Moradabad rail line of Northern Railway, covering 135 route kilometers and passing through the State of Uttar Pradesh has been completed. This important rail route

connects Ghaziabad on electrified (Delhi-Ghaziabad-Kanpur) trunk route with Moradabad on electrified (Ambala-Moradabad-Lucknow) rail route. This has resulted in seamless flow of electric trains in this section as traction changes/ detentions at Ghaziabad and Moradabad ends are eliminated.

VIII Completion of DC-AC conversion in Mumbai area of Western & Central Railways.

Electrification in Indian Railways started on 1500 volts DC on the suburban system of Central Railway with first electric train running on the historic day of 3rd February, 1925.

Post independence, the electrification was done on 25000 volt AC, which was a far superior technology, keeping in pace with the changing times. The complete section of Western Railway from Virar to Churchgate was converted from 1500 volt DC to 25000 volt AC on the historic date of 5th February, 2012. This has resulted in reduction in cost of operation apart from improving speeds and sectional capacity.

On the Central Railway system, which is much larger than the Western Railway system, conversion work has been successfully completed over the entire Mumbai division of Central Railway. This work of very complex nature has been carried out on the busiest network of Indian Railways without any disruption to sensitive commuter traffic. This will substantially improve the traffic throughput and result in a cumulative saving of ₹80-100 crore per annum, apart from introducing State-of-the Art train services for Mumbai suburban passengers with better passenger amenities, reduction in journey time and operating cost of the Railways.

IX Major New Electrification Works Sanctioned in 2015-16, under Plan Head- Railway Electrification.

Section	Railway	State	RKM
Jasai - Jawaharlal Nehru Port Trust	CR	Maharashtra	9
Panvel - Pen - Thal	CR	Maharashtra	75
Bonidanga Link Cabin / Bonidanga - Barharwa - Sahibganj - Kiul including Tinpahar- Rajmahal	ER	Jharkhand & Bihar	247
Koderma - Hazaribagh - Barkakana - Ranchi	ECR	Jharkhand	203
Valmiki Nagar - Narkatiaganj - Sugauli - Muzzafarpur including Sugauli - Raxaul	ECR	Bihar	240
Kiul - Tilaiya	ECR	Bihar	87
Una Himachal - Amb Andaura	NR	Himachal Pradesh	25
Utraitiar - Rae Bareli - Amethi – Janghai	NR	Uttar Pradesh	214
Zafrabad - Akbarpur - Tanda	NR	Uttar Pradesh	101
Idgah - Achnera - Mathura & Achnera - Bharatpur	NCR	Uttar Pradesh & Rajasthan	87

Section	Railway	State	RKM
Jhansi - Manikpur including Khairar - Bhimsen	NCR	Uttar Pradesh & Madhya Pradesh	409
Lalitpur - Udaipura	NCR	Uttar Pradesh	32
Ghazipur - Aunrihar - Manduadih	NER	Uttar Pradesh	78
Hissar - Bhatinda - Suratgarh - Phalodi - Jodhpur - Bhildi including Phalodi - Jaisalmer	NWR	Haryana, Punjab, Rajasthan & Gujarat	1,230
Ajmer - Berach - Mavli - Udaipur	NWR	Rajasthan	294
Rohtak - Bhiwani	NWR	Haryana	48
Erode – Karur -Tiruchchirappalli & Salem - Karur - Dindigul	SR	Tamilnadu	300
Tiruchchirappalli - Nagappattinam - Karaikal Port	SR	Tamilnadu	153
Guntakal - Kalluru	SCR	Andhra Pradesh	40
Peddapalli - Lingampet – Jagtial	SCR	Telangana	83
Pagidipalli - Nallapadu	SCR	Telangana	285
Manmad - Mudkhed - Dhone	SCR	Maharashtra, Telangana & Andhra Pradesh	868
Hosapete - Hubballi - Vasco da Gama	SWR	Karnataka & Goa	346
Ahmedabad - Rajkot	WR	Gujarat	233
Mahesana- Viramgam-Samakhiyali	WR	Gujarat	292
Indore - Mhow	WR	Madhya Pradesh	21
Singrauli- Katni	WCR	Madhya Pradesh	260
Ratlam - Nimach - Chanderia – Kota	WCR & WR	Madhya Pradesh & Rajasthan	348
Total			**6,608**

15-car EMU rake

Signal and Telecom

Signalling

To increase Efficiency and to enhance Safety in train operations, Advanced Signalling System with Route Relay/Panel/Electronic Interlocking (RRI/PI/EI) along with Multi Aspect Colour Light Signals (MACLS) have been progressively provided at 5,393 stations covering about 86 % of the interlocked Broad Gauge stations on Indian Railways, replacing outdated Multi Cabin Mechanical Signalling System involving a large number of human interfaces. Route Relay Interlocking at 13 major stations namely, Majeri, Malda Town, Sultangarh,Tuglakabad, Badarpur, Lumding, Ernakulam, Hatia, Katrasgarh, Etawah, Naini, Hanumangarh, Itarsi, Panel Interlocking at 151 Stations and Electronic Interlocking at 155 stations have been provided during the year 2015-16.

Complete Track Circuiting: has been done upto 99.82% on A, B and C routes. Fouling Mark to Fouling Mark track circuiting on 'A', 'B' 'C', 'D Special' and 'E Special' routes, where permissible speed is more than 75 kilometres per hour has been completed.

Block Proving Axle Counter (BPAC): to enhance safety, automatic verification of complete arrival of train, BPAC is being provided at stations having centralized operation of points and signals.

Automatic Block Signalling (ABS): for augmenting Line Capacity and reduce headway on existing High Density Routes on IR, Signalling provides a low cost option by provision of ABS. As on 31.03.2016, Automatic Block Signalling has been provided on 2,752 Route Kms.

Train Protection and Warning System (TPWS): Train Protection and Warning System (TPWS) based on European technology ETCS L-1 is a proven ATP System to avoid train accidents/ collisions on account of human error of Signal Passing At Danger (SPAD) or over-speeding. As a pilot project, TPWS has been provided on Chennai-Gummidipundi Suburban Section of Southern Railway (50 RKms). In another pilot project on Hazrat Nizamuddin – Agra Section of Northern/North Central Railway (200 RKms), commercial trials with 35 locomotives in nominated trains have been completed. Gatiman Express running at 160 Kmph on Delhi-Agra section has been equipped with TPWS. TPWS has also been provided on Dum

Dum-Kavi Subhash section of Kolkata Metro (25 RKMs) and introduced in commercial service on all the EMU rakes.

Work for provision of track side equipments of TPWS on Basin Bridge-Arakonam Section (67 RKms) of Southern Railway is under progress and targeted for commissioning in current financial year.

Based on experience gained, TPWS has been approved for 3,330 Route Kilometers (RKMs) covering Automatic Signalling Sections of IR. In first phase, the implementation of TPWS works has been taken up on 1244 RKms, automatic Signalling sections on Zonal Railways where EMU services ply with onboard equipment on EMU rakes only. Further, Railways have been advised for implementation of the balance sanctioned work of TPWS on 2,086 (Rkms) on HDN-1/HDN-2/HDN-3 Routes.

Train Collision Avoidance System (TCAS): TCAS is being developed indigenously by RDSO for Collision Prevention as well as Protection against Signal Passing At Danger (SPAD) by loco pilot. RDSO has finalized the Specification after successful proof of concept trials. Extended field trials with multi-vendor, interoperability features are being conducted by RDSO on 250 km section on South Central Railway. Initial round of extended field trials were conducted by RDSO during 2013-14 in a sub section of the above identified section wherein Anti-Collision & Automatic Train Protection features of TCAS were successfully demonstrated. Further, extended field trials on 2 pairs of trains have commenced on 15.02.16.

Train Management System (TMS): TMS helps in real-time monitoring of trains in the control room. The arrival status of local trains is displayed on indicators installed on platforms in the form of a countdown timer (in minutes) to the train's arrival on the platform accompanied by automatic announcements on platforms.

TMS has been provided on Mumbai suburban section of Western and Central Railways. On WR, it covers section from Churchgate to Virar extending over 60 km covering 28 stations and on CR it covers suburban section from CST Mumbai to Kalyan extending over 54 km covering 26 stations. TMS work is near completion on Howrah Division of Eastern Railway.

Accidents at Level Crossings: This has been a major area of concern. Indian Railways have provided interlocking with Signals at 10,776 Level Crossing Gates to enhance the safety at Level Crossings. Initiative has been taken to Interlock Level Crossing gate with Train Vehicle Units of 20,000 and above.

Growth of Signalling

Growth of deployment of Signalling on Indian Railways:

Item	Mar'02	Mar'04	Mar'06	Mar'08	Mar'10	Mar'12	Mar'14	Mar'15	Mar'16
Panel Interlocking (Stations)	2,224	2,692	2,911	3,462	3,830	4,079	4,200	4,195	**4,107**
Route Relay Interlocking (Stations)	183	197	219	223	255	257	276	280	**281**
Electronic Interlocking (Stations)	14	45	100	229	401	535	735	842	**1,005**
PI/RRI/EI (Stations)	2,421	2,934	3,230	3,914	4,486	4,871	5,211	5,317	**5,393**
MACLS (Stations)	3,112	3,508	4,203	4,673	5,097	5,391	5,658	5,772	**5,832**
Track Circuiting (Locations)	17,078	19,593	22,285	24,567	27,215	29,201	30,509	31,073	**31,737**
Block Proving Axle Counter (Block sections)	192	296	632	1,437	2,450	3,410	4,175	4,585	**4,640**
LED Lit Stations	62	268	865	1,785	3,549	4,814	5,449	5,599	**5,732**
Data logger (Stations)	459	813	1,737	2,690	3,816	4,773	5,292	5,460	**5,587**
Automatic Signalling (Route Kms)	1,336	1,352	1,479	1,601	2,020	2,286	2,623	2,715	**2,752**
Intermediate Block Signalling (Block sections)	140	154	164	185	342	397	449	475	**489**
Interlocked Gates (Nos)	6,441	7,006	7,781	8,428	9,335	9,983	10,493	10,513	**10,776**

Telecommunication

Telecommunication plays an important role in train control, operation and safety on IR. Indian Railways has set up a state of the art, nationwide telecom network for meeting its communication needs. RailTel, a Railways Central Public Sector Enterprise formed in September, 2000 is successfully exploiting surplus capacity of IR Telecom network commercially.

As on March 2016, IR has about 49,434 Route Kilometers of Optical Fibre Cable (OFC) that is carrying Gigabits of traffic. Railways Control Communication which is quintessential for train operation and control is also being transferred to OFC system. Till date control communication on 47,001 (Rkm) has been shifted on OFC system. This OFC network is also contributing significantly in building National Knowledge Network through RailTel. A plan to provide Broadband connectivity to Panchayats is also being contemplated through this OFC network.

IR have decided to adopt Global System of Mobile Communication – Railways (GSM-R) based Mobile Train Radio Communication. The same has already been provided on 2,461 Route Kms and is being extended in

balance 'A','B' & 'C' routes.

IR has its own satellite hub that is being utilized for connecting remote location for Freight Operation Information System (FOIS), Unreserved Ticketing System (UTS), Disaster Management System as well as for other critical communication systems. Besides, IR works use 13,116 data circuits that power its various data and voice networks across the country.

Railways have also established its Multi-Protocol Level Switching (MPLS) based Next Generation Networks (NGN) for voice traffic. This Next Generation Networks (NGN) has been used to interconnect more than 100 exchanges of Railways carrying the administrative voice traffic. Common User Group (CUG) mobile phones have also been hired to enable communication while on move to enhance safety, reliability and productivity. IR is also using 1.45 lakh VHF walkie-talkies sets to ensure safety and enhance reliability.

Internet has changed the way organizations work today and is impacting almost all the activities of daily life. IR has also embraced this technology and is using it effectively. It has recently provided broadband in all its major colonies in zonal and divisional headquarters.

Train Information Display Board: Telecom also plays a major role in ensuring passenger comfort. For the convenience of passengers, Train Information Boards have been provided at 1,090 stations, Public Address (PA) Systems at 4,780 stations and Coach Guidance System at 534 stations.

RailTel Corporation is speeding the adoption of latest telecom technologies in Railways. Besides earning revenue from the spare capacity of Telecom Network of Railways, it is also modernizing the same. It has set up a state-of the-art MPLS network that is used for providing Internet and l3-VPN services. The Enterprise WAN of Railway-Railnet works as an L3-VPN on this MPLS network. It has also setup STM-4, STM-16, STM-64 and DWDM networks to carry data across the length and breadth of the country. It is involved in major Government projects like National Knowledge Network & National OFC network thereby contributing to the growth of the nation.

RailTel has also set-up a next-generation-network to carry voice across the country. Point-of-interconnect has been established with all major telecom operators of the country. All zonal and divisional railway exchanges have also been connected to the NGN thereby modernizing the Railways voice STD network.

Vision 2020 envisages provision of Broad Band Internet facility on important mail & express trains.

Broad Band Internet accesses to passengers have been provided using two way satellite hybrid with 2G/3G and Wi-Fi. The System consists of on-board satellite tracking antenna, multiband antenna and Wi-Fi broadcasting

equipments for on-board last mile connectivity. The primary broad-band link to back haul the internet traffic is established via satellite and in the event of non-availability of satellite the multi access router automatically switches from satellite to 2G/3G links to achieve 99% connectivity. The salient features of the system are:

Bandwidth:

- Forward Link (downstream to train) = 4 Mbps

  Shared between three rakes

- Return Link (Upstream from train) = 512 kbps Per train

Authentication of the User:

To comply with the Department of Telecommunications' extant guidelines for user authentication for public Wi-Fi networks, a detailed log in process has been put in place. Multi layered firewall protecting intrusion from either side is also available in the system.

Important Telecom assets are tabulated below:

SNo.	Installation	Units	As on 31.03.2015	As on 31.03.2016
1.	Optical Fibre Cable	Rkms	48,293	**49,434**
2.	Quad Cable	Rkms	55,376	**58,980**
3.	Railway Telephone Subscribers Lines	Nos.	3,95,816	**3,95,816**
4.	No. of Control Sections provided with Dual Tone Multiple Frequency (DTMF) control equipment	Nos.	322	**322**
5.	Mobile Train Radio communication System (Route kms.):-			
a.	GSM (R) based	Rkms	2,461	**2,461**
b.	TETRA based	Rkms	53	**53**
6.	Digital Microwave (7 GHz)	Rkms	2,091	**1,852**
7.	Public Address System	Nos. of STNs	4,638	**4,780**
8.	Train Display Boards	Nos. of STNs	1,090	**1,090**
9.	Coach Guidance System	Nos. of STNs	530	**534**
10.	VHF Sets			
a.	5 Watt sets (Hand held)	Nos.	1,41,976	**1,45,947**
b.	25 Watt sets (At Stations)	Nos.	9,057	**9,461**
11.	V SAT	Nos.	1,068	**1,117**
12.	Railnet Connections	Nos.	1,20,652	**1,30,185**
13.	UTS/PRS Circuits	Nos.	10,470	**10,760**
14.	FOIS Circuits	Nos.	2,186	**2,209**
15.	NGN & Exchange Circuits	Nos.	2,429	**2,429**

Rolling Stock

Locomotives:

The size of IR's fleet of locomotive stock as on 31st March, 2016 consisted of 39 steam, 5,869 diesel and 5,214 electric locomotives. The number of locomotives, traction-wise, along with their average tractive effort is as follows:

Year	Number of locomotives				Tractive effort per loco (in kgs.)	
	Steam	Diesel	Electric	Total	B.G.	M.G.
1950-51	8,120	17	72	8,209	12,801	7,497
1960-61	10,312	181	131	10,624	14,733	8,201
1970-71	9,387	1,169	602	11,158	17,303	9,607
1980-81	7,469	2,403	1,036	10,908	19,848	10,429
1990-91	2,915	3,759	1,743	8,417	24,088	12,438
2000-01	54	4,702	2,810	7,566	29,203	18,537
2010-11	43	5,137	4,033	9,213	34,380	18,304
2013-14	43	5,633	4,823	10,499	36,557	18,184
2014-15	43	5,714	5,016	10,773	36,954	17,950
2015-16	**39**	**5,869**	**5,214**	**11,122**	**37,483**	**17,853**

Traction wise, average tractive effort per loco (Kgs.) for last four year is given below:

Year	Broad Gauge		Metre Gauge	
	Diesel	Electric	Diesel	Electric
2012-13	35,252	36,909	19,009	-
2013-14	35,852	35,999	19,005	-
2014-15	36,520	37,420	18,974	-
2015-16	**37,186**	**37,801**	**18,896**	

Coach upkeep:

763 old coaches were given mid-life rehabilitation and 332 coaches were refurbished which brought substantial improvement in the condition of flooring, toilets and other passenger amenities.

Passenger Carrying Vehicles (PCVs) with aggregate seating capacity in different years and availability of Other Coaching Vehicles (OCVs) are shown below:

Year	Passenger Coaches						Other Coaching Vehicles (Number+)
	EMU Coaches		Conventional Coaches		DMU/DHMU		
	Number	Capacity $	Number @	Seating capacity	Number	Seating capacity	
1950-51	460	87,986	13,109	854,678	-	-	6,059
1960-61	846	150,854	20,178	12,80,797	-	-	7,415
1970-71	1,750	340,541	24,676	15,05,047	-	-	8,719
1980-81	2,625	500,607	27,478	16,95,127	-	-	8,230
1990-91	3,142	609,042	28,701	18,64,136	-	-	6,668
2000-01	4,526	859,701	33,258	23,72,729	142	13,884	4,731
2010-11	7,292	13,64,948	45,082	32,54,555	761	74,097	6,500
2013-14	8,337	15,28,124	50,228	36,42,992	1,024	98,483	6,791
2014-15	8,571	15,45,929	51,838	37,27,998	1,248	1,22,081	7,000
2015-16	**8,805**	**15,93,268**	**53,132**	**37,75,340**	**1,405**	**1,36,594**	**6,899**

$ Includes standing accommodation.
@ Includes Rail Cars.
+ Includes luggage vans, mail vans, parcel vans, etc.

Wagons:

As on 31st March, 2016, the size of IR's wagon fleet consisted of 2,51,256 units 62,650 covered, 1,37,883 open high-sided, 13,785 open low-sided, 23,371 other types and 13,567 brake vans/departmental wagons:

Year	Total wagons on line (In units)	Percentage of total number of wagons					
		Covered	Open high sided	Open low sided	Other types	Depart-mental	Total
1950-51	2,05,596	58.9	25.5	3.4	7.2	5.0	100
1960-61	3,07,907	57.3	25.5	2.5	10.6	4.1	100
1970-71	3,83,990	53.4	25.6	1.8	13.0	4.2	100
1980-81	4,00,946	53.3	28.3	3.2	11.8	3.4	100
1990-91	3,46,102	49.1	29.6	3.6	14.4	3.3	100
2000-01	2,22,193	34.1	41.0	3.6	17.5	3.8	100
2010-11	2,29,987	26.6	52.8	3.1	12.0	5.6	100
2013-14	2,52,833	25.9	53.6	5.6	9.6	5.3	100
2014-15	2,54,018*	26.0	53.8	6.0	8.8	5.4	100
2015-16	**2,51,256**	**24.9**	**55.0**	**5.5**	**9.3**	**5.3**	**100**

*revised

Carrying capacity per wagon on broad gauge and metre gauge are indicated below :

Year	All Gauges		Broad Gauge		Metre Gauge	
	Total number of wagons$ (000)	Total capacity (Million tonnes)	Number$ (000)	Average capacity (Tonnes)	Number$ (000)	Average capacity (Tonnes)
1950-51	195	4.14	149	22.6	43	17.1
1960-61	295	6.30	207	23.1	83	18.0
1970-71	368	9.35	271	27.8	91	19.1
1980-81	387	11.14	299	30.6	83	23.0
1990-91	335	11.50	276	36.9	55	22.9
2000-01	214	10.19	199	48.7	14	34.4
2010-11	217	12.18	213	56.6	4	33.0
2013-14	239	14.65	236	59.1	3	33.2
2014-15	240	14.32	237	60.0	3	33.1
2015-16	**237**	**14.39**	**235**	**60.8**	**2**	**33.0**

$ Excludes departmental service wagons and brake vans.

Some of the major types of wagons held by IR as on 31.3.2016 are shown below.

Types of wagon fleet (B.G.)

Type of wagon	Units available	Brief description
BOX'N'	49,682	High-sided bogie open wagons with cast steel bogie, high tensile couplers, Cartridge Tapered Roller Bearings (CTRB), air brake, etc. for movement of bulk commodities like coal, iron ore etc.
BOXNHS	18,719	Bogie open wagon, air brake, high speed.
BOXNLW	2,178	Bogie open wagon, air brake, light weight.
BOXNCR	263	Bogie open wagon, air brake, made of corrosion resistant IRS M : 44 steel.
BOXNHA	739	Bogie open, air brake wagon of 22 t axle load with high side walls (higher than BOXN), designed for transportation of coal.
BOXNHL	2,178	Bogie open air brake, stainless steel wagon.
BOY	1,247	Standard Gondola wagon, air brake, to carry minerals/ iron ore with an axle load of 22.9 t.
BCN/BCNA	36,320	Bogie covered wagon, air brake fully riveted/welded construction for transportation of bagged cement, food grains, fertilizers etc.
BCNAHS/BCNHS	8,669	Bogie covered, air brake, all welded & riveted construction with High Speed, bogie CASNUB-22 HS BOGIE.
BCNHL	16,828	Bogie covered, air brake, micro - alloy (stainless steel wagon).

BRN	1,372	Bogie Rail wagon Heavy, air brake.
BRNA/HS	5,338	Bogie Rail wagon Heavy, air brake, High Speed bogie, riveted cum welded construction.
BRHNEHS	1,518	Bogie Rail wagon, air brake, high speed CASNUB BOGIE for engineering department.
BFNS	709	Bogie Flat, air brake wagon, high speed for transportation of H.R. coils, plates, sheets & billets loading.
BOST/HS	8,227	Longer BOXNHS, air brake, wagon for finished steel products.
BOBR/N/HS	13,637	Bogie open rapid discharge air brake wagon for coal.
BOBYN	6,361	Bogie Hopper, air brake, bottom discharge wagon.
BOBSN	1,415	Bogie open air brake, side discharge wagon for iron ore.
BTPN	10,724	Bogie Tank wagon, air brake, for liquid consignments like petrol, naptha, ATF and other petroleum products.
BTFLN	846	Bogie Tank wagon, air brake with frameless body.
BTPGLN	90	Bogie Tank wagon, air brake, for carrying Liquified Petroleum Gas.
BLCA/BLCB	13,237	Low Platform Container Flat wagon, 840 mm wheel diameter, AAR'E' type centre buffer coupler and slack less draw bar system (privately owned).
BLLA/BLLB	440	Container Flat wagon, same as BLCA/BLCB, but with a Longer Platform of 45ft. (privately owned).

Repair and Maintenance :

49 loco sheds and 219 carriage and wagons sick lines and central repair depots provide repair and maintenance facilities for the entire fleet of rolling stock. 45 workshops undertake periodic overhaul.

The number of units of rolling stock given periodic overhaul (POH) in railway workshops during the year are given in the following table:

Type of rolling stock(BG+MG)	Periodic overhaul(Nos.) undertaken during the year	
	2014-15	**2015-16**
Diesel Locos	520	**511**
Electric locos	415	**465**
Coaches	29,295	**30,415**
Wagons	46,682	**49,075**

COFMOW

Central Organisation for Modernisation of Workshops (COFMOW) was established under the Ministry of Railways by Govt. of India for modernizing Indian Railways workshop. The modernization project was funded through World Bank credits. Since its establishment in 1979 COFMOW has assisted in modernizing Indian Railways Production Units and maintenance workshops.

This has involved purchasing over 20,196 machines valued at ₹ 5,044 crore. It continues its endeavor to provide crucial technical support to the various manufacturing & maintenance units of Indian Railways with bare minimum staff strength of 181 personnel. It has emerged as a leading specialized organization in the field of manufacturing and maintenance technologies.

COFMOW is in a position to offer its services to those needing modernization or up-gradation of their manufacturing/maintenance activities with enhanced productivity. COFMOW provides professional advice and procurement of machine tools and allied equipment.

Salient Features

- Imbibing latest state of the art technologies available worldwide in the field of M&P.
- Professional expertise is gained through training staff in the required area by interaction with firms and studying the field requirements.
- Supports not only Mechanical units, but all the departments of Indian Railways vis-à-vis their M&P requirements.
- Up-gradation and compilation of specifications of all machines used in various workshops, maintenance sheds and Production Units.
- E-tendering is being done for all M&P items.
- Reverse Auction.
- Sole window for Industrial Engineering expertise in Indian Railway
- Successive efforts for indigenization have led to FOREX savings.
- Setting up complete plants on composite, turnkey basis for timely execution thus minimizing coordination efforts and pin pointed accountability at all levels.

Year	Fund Utilization (₹ in crore}
2014-15	546
2015-16	**443**

Turnkey Projects

COFMOW has recently embarked upon the journey of handling Turnkey composite works including construction of Civil and Electrical infrastructure besides procurement, installation and commissioning of machines and delivering to the consignee.

ICF Expansion Project:

- Works contracts for composite work of augmentation of production

capacity at ICF for manufacturing of advanced LHB coaches (cost ₹ 127 crore) has been completed and handed over.

- More than 350 LHB shells have so far been manufactured from the facility.
- Projects are currently under warranty.

Coiled Spring manufacturing facility for ICF:

- A composite turnkey project for manufacturing of Coiled Springs at ICF/ Chennai has been awarded with signing of contract @ ₹ 84 crore in May 2016.

Wheel and Axle Assembly Complex Automatic with PLC for RWF:

- Composite tender on Turn Key basis covering Civil, Electrical and Machines has been awarded with the signing of contract @ ₹ 60 crore in May 2016.

Axle Foreign Line Project for RWF:

- A Composite turnkey tender at estimated cost of ₹ 294 crore has been opened for setting up a process line facility for manufacturing of Forged Axles at RWF/Bangalore and is under finalisation.

Linear Accelerator (LINAC) for CRI/BSB/NER:

- A composite tender on Turnkey basis for setting up and installation of Linear Accelerator at Cancer Research Institute, Varanasi/NER at the estimated cost of ₹ 13 crore has been initiated.

Pit Wheel Lathe turnkey Project:

- A number of turnkey projects for Under Floor Pit wheel lathes with shed have already been successfully executed and many more to follow.

Simulators:

- A turnkey tender of 12 nos simulators has been awarded valued ₹ 155 crore approx to enhance the skills of train drivers.

Rate contracts:

- COFMOW has entered into Rate contracts for items purchased regularly. Rate contracts finalized are:

  Electric Driven Rotary Screw Air Compressors

  Road Mobile Cranes (Articulating type)

Traction

Electric and Diesel traction constitute the principal modes of traction on IR. The share of traffic in terms of Train Kms. and GTKMs for passenger and freight services hauled under different traction types over the years is given in the following tables:

Percentage of Train Kms. by types of traction

Year	Passenger				Freight		
	Steam	Diesel@	Electric		Steam	Diesel	Electric
			Loco	EMU			
1950-51	93	-	2	5	99	-	1
1960-61	91	-	2	7	94	5	1
1970-71	77	7	7	9	46	39	15
1980-81	49	25	14	12	18	62	20
1990-91	21.8	42.4	22.6	13.2	3	60.6	34.4
2000-01	-	56.2	31.2	12.7	-	43.5	56.5
2010-11	-	49.4	36.6	13.9	-	37.5	62.7
2013-14	-	48.9	37.0	14.0	-	35.9	64.1
2014-15	-	47.7	38.4	13.9	-	36.6	63.4
2015-16		**46.9**	**39.0**	**13.9**	**-**	**37.13**	**62.9**

@ Includes DHMU & DEMU

Percentage of Gross Tonne Kms. by types of traction

	Passenger				Freight		
	Steam	Diesel@	Electric		Steam	Diesel	Electric
			Loco	EMU			
1950-51	92.4	-	2.8	4.8	98.3	-	1.7
1960-61	91.9	-	2.7	5.4	90.5	8.1	1.4
1970-71	74.1	10.7	8.2	7.0	32.2	47.7	20.1
1980-81	41.2	33.0	17.2	8.6	9.0	67.0	24.0
1990-91	15.1	47.1	29.5	8.3	0.8	57.8	41.4
2000-01	-	52.8	40.2	7.0	-	40.2	59.8
2010-11	-	48.8	44.0	7.2	-	35.7	64.3
2013-14	-	48.7	43.9	7.3	-	36.6	65.4
2014-15	-	47.7	44.1	8.2	-	35.2	64.8
2015-16		**45.7**	**45.5**	**8.8**	**-**	**34.9**	**65.1**

@ Includes DHMU & DEMU

Electric Traction:

Electric Loco Production at CLW:

During 2015-16, a product mix of 280 Electric locomotives including 215 High Horse Power (6000HP) locomotives based on advanced 3-phase drive technology have been manufactured by CLW. From December 2015, production of conventional tap changer electric locomotives has been stopped and only three Phase locos equipped with IGBT based propulsion system are now being manufactured by CLW. These locos have regenerative braking feature and are therefore more energy efficient. One 6000 HHP 3 Phase locomotive helps in reducing 250 tonne of CO2 emission per annum in the environment.

Pursuant to the award of contract for setting up Electric Locomotive Factory at Madhepura, Bihar, 12000 HP locomotives with IGBT technology will be manufactured at Madhepura. The first locomotive is expected to be received by February, 2018. These locos will reduce CO2 emission to the extent of 500 tonne per annum and will reduce energy consumption by 12-15% due to regenerative braking feature.

High Speed Locomotive:

At present WAP-5 Electric locomotive is the only High Horse Power electric locomotive capable to haul at 160 kmph. CLW has equipped one WAP-5 locomotive with modified drive gear assembly for running at service speed 160 kmph. This drive gear assembly is simpler in design than the existing hurth coupling arrangement and will be tried on more number of locomotives for extended field trials.

Energy Conservation:

Traction Electric energy bill is nearly 22% of total working expenditure of IR. Even small increase in regeneration of energy can cause substantial impact in reduction of IR electricity consumption and thereby energy bill. Three phase electric locos are inbuilt with regenerative braking feature enabling regeneration up to 20% electricity. This regenerated energy is fed back to the grid and consumed by other trains running in the section, and resulting in reduction in traction energy bill and also result in reductions in CO2 emission.

Hotel Load Converter:

At present, two Diesel Generator power cars are used at either end of the trains to feed electricity for train lighting and air conditioning (referred as Hotel load) in Rajdhani and Shatabdi Express trains. To eliminate these noisy, air polluting & uneconomic power cars, Hotel Load converters are now being provided on Electric locomotives which provide cleaner electricity to cater to Hotel Load drawn from over head traction power supply through

locomotive pantograph. At present, some WAP7 locos are under extensive field trials on Northern, Southern and Western Railway. This will reduce noise pollution caused by power cars and reduce CO2 emission by using clean energy from OHE.

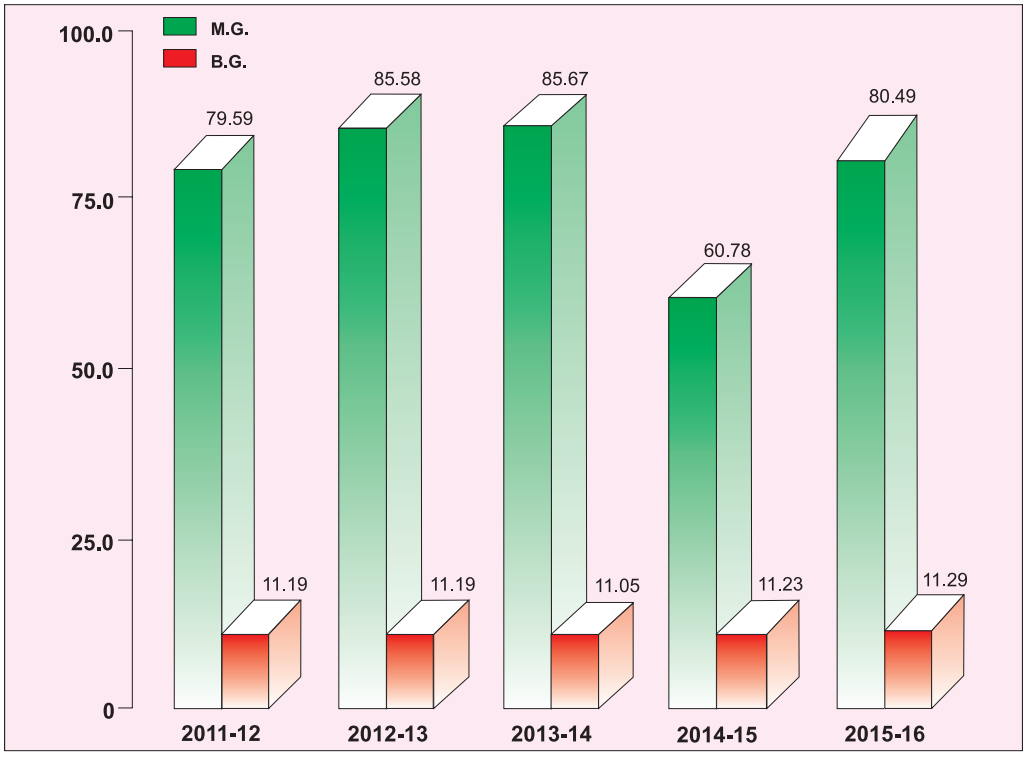
Diesel Traction:

Indian Railways has a fleet of about 5,345 mainline BG diesel locos based in 44 Sheds. There has been a constant improvement in the availability, reliability and fuel & lube oil efficiency of the fleet. Following initiatives have been taken by IR for improving availability & reliability and enhancing the safety concerning diesel locomotives and train operation.

Air Conditioning (AC) of Locomotive Cabs: Loco Pilots are working in extreme weather conditions of heat, humidity and dust. Provision of AC in loco cab will reduce fatigue level on run and will make working environment of crew better and improve their efficiency. So far, ACs have been fitted in 359 Diesel Locos.

Bio–Diesel: IR has started using HSD oil blended with 5% bio-diesel (B5) mixture on World Environment Day i.e on 05.06.2015 at two locations Itarsi/West Central Railway and Sanathnagar/South Central Railway.

ENERGY CONSUMPTION (IN COAL EQUIVALENT)
GOODS SERVICES
(KGS. OF COAL/1000 GTKMS.)



Subsequently it has now started at 16 locations on 8 Zonal Railways. Use of bio-diesel will result in reduction of Greenhouse Gases emission, earning of carbon credits & saving of foreign exchange. Bio-diesel is expected to be 5-10 % cheaper than High Speed Diesel.

CNG DEMU: IR has already embarked on its journey to use alternate source of energy like CNG in its fleet of Diesel Electric Multiple Units (DEMUs). CNG is not only cheaper fuel than diesel but is also more environment friendly and also results in a saving in fuel cost by 6% by use of CNG engines in dual fuel mode.

Auxiliary Power Unit (APU): APU is a self-contained unit containing a small diesel engine coupled to a compressor and alternator for battery charging. It has its own set of controls, accessories and is integrated to the existing microprocessor control system of locomotive. In APU System, main engine shuts down and small 25 HP Engine starts and charges batteries and air brakes pipes, when loco idles for more than 10 minutes. The diesel engine of APU consumes only 3 litres of diesel per hour in comparison to 25 litres by the main engine of the locomotive. Expected savings per loco fitted with APU is ₹ 20 lakhs per year on account of savings in fuel oil only.

Remote Monitoring and Management of Locomotives and Trains (REMMLOT): Enables remote monitoring of Diesel Locomotives. It specifically enables analysis of lapses on part of the loco pilot, when he is reported to have passed a signal at danger. This will enable focused counseling and training of such crew, who are prone to unsafe working. REMMLOT also monitors condition of locomotive and helps in preventive maintenance of locomotives. REMMLOT monitors shutting down of locomotives when idle for a long time and generates management information to ensure this. The above system is already running on about 2,582 locomotives.

Guidance for Optimized Loco Driving (GOLD): This is a GPS based driver guidance system, which assists the loco pilot in optimizing fuel consumption with an eye on terrain ahead. It advises the loco pilot to lower throttle if there is a down gradient ahead or to throttle up if there is a climb ahead. It also warns the crew of signals, stations and level crossing gates ahead. Successful trials have been conducted and this system will be proliferated on the locomotives.

Common Rail electronic Direct Injection (CReDI): Use of CReDI as fuel injection system leads to reduction in fuel consumption, reduction of emissions to very low levels and reduction of engine combustion generated noise. In addition the life of engine is increased due to controlled injection and combustion of fuel. The performance envisaged with implementation

of a CReDI system is reduction in fuel consumption by 4-6% over the duty cycle with added benefits of reduced key emissions.

The following development are also in hand with regard to Diesel Locomotives:

Multi-genset locomotive: Developed by RDSO and DMW in collaboration with NREC of USA, in this the single large engine is replaced by three smaller engines. An on-board computer monitors the power requirement and shuts down/ starts engines as per load demands, which makes it more fuel-efficient and also reduces emission. Two such locomotives have been turned out by DMW/PTA.

Dual-mode Locomotive: With modern electronics, it is much easier to build an electro-diesel locomotive (Dual mode), which is equally capable of running at designated speeds both on electrified and non –electrified territory. These are very useful and economical for operation in territories, where there are a number of traction change points. There will be huge cost savings due to reduction in the detention time of locomotive and rakes at the traction change points. This will eliminate shunting of locomotives at traction change points, improve flexibility of operation in the goods yards/sidings and increase throughput of the sections. In the event of major accident/natural calamities where OHE gets affected, dual mode loco will provide excellent operational flexibility to work on diesels until the normalcy is established. A dual mode loco design has been developed by RDSO.

Diesel Locos with Hotel Load capability: Provision of hotel load has been made on Deisel Locomotives which will eliminate use of diesel generator cars, thereby replacing one power car by a passenger carrying coach and the other power car would be standby. This will help in fuel saving to the tune of 10-15% of the consumption in power cars. Prototype with 500 KVA hotel load has been manufactured and is in use in LJN-R-BPL Garibrath, ANVT-KGM Shatabdi Exp., NDLS-DDN Shatabdi Exp., JU-JP Intercity Exp., JP-AF Shatabdi Exp.

Toilet onboard 4500 HP WDG4D Diesel Electric Locomotive: DLW has designed and manufactured a HHP Diesel Electric Freight locomotive fitted with Vacuum type toilet having microprocessor based controls and inbuilt safety interlocks onboard. It is equipped with environment friendly and self-sustaining bio digester technology for onboard sewage treatment. First WDG4D HHP locomotive fitted with vacuum based toilet and bio-digester system has been flagged off on 06th May 2016.

Steam Locomotives:

Steam locomotives are the icons of IR's century old rich history. These gallant stalwarts of a bygone era are now part of IR's glorious heritage.

Considering their heritage value and attractiveness for the tourists, the following sections have been earmarked for running of trains hauled by steam loco:

i) Broad Gauge Steam service between Delhi Cantt. and Rewari.

ii) Darjeeling Himalayan Railway (DHR), now in its 137th year and a UNESCO World Heritage Site.

iii) Nilgiri Mountain Railway, now in its 109th year and a UNESCO World Heritage Site.

iv) Kalka-Simla Railway (KSR) now in its 114th year and UNESCO World Heritage Site.

v) Neral-Matheran on Matheran Light Railway (MLR), now in its 110th year.

vi) Kangra Valley Railway (KVR), now in its 88th year.

Besides about 20 steam locomotives that are in regular operations, IR have also preserved about 16 steam locomotives as working heritage. The Rewari Steam Shed has been rechristened as Rewari Heritage Steam Centre in 2002 for recreating the memories of working Steam Shed and now maintains six Broad Gauge and four Meter Gauge working steam locomotives, that include the iconic "Fairy Queen" (1855), placed in the Guinness Book of Record as being the oldest working locomotive in the world.

In addition, about 230 steam locomotives, many of which are more than 100 years old, have been preserved at the National Rail Museum, Regional Rail Museums, Railway Stations, heritage parks and other public places for display and bringing back memories of old glory to the minds of the visitors.

Consumption of Fuel/Energy

	Quantity Consumed			
	For Traction		**For other than traction Purposes (excluding manufacturing units)**	
	2014-15	**2015-16**	2014-15	**2015-16**
Electricity (Million KWH)	15742.89	**15,701.20**	2503.38	**2,524.44**
HSD Oil (Million litres)	2856.19	**2,874.53**	37.66	**43.66**
Coal (Million tonnes)	0.001	**0.001**	0.001	**0.001**

Personnel

The number of regular employees on Indian Railways as on 31.3.2016 stood at 13,31,433.

The table below shows, the strength of railway employees under various groups, together with total expenditure incurred on them, for some selected years:

Year	Number@ of staff as on 31st March (in thousands)				Expenditure@ on staff (₹ in crore)
	Groups A&B	Group C	Group D	Total	
1950-51	2.3	223.5	687.8	913.6	113.8
1960-61	4.4	463.1	689.5	1,157.0	205.2
1970-71	8.1	583.2	782.9	1,374.2	459.9
1980-81	11.2	721.1	839.9	1,572.2	1,316.7
1990-91	14.3	891.4	746.1	1,651.8	5,166.3
2000-01	14.8	900.3	630.2	1,545.3	18,841.4
2010-11	16.9	1,079.2	235.9	1,332.0	51,776.6
2013-14	17.1	1,187.9	129.0	1,334.0	75,893.1
2014-15	17.1	1,229.8*	79.4	1,326.3	84,751.5
2015-16	**16.7**	**1,230.4**	**81.7**	**1,331.4**	**92,985.1**

*revised

@ Includes number of Railway Protection Special Force (RPSF) personnel and expenditure on them from 1980-81 onwards. These were not included in earlier years.

Number of personnel (Groups A&B) constitute 1.30% of the total strength, while Group C and D account for 92.4% and 6.3% respectively. Of the employees in Group C and D, 3.60 lakh (27.4%) are workshop employees and artisans and 7.8 lakh (72.6%) from other categories including running staff. Railway Protection Force/RPSF personnel totalled 65,110.

In the non-gazetted cadres, the ratio of Group C to D changed from 25:75 in 1950-51 to 94:6 in 2015-16, indicating a shift towards induction of skilled manpower.

Representation of Scheduled Castes (SCs) and Scheduled Tribes (STs):

Representation of scheduled caste and scheduled tribe employees on IR (including MTP Railways) for the year 2015-16 as compared to the previous year is given below:

	Number of SC Employees		Number of ST Employees	
	As on 31.03.2015	**As on 31-3-2016**	As on 31.03.2015	**As on 31.03.2016**
Group A	1,213 (12.81%)	**1,286 (13.45%)**	674 (7.12%)	**744 (7.78%)**
Group B	1,300 (17.08%)	**1,254 (17.65%)**	522 (6.86%)	**550 (7.74%)**
Group C #	2,26,916 (17.33%)	**2,31,784 (17.63%)**	1,06,487 (8.13%)	**1,08,352 (8.24%)**
Grand Total	**2,29,429 (17.30%)**	**2,34,324 (17.60%)**	**1,07,683 (8.12%)**	**1,09,646 (8.24%)**

Including erstwhile Group 'D'
Note: Figures mentioned in brackets indicate the percentage of SCs/STs to total number of employees.

A fully dedicated reservation cells exist each at the level of Ministry/ Railway/Zones/ Divisions/Workshops/Production Units, for dealing with the reservation matter.

Wage Bill:

Wage bill including pension etc. during 2015-16 was ₹93,015.97 crore registering an increase of ₹8,256 crore over the previous year. The average wage per employee was up by 10.25% from ₹ 6,51,376 per annum in 2014-15 to ₹7,18,147 per annum in 2015-16. The ratio of staff cost on open line (excluding payment towards pension and gratuity) to ordinary working expenses (excluding appropriation to DRF and Pension Fund) was 50.9%.

The average annual wage (excluding fringe benefits) per employee paid under various categories in 2015-16 is given below:

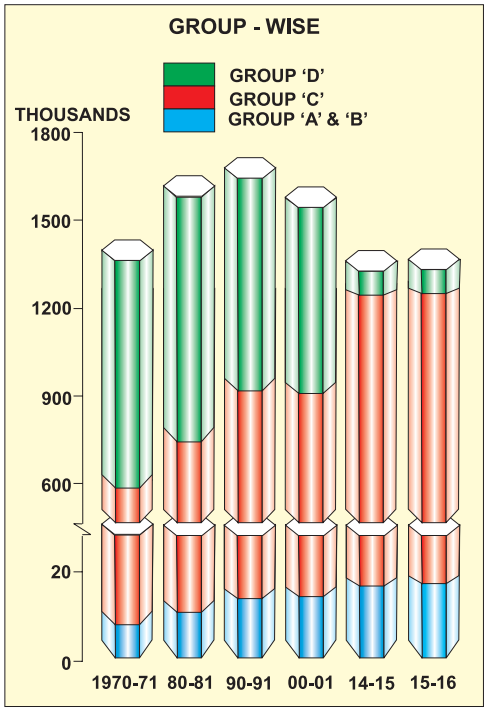
Category	GroupsA&B (₹)	Group C (₹)	Group D (₹)	Total (₹)
Workshop and artisan	-	6,74,243	4,35,052	6,57,551
Running *	-	9,65,249	-	9,65,249
Others	-	7,05,439	4,21,464	6,84,673
Total	**19,71,336**	**7,21,240**	**4,25,307**	**7,18,147**

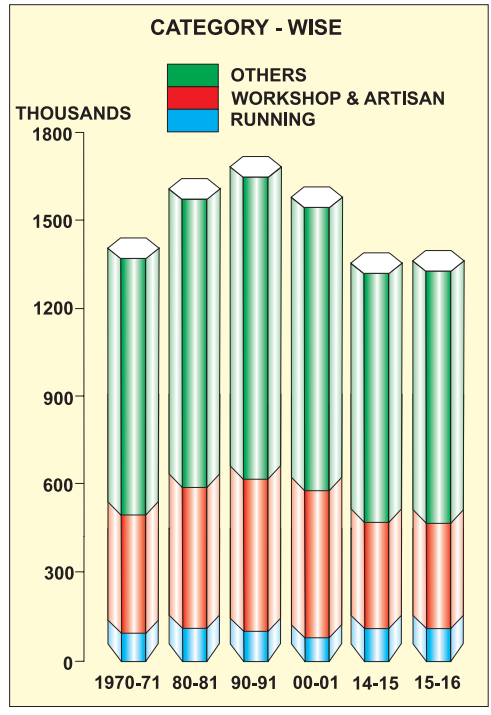
*Emoluments include Running Allowances.

Productivity Linked Bonus:

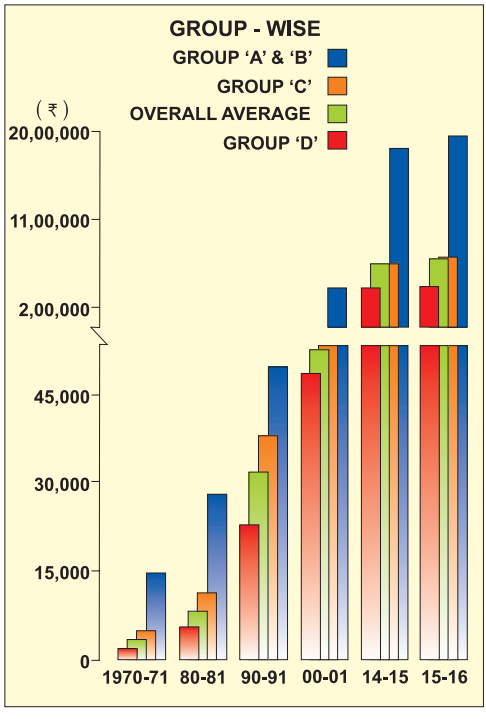
In 2015-16, all non-gazetted Railway employees (excluding RPF/RPSF personnel were sanctioned Productivity Linked Bonus (PLB) for 78 days. This benefitted an estimated 12,59,380 railway employees. Group 'C' and 'D' RPF/RPSF personnel were sanctioned ad-hoc bonus equivalent to 30

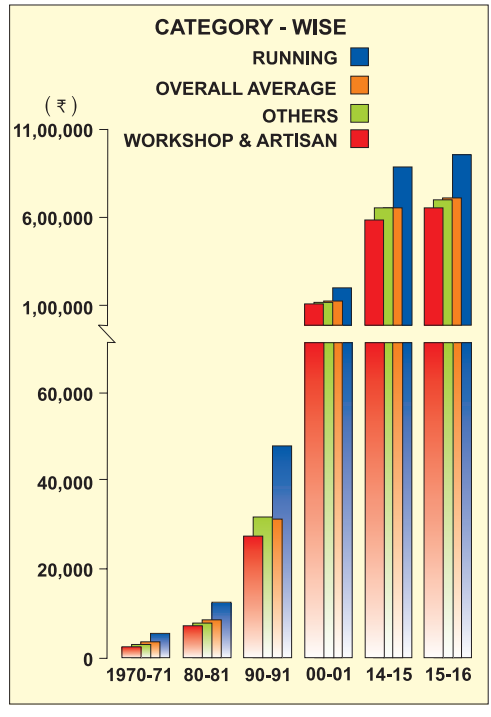
NUMBER OF PERSONNEL





AVERAGE ANNUAL WAGE PER EMPLOYEE





days' emoluments for the year 2015-16. The PLB and ad-hoc bonus were both paid on an enhanced calculation ceiling of ₹ 7,000/- p.m.

Human Resource Development (HRD) and Manpower Planning:

Human Resource Development strategies on IR have been re-oriented towards enhancing the competitiveness in the context of internal and external changes taking place. In addition to in-house training, railwaymen are being provided specialized training in other institutions in India and abroad. Railway employees are also encouraged to enhance their knowledge and skills by acquiring higher educational qualifications in the specified areas relevant to their work by granting incentives to them. Efforts are being made to improve the basic infrastructure for training to provide structured training programme in improved learning environment. Manpower planning system has been redesigned to regulate manpower intake with reference to emerging business need.

Following seven Centralised Training Institutes (CTI) cater to the training needs of Indian Railway Officers:

- National Academy of Indian Railways, Vadodara.
- Indian Railways Institute of Civil Engineering, Pune.
- Indian Railways Institute of Signal Engineering and Telecommunications, Secunderabad.
- Indian Railways Institute of Mechanical & Electrical Engineering, Jamalpur.
- Indian Railways Institute of Electrical Engineering, Nasik.
- Indian Railways Institute of Transport Management, Lucknow.
- Jagjivan Ram Railway Protection Force Academy, Lucknow.

The Centralized Training Institutes, apart from imparting probationary training, also cater to the various specialised training needs of IR officers. National Academy of Indian Railways provides inputs in General Management, Strategic Management and function-related areas for serving Railway Officers. Other CTIs conduct specialised technical training courses in respective functional areas including Training Programmes on Information Technology. The need based special courses conducted by CTIs and facilities offered by them to trainees from abroad and non-railway organizations in India have been well appreciated. The training programmes emphasize on learning with a purpose and professional approach. In addition to inhouse faculty, outside experts with diverse experience in business, industry and government are utilized to relate academic concepts with practical problems to address the changing needs.

Training needs of non-gazetted staff are being taken care of by over 295 training centres located over Indian Railways. Mandatory training has been prescribed at different stages in an employee's career especially for staff belonging to the safety and technical categories. In fact some categories of staff overdue for refresher training are taken off duty, till completion of the said training. Efforts are constantly made to improve the living conditions in the hostel, provide better messing facilities, strengthen facilities for recreational and cultural activities, making good the deficiencies in respect of training aids and also upgrading the Model Rooms with working models, see through models etc.

As a policy, Railway Board has encouraged setting up of multi disciplinary training centers where cross-functional competencies could be imparted to railway employees from different functional areas.

During 2015-16, a total of 8,699 Gazetted Officers and 3,61,229 Non-Gazetted Staff underwent different types of training programmes.

Railway Recruitment Boards:

Group 'C' Recruitment on Indian Railways by RRBs:-

During the financial year 2015-16 & April-September (2016), many monumental and landmark initiatives have been launched and implemented so far. These have given positive results. Some such major initiatives are-

- **Transformational leap from Paper Applications and OMR based examinations to On-line Applications and Computer Based Examinations.**
- **Conduct of the world's largest computer based recruitment exam** for a staggering number of about 92 lakh candidates spread over 71 shifts in 25 days, in more than 1100 centres in 351 cities across India.
- **Reaching out to remote areas like North East, Andaman & Nicobar Islands, Kashmir valley and smaller towns** by way of setting up more than 1100 centres in 351 cities.
- **Landmark Green Initiative:** On-line Applications and Computer Based Exams has led to tremendous contribution towards betterment of environment. It has saved 310 crore A4 size sheets, which means a saving of about 4 lakh trees from cutting, in last three examinations alone.
- Application procedure and format have been simplified.
- The stage of interview has been eliminated from recruitments.
- In Computer Based Tests (CBTs) candidates are shown their Question

paper, Answer Booklets alongwith correct Answer Keys.

- Grievance Redressal: all 21 RRBs have been put on Government of India's Centralised Public Grievance Redress and Monitoring System (CPGRAMS) portal, facilitating the candidates to lodge their grievances online.

Further, during 2015-16, panels of 27,995 candidates have been supplied to the Indenting Railway(s)/Production Unit(s) by 21 RRBs across India.

Staff welfare:

IR's welfare schemes cover a wide spectrum of activities in the areas of education, medical care, housing, sports, recreation and catering.

Staff Benefit Fund is an important channel for providing additional facilities to railway employees and their families in the spheres of education, recreation, medicare, sports, scouting and cultural activities. Dispensaries, under the indigenous systems of medicine viz. Ayurvedic and Homeopathic, are run with the help of this Fund.

Approximately 44.4% staff have been provided with railway quarters, 1,644 staff quarters were electrified during 2015-16.

Co-operative societies of various types are engaged as a part of welfare programme for employees on IR. There were 42 Thrift and Credit Societies, 150 registered Railwaymen's Consumer Co-operative Societies, 6 Railway men's Co-operative Housing Societies and 24 Labour Co-operative Societies functional on IR during 2015-16.

IR attaches due importance to recreation for its employees and provide excellent facilities through Institutes/Clubs for sports, libraries, etc. as also Holiday Homes to enable the employees and their families to enjoy holidays at nominal expense.

Indian Railway Medical Services:

Indian Railway Medical Service was primarily constituted to look after the health of Railway employees. Slowly its ambit of duty expanded to include the family members of the employees, retired employees & their family members also as per pass rules.

With a sanctioned strength of 2597 Medical Officers it is the largest industrial health services in the world. It is running 24x7 round the year, 127 hospitals & 583 health units spread throughout the length & breadth of the country. Indian Railway Medical Service also employs 41,386 paramedical staff for about 14000 indoor beds it has in its hospitals. The following

statistical figures provide a glimpse of the mammoth services being provided by Indian Railway Medical Service.

(A)- Resources Available

No of Hospitals	127
No. of Indoor Beds	13,702
No. of Health Units/Polyclinics	583
No. of Lock Up Dispensaries	92
No. of Pvt. Hospitals recognized for Medical treatment	250 (approx)

(B) - Beneficiaries

No of REHS Card Holders	5,52,992
No. of Beneficiaries	64,40,136

(C) - Performance during 2015-16

No. of patients treated in OPD	2,14,68,747
No. of patients treated as Inpatients	4,94,626
Major & Special Surgeries performed	42,621
Total Surgeries performed	1,37,761
Candidates' pre placement Medical Examination	96,950
No. of employee's periodical Examination	1,25,767
No. of Medical Boards held	2,752
No. of Railway incidents attended	37,188
Percentage of Man days lost due to sickness on RMC	1.3%
No. of Passengers provided Medical Aid	37,188
No. of confinements (Deliveries) in Rly Hospitals	9,032
No. of water Samples for Bacteriological examined	66,537
No. of water Samples for Residual Chlorine examined	10,56,970
No. of Food Samples Collected under FSSA	1509
No. of Food Samples Collected under Quality Control Departmental Check	19,677

Pension Adalats:

Long-standing disputes or delays in the settlement of dues of superannuated railway employees are decided on the spot in Pension Adalats organized at Zonal and Divisional Headquarters level. 7,731 cases were decided in the Pension Adalats held during the year.

Railway Minister's Welfare and Relief Fund:

The Fund provides financial assistance and relief to railway employees and their families in the times of distress. Voluntary contributions from the employees and Railway Women's Welfare Organizations constitute the

primary sources of the Fund. In 2015-16, a sum of ₹ 2,06,549 was received as contributions from railway employees to this Fund. Financial assistance to the tune of ₹ 95,000 was provided from this Fund during the period.

Railway Schools:

IR runs and manages one Degree College and 141 Railway Schools which include 88 Senior/Secondary/High Schools. These schools provide quality education at subsidized cost to about 23,077 children of railway employees and about 35,873 non-railway wards. There are 2,606 teachers and 821 non-teaching staff employed in these railway schools. IR also supports 82 Kendriya Vidyalayas for the benefit of Railway employees.

Promoting Hindi

In accordance with the provisions of the Official Languages Act,1963 and the Official Language Rules,1976 promotion of usage of Hindi is a continuous endeavour on IR. Till the end of 31st March, 2016, the total number of notified Railway offices is 3,568. In these railway offices, employees proficient in Hindi have been given directions to transact cent percent work in Hindi in the subjects specified under Official Language Rules. Beside this, Official Language officers of Railway Board office and Zonal Railways regularly inspect the offices to monitor the implementation of Hindi. In the year 2015-16, a total number of 977 inspections have been done by these officers and the second Sub-Committee of 'Parliamentary Committee on Official Language' has inspected 16 railway offices and has appreciated the use of Hindi in these offices. In addition, Grih-Patrika, 'Rail Rajbhasha' in Hindi is also regularly published by Railway Board office. Till now, 118 editions of the patrika have been published and E-Rajbhasha magazine is also being prepared regularly in every quarter. Till now, 15 edition of this patrika have been brough out. Grih-Patrika is also being published by Zonal Railways/Divisions etc.

Training in Typewriting, Stenography and Hindi Language:

In addition to the Training Centres set up by the Ministry of Home Affairs, arrangement are also made by IR to provide in-service training in Hindi language, Hindi typing and Hindi stenography. The number of employees trained at the end of 2015-16 as compared to 2014-15, is as follows:

Activity	As on March 31, 2015	**As on March 31, 2016**
Working knowledge in Hindi	8,26,852	**8,49,536**
Hindi Typewriting	6,714	**6,766**
Hindi Stenography	3,297	**3,196**

Other activities:

The existing policy of purchasing bilingual electronic equipments, like computers etc. is being followed. During 2015-16, 44,123 bilingual personal computers were available in various offices of Indian Railways. Websites of the Zonal Railways including Railway Board are also bilingual. In order to promote usage of Hindi in Railway offices, 920 Codes/Manuals and 5971 Station-Working Rules have been published bilingually. Besides this, 27,051 Local, Statutory and Standard forms have been made available in bilingual form in Zonal Railways, Production Units including Railway Board's office. The Memorandums Of Understanding done with the various countries in connection with the Railway Co-operation by Indian Railways are prepared simultaneously in Hindi also. Presently, about 17 lac books in Hindi are available in 974 Hindi libraries on Indian Railways.

Official Language Implementation Committees

To review the progress of the use of Hindi, total 992 'Official Language Implementation Committees' are functioning on the Zonal Railways and Production Units etc. and meetings of these committees are being organized regularly. Besides this, Railway Board Official Language Implementation Committee has also been constituted at Railway Board level and its meetings are conducted under the Chairmanship of Chairman, Railway Board regularly.

Railway Hindi Salahakar Samiti

"Railway Hindi Salahakar Samiti" has been constituted by Hon'ble Minister for Railways on 07.09.2015 in order to propagate the use of Hindi in Ministry of Railways and all Zonal Railways. The 58th meeting of Railway Hindi Salahakar Samiti was orgainsed in Rail Bhawan on 08.12.2015, wherein honourable members of the Samiti gave valuable suggestions to propagate the use of hindi.

Incentive Schemes for the use of Hindi

Various incentive schemes have been implemented to encourage Railway personnel to work in Hindi. Prominent among them are the 'Individual Rajbhasha Cash Awards', 'Group Award Scheme', 'Railway Minister Shield/ Trophy Scheme', 'Premchand and Maithili Sharan Gupt Award Scheme', "Rail Yatra Vritant Scheme" and other schemes for Elocution/Noting/ Drafting. During the year, under Prem Chand and Maithili Sharan Gupt award scheme, three awards each were given. Further, under 'Kamlapati Tirpathi Rajbhasha Swarn Padak Scheme', Gold Medal and Cash award was given. 30 silver medals under 'Rail Mantri Rajbhasha Rajat Puraskar Scheme', and three awards under 'Lal Bahadur Shastri Original Technical

Books Writing Scheme, were given to officers working on Zonal Railways.

Further, in order to promote usage of Hindi, 'Rajbhasha Fortnight' was orgainsed from 14th to 24th September, 2015 in the Ministry of Railways. During this period various programmes like Essay Writing Competition, Elocution and Noting & Drafting Competition, Vocabulary test, Caligraphy Competition, Antakshari. Hindi Prashan Manch, Hindi Workshops for officers and employees, Kavi Sammelan and celebrating the Jayanties of great authors/laureates were organized.

'Akhil Rail Hindi Natyotsava' was also organized at Zonal Railway Training Institute, Udaipur From 18/11/2015 to 20/11/2015, in which 16 teams of various Railways/Workshops participated.

During 16th February to 18th February 2016, Hindi Essay Competition at all Indian Railways' level, Elocution, Noting and Drafting competition were conducted at ICF/Chennai.

A Voice Typing workshop was also conducted for the Officers/staff in the Ministry of Railways on 29.03.2016.

In, 2015, Ministry of Railways has been awarded third prize under the Rajbhasha 'Kirti Puraskar Scheme' by the Hon'ble President of India.

Outstanding Achievements in Sports

The notable achievements of Indian Railways sports persons in the field of sports at International and National levels during 2015-16

1. At International Level :-

i) Indian Railway (5 Women & 1 Men) weightlifters represented India in the Commonwealth Youth, Junior & Senior Weightlifting Championship held at Pune from 11th to 15th November, 2015, and the performance of Railways players was outstanding. All Railway players won medals in this Championship. Ms. Matsa Santoshi, Ms. Punam Yadav, Ms. Sanjita Chanu, Shri S. Satish Sivalingam won gold medals, Ms. S. Mirabai Chanu silver medal and Ms. Minati Sethi won Bronze medal in their weight categories.

ii) Ms. L. Bombayla Devi and Ms. Laxmirani Majhi won Silver Medal in 19th Asian Archery Championship held at Bangkok, Thailand from 1st to 8th November, 2015.

iii) Indian Railway Golf team for the first time won Gold Medal in USIC (World Railway) Golf Championship held at Vichy (France) from 21st to 25th September, 2015.

iv) Shri Sumedh Kumar Devlalivala, won Gold and Ms. Ayonika Paul won Bronze Medal in the 8th Asian Airgun Championship held at New Delhi from 25th to 30th September, 2015.

v) Indian Railway Volleyball team won Gold Medal in USIC (World Railway) Volleyball Championship held at Gomal (Belarus) from 10th to 17th June, 2015.

vi) Indian Railway Tennis team won Gold Medal in USIC (World Railway) Tennis Championship held at Nuremberg (Germany) from 31st May to 6th June, 2015.

vii) Ms. Sakshi Malik and Ms. Lalita won Bronze Medal in Senior Asian Wrestling Championship held at Doha (Qatar) from 5th to 10th May, 2015.

viii) Ms. Tintu Luka and Ms. Lalita Babar won Gold Medal in 800 Mtr. and 300 Mtr. Steeple Chase events respectively, in Asian Athletics Championship held at Wuhan (China) from 3rd to 7th June, 2015. In addition Indian Railway Athletes won two Silver and two Bronze Medals.

ix) Shri Mangal Singh Champia won Silver Medal in mixed double event in World Cup Archery Championship held at Wroclaw (Poland) from 9th to 17th August, 2015.

Staff Hostel at Mahalaxmi Western Railway

x) Shri Arghdip Das won Silver Medal in Commonwealth Chess Championship held at New Delhi from 22nd to 30th June, 2015.

xi) In South Asian Games – 2016 held in Guwahati and Shillong from 5th to 16th February, 2016. Out of the 81 Railway athletes who participated 76 (approximately 94%) had a medal winning performance. Out of total 308 Medals won by India, Railway Sports persons bagged 67 Medals.

2. At National Level :-

During 1st April, 2015 to 31st March, 2016, Indian Railway team won National titles in 26 disciplines and stood runners-up in 08. The Men's teams won 12 titles including Aquatics, Body Building, Hockey, Volleyball while the women's teams won 14 titles including Aquatics, Boxing, Basketball, Hockey.

3. Following Railway players have been honored with National Sports Awards (Arjuna Award) during 2015-16:-

Name	Game	Award	Railway
Shri Mandeep Jangra	Boxing	Arjuna Award	NR
Shri Manjeet Chhillar	Kabaddi	Arjuna Award	NR
Shri S. Sathish Kumar	Weightlifting	Arjuna Award	SR
Shri Bajrang	Wrestling	Arjuna Award	NR

Facility of Indoor Sports at Mahalaxmi, Western Railway

Finance

IR's financial results for 2015-16 compared with the previous year are tabulated below:

		(₹ in crore)
	2014-15	**2015-16**
Capital-at-Charge	**1,97,991.80	***2,24,685.32**
Investment from Capital Fund	44,125.17	**50,449.91**
Total	2,42,116.97	**2,75,135.23**
Passenger Earnings	42,189.61	**44,283.26**
Other Coaching Earnings	3,997.89	**4,371.49**
Goods Earnings	1,05,791.34	**1,09,207.65**
Sundry Earnings	5,092.74	**5,928.55**
Gross Earnings	1,57,071.58	**1,63,790.95**
Suspense	(-)361.04	**542.56**
Gross Traffic Receipts	1,56,710.54	**1,64,333.51**
Ordinary Working Expenses	1,05,995.88	**1,07,735.93**
Appropriation to Depreciation Reserve Fund	7,775.00	**5,600.00**
Appropriation to Pension Fund	29,225.00	**34,500.00**
Total Working Expenses	1,42,995.88	**1,47,835.93**
Net Traffic Receipts	13,714.66	**16,497.58**
Miscellaneous Transactions	3,123.83	**2,730.90**
Net Revenue Receipts	16,838.49	**19,228.48**
Dividend payable to General Revenues $	9,173.55	**8,722.51**
Excess (+)/Shortfall (-)	7,664.94	**10,505.97**
Percentage of Net Revenue to Capital-at-Charge (including investment from Capital Fund)	6.95	**6.99**
Operating Ratio (%age)	91.25	**90.48**
Capital-at-Charge (incl. investment from Capital Fund) per NTKM (in paise)	317	**374**

* Excludes ₹11,873.47 crore of MTPs, ₹540.80 crore of Circular Railways and ₹13,387.61 crore of Udhampur-Srinagar-Baramulla Project (National Project) and ₹ 11,954.00 crore of appropriation to SRSF and ₹4400.71 crore investment in DFCCIL.

** Excludes ₹10,535.01 crore of MTPs ₹532.80 crore of Circular Railways and ₹11,954.00 crores of appropriation to SRSF, ₹10,807.47 crore of Udhampur-Srinagar-Baramulla Project (National Project).

* Includes ₹16,269.11 crore of Production Units.

** Includes ₹16,078.34 crore of Production Units.

$ Includes payment in lieu of Passenger Fare Tax of ₹ 23.12 crore and Contribution to Railway Safety Fund of ₹2.61 crore during 2014-15 and 2015-16 each.

Revenue:

Revenue from Freight accounted for 66.68% of Gross Earnings. Passenger Earnings constituted 27.04% of the Gross Earnings, of which 5.82% was from Suburban Services, 82.58% from Express Long distance and 11.60 % 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 89.23 % of the total goods earnings, while commodities other than the above accounted for 8.70%. Miscellaneous realization like demurrage, wharfage, shunting and siding charges etc. made up the remaining 2.07%.

Balance Sheet:

A brief summary of the Balance Sheet as on 31st March, 2016 compared with the previous year is given below:

(₹ in crore)

	As on 31.3.2015	**As on 31.3.2016**	Variation
Assets			
Block Assets	3,68,758.21	**4,19,123.61**	50,365.40
Funds with Central Government			
(i) Reserve Funds	6,872.74	**10,806.92**	3,934.18
(ii) Banking Accounts	47,462.72	**53,145.46**	5,682.74
Sundry Debtors	4,022.50	**3,507.18**	-515.32
Cash in hand	1,930.41	**1,082.83**	-847.58
Total	4,29,046.58	**4,87,666.00**	58,619.42
Liabilities			
Represented by:			
Capital-at-Charge	2,08,799.27**	**2,42,473.64***	33,674.37
Investment financed from internal resources etc.	1,59,958.94	**1,76,649.97**	16,691.03
Total (i)	3,68,758.21	**4,19,123.61**	50,365.40
Reserve Funds	6,872.74	**10,806.92**	3,934.18
Total (ii)	6,872.74	**10,806.92**	3,934.18
Banking Accounts			
i) Provident Fund	29,855.44	**31,414.09**	1,558.65
ii) Miscellaneous Deposits etc.	17,461.84	**21622.96**	4,161.12
iii) Loan and Advances	145.44	**108.41**	-37.03
Total (iii)	47,462.72	**53,145.46**	5,682.74
Sundry Creditors etc. **(iv)**	5,952.91	**4,590.01**	-1,362.90
Total (i) to (iv)	4,29,046.58	**4,87,666.00**	58,619.42

* Excludes ₹ 11,873.47 crore of MTPs, ₹ 540.80 crore of Circular Railway and ₹ 11,954 crore appropriation to SRSF, includes ₹ 13,387.61 crore of Udhampur-Srinagar- Baramulla Project (National Project) and ₹ 4,400.71 crore investment in DFCCIL.

** Excludes ₹ 10,535.01 crore of MTPs, ₹ 532.80 crore of Circular Railway and ₹ 11,954.00 crore appropriation to SRSF and includes ₹ 10,807.47 crore of Udhampur-Srinagar- Baramulla Project (National Project).

Cash Flow:

	2015-16	(₹ in crore)
Acquisition of new assets and replacement of existing assets:		
Acquisition of new assets and improvement element in replacement of assets like replacement of assets	43,335.20	**46,126.48**
By replacement of assets	2,791.28	
Payments of interest on loans, repayment of loans and increase/decrease in Reserve Funds		
Payments of interest on loan for Development Fund	0.00	**3921.01**
Repayment of loan for Development Fund	0.00	
Increase (+)/ Decrease (-) in Funds balances	3,921.01	
Payment for Accident Compensation	0.00	
	Total	**50,047.49**
Finance for these requirements was provided from the following sources:		
Internal sources:		
Contribution from Revenue/Capital to fund and interest occruing on the balances of the fund.	10,350.73	**23,366.91**
Development Fund financed from Surplus	1,219.74	
Development Fund financed from General Revenue	0.00	
Capital Fund financed from surplus	5,798.24	
Capital Fund financed from Railway Revenue (for capital component of IRFC lease charges)	0.00	
Railway Safety Fund financed from surplus	0.00	
Debt Service Fund financed from Surplus	3,487.98	
Railway Safety Fund financed from General Revenues(from Central Road Safety Fund)	2,510.21	
Spl. Railway Safety Fund financed from Surplus	0.00	
Spl. Railway Safety Fund financed from Genl. Revenues OLWR	0.00	
Cash Surplus - Working Results		**10,505.97**
Appropriation to Development Fund		**-1,219.74**
Appropriation to Capital Fund		**-5,798.24**
Appropriation to Debt service fund		**-3,487.98**
Appropriation to Railway Safety Fund		**0.00**
Appropriation to Special Railway Safety Fund		**0.00**
Borrowing from General Revenues (excluding MTPs)*		**26,680.58**
	Total:	**50,047.49**

* Excludes ₹ 1,338.45 crore (MTP), ₹ 8.00 crore (Circular Railway), ₹ 2,580.13 crore (Udhampur –Srinagar-Baramulla), DFCCIL ₹ 4,400.71crore and includes ₹ 245.40 crore of PUs.

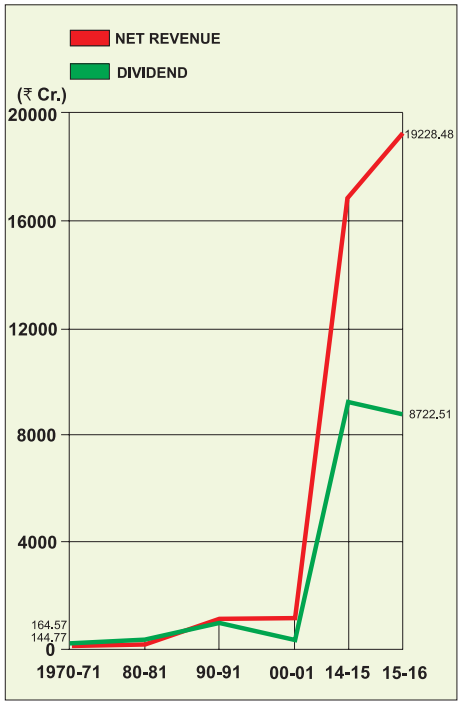
With a view to reduce the burden on common man passenger fares and freight rates on products for mass consumption were kept low. The gap between the unit revenue and increase in input costs is given below:

(Base 2004-05=100)

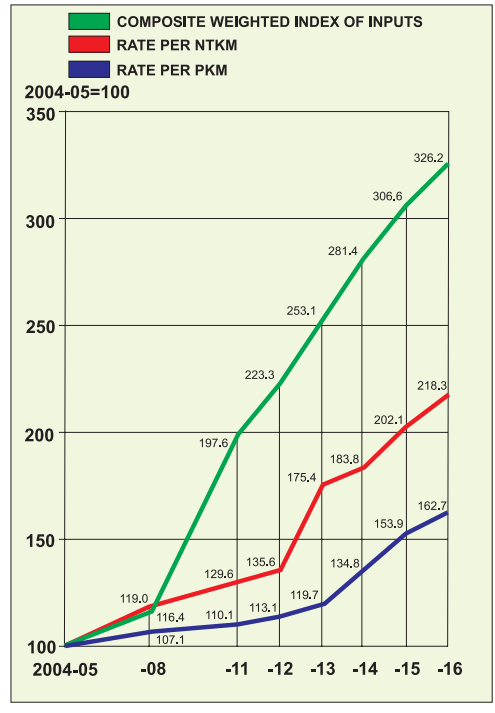
	2014-15		**2015-16**	
	Revenue Index	Cost Index	**Revenue Index**	**Cost Index**
Unit Revenue:				
Average receipt per pkm	153.9		**162.7**	
Average receipt per ntkm	202.1		**218.3**	
Inputs:				
Average annual wage per employee @		412		**454.1**
Diesel (H.S.D.)		223.3		**186.9**
Electricity (Railway traction)		157.6		**162.6**
Transport equipment and parts		136.2		**138.1**
Non ferrous metals		168.6		**164.2**
Electrical machinery, equipment & battery		138.6		**138.2**
Lub. Oil		271.8		**277.5**
Manufactured products		155.1		**153.4**
Ferrous metals (Ferro Alloys)		155.6		**141.7**
Composite weighted index of inputs		306.6		**326.2**

@ based on Annual Statistical Statement No.40

NET REVENUE AND DIVIDEND



UNIT RECOVERY VS UNIT OF INPUT COST



Social Service Obligation

Indian Railways (IR), carries out certain transport activities which are essentially uneconomic in nature in the larger interest of the economically disadvantaged sections of the society. Losses incurred on this account fall under Social Service Obligation of IR.

Net Social Service Obligation borne by IR in 2015-16 is assessed at ₹ 27,026.61 crore excluding staff welfare cost (₹ 5,099.35 crore) and law and order cost (₹ 3,833.63 crore). These costs impinge upon the viability of Indian Railways system.

Elements of Social Service Obligation:

The main elements of Social Service Obligation in IR are losses relating to:

Essential Commodities carried below cost;

Passenger and Other Coaching services;

Operation of Uneconomic Branch Lines;

New Lines opened for Traffic during the last 15 years.

Losses on transportation of Essential Commodities carried below cost:

As part of the Railways' Social Service Obligation, certain essential commodities of mass consumption like fruits and vegetables, sugarcane, paper, charcoal, bamboos, cotton raw pressed etc. are carried below cost of operation in order to contain their market prices. The total losses on the movement of these commodities in 2015-16 amounted to ₹ 41.20 crore.

Commodities	Losses(in Crore of ₹)
Fruit &Vegetables	25.12
Bamboos	7.00
Cotton Raw pressed	3.63
Charcol	3.31
Cotton Manufactured other than piece goods	1.33
Provisions	0.39
Paper	0.33
Oil seed other than G.Nut	0.07
Sugar Cane	0.01
Fire Wood & Other Fuel	0.01
Total	**41.20**

These commodities constituted 0.53% of the total revenue NTKMs and 0.23 % of freight earnings in the year 2015-16.

Losses on Passenger and Other Coaching services:

Analysis of the profitability of Coaching Services in 2015-16 has revealed an overall loss of ₹35918.39 crore to which net suburban losses in Chennai, Kolkata, Mumbai and Secunderabad provided with EMU and Non-EMU services contributed ₹5200.28 crore. While the lag in the rise of passenger fares with respect to inflationary pressures prevalent in the economy has contributed to coaching losses, other factors have also exacerbated the situation which include

Low Second Class Ordinary Fares in both suburban & non suburban

Passenger Services: These journeys constitute 78.8% of total traffic but provide only 16.6% of total passenger earnings.

	Suburban			Non-Suburban			Total (Suburban & Non-Suburban)		
	Total (all Classes)	IInd. Class Ordinary	% age	Total (all Classes)	IInd. Class Ordinary	% age	Total (all Classes)	IInd. Class Ordinary	% age
No. of Passengers (in million)	4,458.86	4,203.67	94.3	3,648.47	2,182.73	59.8	8,107.33	6,386.40	78.8
Passenger Earnings (₹in crore)	2,575.22	2,231.93	86.7	41,708.04	5,135.84	12.3	44,283.26	7,367.77	16.6

(ii) Non-Suburban commuters availing Season Ticket concessions up to a distance of 150 kilometres. These journeys constituted 22.1% of Non-Suburban Traffic but provided only 1.3% of Non-Suburban passenger earnings.

	Non-Suburban		
	Total (All Classes)	Season Tickets	% age
No. of Passengers (in million)	3,648.47	804.70	22.1
Passenger Earnings (₹in crore)	41,708.04	522.55	1.3

(iii) Commuters availing concessional Monthly and Quarterly Season Tickets on Suburban Sections of Chennai, Kolkata, Mumbai and Secunderabad. Journeys performed by passengers holding season tickets formed 61.5% of Suburban Traffic but provided only 44.7% of Suburban passenger earnings.

	Total (All Classes)	Suburban Season Tickets	% age
No. of Passengers (in million)	4458.86	2741.81	61.5
Passenger Earnings (₹in crore)	2575.22	1150.85	44.7

(iv) Concessions in Fare extended to various categories such as (i) Senior citizens (ii) Recipients of gallantry awards (iii) National sports awards (iv) Participants in National and State sports tournaments (v) Teachers honored with National awards (vi) Shram awardees (vii) War widows (viii) Patients suffering from cancer, tuberculosis and other serious diseases (ix) Handicapped persons (x) Press correspondents (xi) Film technicians etc.

(v) Concessions are also extended to (i) Military traffic (ii) Postal traffic (iii) Transportation of registered newspapers & magazines etc. and (iv) Traffic to the North East. IR also steps in to provide emergency relief by transporting materials like food, water, fodder etc. to areas affected by natural disasters like drought, cyclone, earthquake etc.

Compensation for Social Service Obligations in Other Countries:

Railways, the world over, are called upon to meet certain public service obligations at lower tariffs for which they are adequately compensated for by the government. Such support is provided in various forms and for different purposes like:

(i) Compensation for losses on account of concessional tariffs;

(ii) Out-right grant to cover deficits;

(iii) Soft loans to meet the deficits;

(iv) Financial support to maintain viability of the system and to earn marginal profits;

(v) Writing off of accumulated debts and unproductive capital; and

(vi) Support for investment and infrastructure maintenance.

Indian Railways incur losses every year by performing a variety of unremunerative services. These losses are mostly due to (a) Low ordinary second class fare (b) Suburban and non-suburban season fare (c) A variety of concessions granted on passenger ticket and (d) Transportation of certain commodities below cost. Working of uneconomic branch lines, too, imposes a heavy burden on IR's finances. A gap is thus created between the revenue income generated through these services and their running costs.

The Net Social Service Obligation borne by IR in 2015-16 assessed at ₹ 27026.61 crore, constitutes 16.5% of the total revenue earnings and 18.2% of the total working expenditure.

Uneconomic Branch Lines:

Despite concerted efforts to enhance earnings on branch lines, most of such lines remain commercially unviable. The Railway Reforms Committee recommended closure of 40 such lines but due to stiff public resistance and opposition of State Governments towards withdrawal of such services, only 15 lines have been closed permanently by the Railways. A review of the financial results of existing 101 uneconomic branch lines for the year 2015-16 shows that, on an original investment on these lines of the order of ₹ 4091 crore, loss during the year 2015-16 amounted to ₹ 1895 crore.

New lines opened for traffic during the last 15 years:

The Railway Convention Committee (RCC) in its 9th Report on this subject has noted that in the present state of Railway finances and prevalent high costs of construction, the Railways are not in a position to inject adequate capital investment in under-developed areas. Therefore, they have felt that reliefs like making available land free of cost and waiver of dividend payment on such lines for a minimum period of twenty years are justified. Periodic reviews have revealed that of the 18 lines examined in 2015-16, as part of Social Service Obligations of the Railways for development of backward areas, all lines are showing either negative or unremunerative returns.

FINANCIAL RESULTS OF NEW LINES FOR THE YEAR 2015-16

S.No	Name of the branch line	Date of opening	Cost (₹ in crore)	Expected return on investment	Actual return on investment		
				(%)	2013-14 (%)	2014-15 (%)	**2015-16 (%)**
	Developmental Lines						
1	Lanjigarh-Bhawanipatna-Junagarh (BG) 54.5 Kms.	11.8.2012	273.22	2	-5.56	-5.75	**-4.2**
2	Abohar-Fazilka (BG) 34 Kms.	16.7.2012	232.48	-7.44	NA	-14	**-11**
3	Taran Trn-Govindwal (BG) 21.416 Kms.	06.8.2011	81.44	NA	NA	-25	**-20**
4	Ludhiana-Sahnewal (BG) 15.11 Kms.	17.11.2012	287.01	-2.26	NA	-5	**-4**
5	Udhampur-SVDK (BG) 25 Kms.	04.7.2014	1231.09	NA	--	0.44	**-2**
6	Jammu Tawi-Udhampur (BG) 53 Kms.	2004	521.00	0.50	NA	-3	**-6**

7	Banihal-Baramula (BG) 13.7 Kms.	26.6.2013	4917.00	-1.30	NA	-2	**-2**
8	Churaru Takrala-Amb Andaura (BG) 11.17 Kms.	2011-12	219.60	0.18	NA	-5	**-4**
9	New Morinda-Sahnewal (BG) 52.18 Kms.	2013-14	708.41	-2.26	--	-8	**-7**
10	Chandigarh-Morinda (BG) 43.89 Kms.	2006-07	309.52	-2.26	NA	-17	**-14**
11	Una Himachal-Churaru Takrala (BG) 16.5 Kms.	2005-06	329.41	0.18	NA	-6	**-4**
12	Rewari-Jhajjar-Rohtak (BG) 81.257 Kms.	08.1.2013	29.50	-4.78	NA	-15	**-2**
13	Kolayat-Phalodi (BG)112Kms.	2006-07	170.77	-3.06	-13.14	-14.64	**-19.76**
14	Madar-Pushkar (BG) 25.7 Kms.	23.1.2012	1.32	-4.06	NA	-123.29	**-125.78**
15	Kakinada-Kotipalli (BG) 44.7 Kms.	13.5.2005	153.58	19.87	-1.00	-7	**-6.86**
16	Penukonda-Dharmavaram via Puttaparthi (BG) 53 Kms.	2002	64.50	14.14	-39.98	-55	**-52**
17	Chikkabanavara-Nelamangala (BG) 14 Kms.	2002	77.70	NA	NA	-11.91	**-10.33**
18	Koderma-Hazaribagh (BG) 79.51 Kms.	20.02.2015	838.48	NA	--	--	**-1.07**

International Yoga Day, MCF

Research and Development

RDSO is the sole R&D organisation of Indian Railways and functions as the technical advisor to Railway Board, Zonal Railways and Production Units. One of the major roles that RDSO has played is that of developing and maintaining standards and specifications which ensure that all different technologies are able to work together as a system, which permits Indian Railways to operate seamlessly without any technology limitations.

RDSO also offers international consultancy services in matters pertaining to design, testing and inspection of railway equipments as well as survey for construction of new lines. The significant accomplishments of RDSO in the sphere of research & development have always attracted worldwide attention. Some of the important activities during the year are as given below:

Safety

- Development of Digital Air Flow Sensor for Diesel Locomotive Application
- Modification in high speed cattle guard of Electric Locomotives suitable for 160 kmph.
- Development of Indian Railway Tunnel Manual
- Development of Train Collision Avoidance System (TCAS) - an Automatic Train protection (ATP) System with cab-signalling
- Development of Advanced Auxiliary Warning System (AAWS) installed on Mumbai suburban section for preventing SPAD
- Development of Train Protection & Warning System
- Fog Pilot Assistance System for Safety (FogPASS)
- Development of 60 Kg 1 in 16 Thick Web Switch
- Design and Development of Wider and Heavier PSC Sleeper for 25T Axle Load
- Alterations in the Drawings for Improved SEJ
- VSAT based Accident Site Communication System
- Advance Warning System (Radio & RFID Based) for Approaching Trains at Unmanned Level Crossing Gate
- VHF Based Approaching Train Warning System for Track Maintainers

Passenger Amenities

- Development of Integrated Passenger Information System consisting of train information announcement system, LED display boards & Coach Guidance display boards
- Development of Integrated passenger information system (PIS) for mainline and EMU coaches informing about the late running status of train, next station name, distance of next station, speed of the train and welcome & safety messages
- Development of under slung Diesel Alternator (DA) set for power car/ SLR
- Roof Mounted Ventilation Units (RMVUs) for 3 phase AC EMU of MRVC phase II project for Mumbai sub-urban services

Infrastructure

- Issuance of Working Procedure for use of Nuclear Gauges to Facilitate Accelerated Construction of Embankments

Operational Efficiency

- Revised Load charts and Attacking Speed charts have been simulated/ calculated for freight service of diesel electric locomotives on dry rail as well as conditions with varying degree of curves.
- Issuance of Functional requirement Specification for development of the TCN compliant Digital Communication Network between two Diesel Electric locos for MU operation
- Development of Composite Sleeper. Their Provision in place of steel channel sleepers on girder bridges shall result in improved riding comfort and maintainability.
- Development of Level Crossing Gate Control & Monitoring System
- Prototype Development of Newly Designed 25T Open Wagon
- Design Development of 25T Container Flat Wagon
- Development and patenting of higher capacity steel coil carrying flat wagon of 22.9 T axle load capacity
- Prototype Development of New Design High Capacity Parcel Wagon
- Development of V-Belt Driven Permanent Magnet(PM) alternator for LHB and conventional coaches
- Issuance of Specification for LED based luminaires for Passenger Coaches

Indigenous Development

- Development of OFC Based Backup Signalling Arrangement for Disaster Situations Like Itarsi RRI
- Greenfield development – Energy saving LED Signal Units
- Development of Common Rail Electronic Direct Injection System (CReDI) for ALCO
- Development of Single Shot Crucible Technique for Alumino – Thermic Welding
- Development of Design for SEJ Over H-Beam Sleeper
- Development of two types of indigenous EMUs with improved safety features, better passenger comfort and energy efficient technology
- Development of indigenous rolling stock for Kolkata Metro with improved safety features, better passenger comfort and energy efficient technology
- Memorandum of Understanding with RTRI, Japan to promote cooperation in Railway Research & Development
- Establishment of Technology Mission for Indian Railways with Mission office at New Delhi as consortium of Ministry of Railways, Ministry of Human Resource Development, Ministry of Science & Technology and Ministry of Industries on an investment sharing model for taking up identified railway projects for applied research and use on Indian railways.

Inspection and Quality Audit

- Review/Revision of STR & IRS specification for PSC sleepers
- Revision of specification IRS-T-29:2000 for CMS crossing
- Inspection (Type test / Acceptance test) of unconventional Highly Technological & Sophisticated Equipments of Integrated Security System
- Management Audit of RDSO 2015 performed and the report submitted
- Global Benchmarking Report on the latest "Global Benchmark" regarding Railway Technology in the world and Roadmap on Indian Railways has been prepared
- Recertification Audit of RDSO for ISO-9001:2008 successfully completed

Consultancy

- Design and development of new underframe with fabricated I Beam for WDP1 locomotive required during rebuilding in DMW/PTA

- During the year 2015-16, four consultancy/Inspection Reports have been issued to Zonal Railways for various track formation related problems at different locations.

Tests and Trials

- Development of Emission Tests on Diesel Locomotives: Emission Test car has been indigenously developed by Engine Development Directorate of RDSO to measure the key emissions of the locomotive of Indian Railways.
- Testing of Biodiesel Blends as Traction Fuel
- Introduction of LASER Contact Less Sensor Based Track Recording Cars : 02 nos. LASER contact less sensor based track recording cars with speed potential from 20-180 kmph have been introduced on IR network
- Development & Testing of GPS Based Acceleration Measurement System at Axle Box Level. This system is capable of recording vertical and lateral acceleration at axle box level on both left and right side of axle.
- Test stretches for Oscillation Trials. On the basis of the latest track recording results, the test stretches conforming to the stipulation of Third Report of Standing Criteria Committee have been provided for various Rolling Stock.
- Testing of Soil Samples: A total of six hundred ninety one (691) tests were performed in Geotechnical Engineering Laboratory on seventy six (76) soil samples received during the year 2015-16.

WAP 4 Class of Locomotive, RDSO

Undertakings and other Organizations

As many as 16 Public Sector Undertakings and other Organizations are functioning under the Ministry of Railways, as detailed below:-

S.No.	Name	Year of Incorporation/ Inception	Core competence
1	RITES	1974	To design, establish, provide, operate, maintain and perform engineering, technical and consultancy services for development of projects/systems of all types and descriptions pertaining to Railways and Other Sectors/ Industries in India and outside India.
2	IRCON	1976	To undertake construction activities in India and abroad on turnkey basis or otherwise in various fields of infrastructure like Railways, Bridges, Roads, Highways, Industrial and Residential Complexes, Airports, etc.
3	CRIS	1986	CRIS is the IT arm of Indian Railways. It designs, develops, implements and maintains centralized IT system for all departments of Indian Railways.
4	IRFC	1986	To raise funds from the market to part finance the Plan Outlay of IR.
5	CONCOR	1988	To develop multi-modal logistics support for India's international and domestic containerized cargo and trade.
6	KRCL	1990	To construct and operate railway lines, construct Road Over Bridges and rail line projects.
7	RCIL (RailTel)	2000	To utilize the surplus telecom capacity and right of way available with the IR to build nationwide optical fibre cable based broadband telecom and multimedia network.
8	IRCTC	2001	To undertake catering and tourism activities of the Railways. Also facilitates internet ticketing through its website.
9	PRCL	2001	To execute the Surendranagar-Rajula-Pipavav Port gauge conversion and new line projects in Gujarat.
10	RVNL	2003	To create and augment the capacity of rail infrastructure. To mobilize resources mainly through multilateral/bilateral funding agencies and also through domestic market for successful implementation of projects.

11	RLDA	2005	To develop vacant railway land for commercial use for the purpose of generating revenue by non-tariff measures for IR.
12	DFCCIL	2006	To plan and construct Dedicated Rail Freight Corridors (DFCs) for movement of freight trains on the corridors.
13	MRVC	1999	To plan and implement rail projects in the Mumbai Metropolitan Region.
14	BWEL	1978 (In MOR from 2008)	To manufacture wagons and undertake structural fabrication jobs
15	BSCL	1976 (In MOR from 2010)	To manufacture Railway Rolling Stock.
16	BCL	1976 (In MOR from 2010)	To manufacture wagons, undertake structural fabrication jobs and manufacturing, retrofitting of EOT crane.

Rail India Technical and Economic Services Limited (RITES):

RITES, a Mini Ratna Enterprise, Schedule 'A', an ISO 9001-2008 certified multidisciplinary organisation of consultants, engineers and project managers in transport and infrastructure sectors, offers comprehensive services from concept to commissioning in railways, urban transport, highways, bridges, tunnels, ports, inland waterways, airports, ropeways, institutional buildings, renewable energy and export packages of rolling stock and railway related equipment. It has operational experience of 42 years in over 60 countries of SAARC, ASEAN, Africa, Latin America and Middle East region.

Capabilities

Its capabilities include feasibility, design and detailed engineering, project management, quality assurance, workshop management, operation and maintenance, railway electrification, signalling and telecommunication, environmental impact assessment, training and human resource development It has recognition by multi-lateral funding agencies- the World Bank, Asian Development Bank, UNDP and AFDB.

Projects

Some of the important assignments undertaken in the recent past include:

Overseas:

Bhutan - Consultancy services for the construction of Cargo Complex, parallel taxiway and modification of old terminal building at PARO

International Airport, Bhutan- Department of Air Transport, Govt. of Bhutan

Gabon - EIA feasibility study for Mbigaou- Franceville new standard gauge railway line in Gabon-. Ministry of Economy, Commerce, Industry and Tourism, Govt of Gabon.

Mozambique - Leasing of 16 locomotives- CFM, Maputo

Myanmar - Supply of 18 YDM4 locomotives- Myanmar Railways

Nepal - Construction. Supervision of Phase-I Terai Region Roads in Nepal – MEA, Govt.of India

Rwanda: Feasibility study and design for expansion of Kamembe and Gisenyi airports- Rwanda Civil Aviation Authority.

Integrated Check Posts at the borders of neighbouring countries is a first of its kind project in India and are being proudly executed by RITES. These are world-class facilities for passenger and cargo movement in an airport like set up with state of the art immigration and custom facilities. RITES is offering Project Management Consultancy services for Integrated Check Posts along international borders at Jogbani, Biratnagar, Birgunj along Indo- Nepal Border; Dawaki and Moreh along Indo-Myanmar border. RITES has completed Integrated Check Post at Attari on India-Pakistan border, Petropole on Indo-Bangladesh border, Agartala along Indo-Myanmar border and Raxaul on Indo-Nepal border.

Domestic Projects:

- At home, RITES is involved in mega transportation projects like dedicated freight corridors, metros, high speed rail studies, logistics parks, rail infrastructure and green energy etc.
- Studies for Dedicated Freight Corridors (DFC) of about 10,000 km length since 2005. Based on RITES study, projects of Eastern Dedicated Freight Corridor of 1,856km from Dankuni to Ludhiana and Western Dedicated Freight Corridor from Dadri to Jawaharlal Nehru Port(JNPT) of 1504 km are already in the stages of implementation
- Turnkey projects from the Ministry of Railways, for the third line in Pendra Road- Anuppur section of Bilaspur division of South East Central Railway and Gooty- Dharmavaram doubling works for South Central Railway
- Consultancy for country's key metro rail projects like Delhi, Bangalore, Ahmedabad and Nagpur and feasibility study & DPR for metros in Kochi, Patna, Guwahati, Kanpur, Varanasi, Agra, Lucknow & Chennai Metro

- Detailed design consultancy for six elevated metro stations for Metro Link Express for Gandhinagar, General consultancy for Ahmedabad and feasibility study for high-speed rail corridor between Delhi-Chandigarh-Amritsar
- Undertaken Wet leasing of locos to non-railway customers and operation and maintenance of more than 100 locos and 1200 wagons owned by clients
- Setting up of the state-of-the-Art wagon factory, at Kulti, West Bengal as a 50:50 JV between RITES and SAIL, a "Make in India" initiative of the Indian Railways. An assured off-take Agreement has also been signed with Railways for manufacture of 1200 wagons/annum and rehabilitation of a minimum of 300 wagons/annum
- Rail infrastructure connectivity projects in steel, aluminium, power, mining and ports including NTPC's mega project management works at Lara in Chhattisgarh state
- The consultancy services for development of CONCOR's Logistic Hub Infrastructure facilities in Rajasthan and Multi Model Logistic Park in Gujarat
- Bridge design of Ganga Bridges at Patna and Munger, Brahmaputra Bridge at Bogibeel and Jubliee Bridge across Hooghli
- Project management for Central Universities at Puducherry, Karnataka, Kerala, Gaya and Allahabad
- Greenfield airports at Gwalior and Singrauli, expansion of Shimla airport etc
- Setting up of M-15 Gas Turbine aggregate testing facilities for Indian Navy at INS Eksila, Visakhapatnam
- Deep water port facilities with port connectivity (Sagar Island), setting up new green field ports in Andhra Pradesh, Tamil Nadu, Karnataka, Maharashtra, Odisha, West Bengal
- Developmental works of Inland Waterways Transport on major National Waterways of India
- The advisory consultancy services for Yamuna Expressway from Noida to Agra, DPR for 400 km ADB funded road project in Tamil Nadu and a state- of –the- art extra dosed cable stayed bridge over river Hooghly
- As a matter of diversification, RITES and the Indian Railways promoted a Joint Venture Company, Railway Energy Management Company Ltd.

(REMCL) for renewable energy projects, bilateral purchases, power trading and energy efficiency projects etc. In a record time of 10 months, it has commissioned 26 MW Wind Mill in Jaisalmer and also concluded power procurement contracts for 1200 MW in different states.

Financial Performance:

The comparative financial performance of RITES during the last 2 years is as follows:

		(₹ in crore)
	2014-15	**2015-16**
Total Turnover	1,166	**1,294**
Net profit after tax	306	**339**
Net worth	1,628	**1,803**

IRCON INTERNATIONAL LIMITED (IRCON)

Ircon International Limited (formally known as Indian Railway Construction Company Limited), a Mini Ratna and Schedule 'A' PSU, was incorporated on 28th April, 1976, mainly for the purpose of construction and development of Railway infrastructure in India and abroad with Indian Railways' expertise. The company diversified in other areas and considering its major share of business from projects abroad, its name was changed to "Ircon International Limited" w.e.f. 17th October 1995.

IRCON has established itself as one of the leading construction companies of the world during the last 40 years of its operations, with successful completion of about 376 infrastructure projects of national importance in India and 119 projects across the globe in over 24 countries. As per August 2016 edition of Engineering News Record (ENR) of USA, IRCON is among the only four Indian companies to make it to the list of top 250 International Contractors.

The Company's vision has helped in diversification of its area of work to Highways, Tunnels, Bridges, Flyovers, ROBs, Airport Hangar & Runways, Metro rail and Buildings, EHV Transmission Line & Grid Sub-stations, Industrial Electrification, Signalling and Telecom Systems etc. IRCON has formed two subsidiaries, namely, 'Ircon Infrastructure & Services Limited' (IrconISL) and 'Indian Railway Stations Development Corporation Limited' (IRSDC) to undertake services related to real estate development projects and development of new/ existing railway stations respectively.

Performance on Foreign Projects

IRCON is actively engaged in infrastructure development in several Asian and African countries.

Major projects being undertaken by IRCON abroad include :

- Construction of double track line (93 Km) between Oued-Sly and Yellel of the Algiers-Oran line, Algeria
- Construction of 2nd Bhairab Railway Bridge with Approach Rail Lines (Lot-A), Bangladesh
- Installation of Signalling System at 11 stations between Ishurdi-Darsana section of Bangladesh on Turnkey basis
- Construction of Embankment, Track, All civil works, major and minor bridges (except Rupsha) & culverts of EMP of Khulna - Mongla Port Rail Line in Bangladesh
- Installation of 2x20 MVA, 66/33 KV Sub-station including all associated works at Paro in Bhutan on Turnkey basis
- Installation of Overhead Track Equipment, Traction & Auxiliary Power Supplies Sub-station and Signalling System for the Majuba Rail Project in South Africa

International Rail Connectivity Projects

Taking the bilateral relationship with the country's neighbours forward, IRCON is executing three Rail connectivity projects to Nepal and Bangladesh.

Strategic Projects in India

After recent commissioning of the most challenging section of the Jammu & Kashmir Railway network, involving the Pir Panjal Railway Tunnel, IRCON is working to connect the remaining sections of the project to connect Katra with Banihal. IRCON has recently commissioned the longest Rail-cum-Road Bridge (4.556 Km) over the river Ganges at Patna connecting Hajipur to Patna, which has reduced travel time from Patna to Hajipur to one-fourth. A world class Rail Coach Factory providing manufacturing/production of "State of the Art" Railway Coaches has been set up by IRCON for the Indian Railways at Rae Bareli. IRCON has also contributed significantly in the road sector by completing about 5,000 km of roads and about 100 nos. of Road over Bridges.

Other major projects being undertaken by IRCON in India include :

- Construction of Railway Lines for Dedicated Freight Corridor Corporation

of India Limited (DFCCIL) from Vaitarana to Vadodara

- Construction of Railway Corridors on PPP basis of approx. 1,059 km length in the states of Chhattisgarh, Jharkhand and Odisha
- Doubling projects of approx.. 470 km between Hajipur-Bachwara, Kiul-Gaya, Rampur Dumra-Tal-Rajendrapul and Katni-Singrauli
- Power Supply Distribution works (R-APDRP) in the states of Uttar Pradesh and Jammu & Kashmir

IRCON has signed two Memoranda of Understanding (MoUs) with the State Government of Chhattisgarh and South Eastern Coalfields Limited (SECL) for the development of two coal connectivity rail corridors in the State. Similarly, IRCON has also signed MoUs with the State Governments of Odisha & Jharkhand and their respective coal companies for the implementation of two coal connectivity rail corridors in each of the states of Odisha and Jharkhand.

Awards & Recognition

IRCON has bagged several awards & accolades during the last one year. Some of them are:

- Dun & Bradstreet Infra Awards 2015 in the categories of 'Construction and Infrastructure Development (Railways)' and 'Best Construction Project–Rail cum Road bridge on river Ganga at Patna'.

Rembau Station Building of Seremban-Gemas Electrified Double Track project by IRCON, Malaysia

- Dun & Bradstreet India's Top PSUs Awards 2015 in the category of 'Contract and Construction sector' for its exemplary performance
- CIDC Vishwakarma Awards 2016 in the category of 'Best Construction Project – Rail cum Road bridge on river Ganga at Patna'.
- Dainik Bhaskar India Pride Awards 2015-16 in the category of 'Excellence in CSR/ Environment Protection and Conservation'.

CENTRE FOR RAILWAY INFORMATION SYSTEM (CRIS)

The Centre for Railway Information Systems (CRIS), is an autonomous Organization of the Ministry of Railways, with its headquarters in New Delhi. It develops and manages the IT systems of the Indian Railways, from Kargil to Kanniyakumari, and from Tawang to the Andaman Islands.

CRIS's current portfolio of projects covers the gamut of Indian Railways' functions such as Passenger ticketing, passenger enquiry services, Freight operations, Train dispatching and control, Crew management, e-procurement & materials management, management and protection of Railways' fixed and moving assets, parcel management, Comprehensive financial management system, and production of rolling stock. Mobile apps provide information at the passengers' fingertips.

CRIS is currently developing systems to cover emerging needs of the Railways including energy management, management of the overhead electrification system, employees' health management, tracking of rolling stock using radio frequency identification, setting up a geo-spatial database, and building a state-of-the-art datacenter to house the Railways' IT systems

Various Systems in the domains of Passenger Applications, Operations, Management of Railway Assets and Material, Financial and Resource Management, have been developed by CRIS which are as follows :

Passenger Applications: Passenger Reservation System (PRS), Next Generation E-Ticketing System (NGeT), Unreserved Ticketing System (UTS) National Train Enquiry System (NTES), Hand-held terminals for TTEs (HHT), Ticketing Data Warehouse, Automatic Ticket Vending Machines (ATVM/CoTVM), UTS through mobile phones, Automatic Fare Collection System for Kolkata Metro, Complaint Management System, WAP/SMS gateway, Parcel Management Information System (PMIS), The Commercial Contract Management System, Computerization of coaching refunds for simplifying coaching refunds and the web Portal for IR.

Train Operations: Freight Operations Information System (FOIS),Software Aided Train Scheduling System (SATSANG) to

aid scheduling of Passenger Trains, Crew Management System (CMS),Computerization of TTE lobbies, Integrated Coaching Management System (ICMS),Web enablement of claims (Webclaims) and Safety Information Management System.

Asset Management: Track Management System (TMS),System for rail-road crossing GAD Approval (Way Leave Easement rights, and private sidings), Locomotive Asset Management System (LAMS), Coaching Maintenance Management System (CMM), Freight Maintenance Management System (FMM),Workshop Information System (WISE), Centralised information systems at Production Units viz. DLW (Varanasi), RWP (Bela), and RCF (Rae Bareli),Integrated web based solution for COFMOW, Radio Frequency Identification (RFID),Electrical Energy Management System (EEMS),Traction Distribution Management System (TDMS), and a pilot Signaling Maintenance Managements System (SMMS).

Material Management, Financial Management, and Resource Management :

E-Procurement System (IREPS),Centralized Material Management Information System (MMIS), Vendor Interface Management System, Accounting Information Management System (AIMS), Railway Budget Compilation System, Indian Railways Projects Sanctions & Management (IRPSM),RPF Security Management System (RSMS), Human Resource Management System (HRMS), Office automation and documentation system at SECR (SECROADS), a comprehensive system of office file management viz. E-Office, Network Security Infrastructure Management System, Indian Railway Information Security Group Project. Besides the above, an IT incubator and software development centre is being set up in Darjeeling area of NF Railway.

INDIAN RAILWAY FINANCE CORPORATION LIMITED (IRFC)

Set up as a public limited company in December, 1986 with the sole objective of raising money from the market to part-finance the plan outlay of Ministry of Railways and for meeting their developmental needs, IRFC has been successfully meeting the borrowing targets set for it year after year. Funds are raised through issue of bonds.

term loans from banks/financial institutions and through external commercial borrowings/export credit etc. The Department of Public Enterprises has rated the Company as “Excellent” for ten years in succession.

The Company has leased rolling stock assets worth ₹1,37,037 crore to the Railways upto 31st March, 2016. Assets worth about ₹14,000.22

crore were financed during 2015-16. Funding has been made by IRFC in locomotives, wagons and coaches. The acquisition has helped in increasing traffic output and revenue growth in Indian Railways over the years.

Rolling Stock assets funded by IRFC are leased to Ministry of Railways. IRFC has successfully brought down lease rentals from 17.5% p.a. in 1996-97 to 11.20% p.a. in 2015-16 which compares favourably with the borrowing of the Government of India. The Ministry has been making lease payments to IRFC regularly.

The Company has also disbursed loans amounting to ₹3,151.80 crore to Rail Vikas Nigam Ltd. (RVNL) till the end of fiscal year 2015-16 for development of Railway Projects.

IRFC has consistent profit earning track record. It has so far paid ₹2,220 crore as dividend to the Government. Based on its strong financial strength and credit standing, it has got highest possible rating from three prominent domestic Credit Rating Agencies and investment grade at par with 'Sovereign' from four major International Credit rating Agencies.

CONTAINER CORPORATION OF INDIA LIMITED (CONCOR)

Container Corporation of India Limited (CONCOR) a Navratna undertaking of Government of India, was incorporated in 1988 with the objective multi modal logistics support for India's domestic and international containerized cargo and trade. It manages the largest dry port network of India and acts as a carrier, terminal, terminal operator and warehouse/CFS operator.

CONCOR prides itself of having the highest market presence in industry which is corroborated in the form of 75% market share presently held by it. The company owns 268 high speed rakes & 1357 BFKHN wagons which interconnect a vast spread network of its 64 terminals, catering to both domestic and international containerized cargo. In terms of performance, CONCOR achieved a gross operating turnover of Rs. 5742.58 crore While handling a total of 2.92 million TEUs. In terms of tonnage, the company carried a total tonnage of 33.40 million tons in FY 2015-16.

CONCOR's terminals provide a spectrum of facilities in terms of warehousing, container parking, repair facilities, reefer container plug-in facilities etc. As a CFS operator, CONCOR adds value to the logistics chain by offering services such as transit warehousing, bonded warehousing, Less than container load (LCL) consolidation and reworking of consolidated cargo at nominated hubs, and air cargo clearance using bonded trucking. The customers can track the location of their containers through internet or

even through an SMS empowering them to take better decisions. CONCOR maintains high integrity standards and utmost transparency in all its operations and public dealings benefiting all the stakeholders.

CONCOR has attempted to diversify its business by venturing into CFS and post terminal operations through JVs with private corporates. A wholly owned subsidy of CONCOR, CON AIR was launched in 2012, which deals with air cargo. It also has agreement with SIDCUL and Punjab CONWARE to set up MMLPs in Pantnagar and Quila Raipur respectively. Also, further diversifying its scale of operations, CONCOR has entered into an agreement with Land Ports Authority of India to Manage its Integrated Check Post at Raxaul.

Huge investments have been made towards creation of state of the art infrastructure facilities called Multi Modal Logistics Parks which in future shall be the answer to all transportation, warehousing, clearance needs of the trade.

With the upcoming Dedicated Freight Corridor and export favoring policy being adopted by the government, coupled with the fact that India is set to become favorite trade destination of the world, CONCOR shall play a very important role by connecting ports with the hinterland and providing ready infrastructure for handling the load.

KONKAN RAILWAY CORPORATION LIMITED (KRCL)

The Corporation was established in 1990 with equity participation by Ministry of Railways (51%), Maharashtra (22%), Karnataka (15%), Kerala (6%) and Goa (6%) for the purpose of construction and operation of Railway along the Western Coast of India i.e. from Roha (State of Maharashtra) to Thokur (State of Karnataka) with a length of 741 Kms. The completion cost of the project was ₹3,555 crore inclusive of ₹1,035 crore on project financing cost. The Corporation became a fully operational Railway on 26th January 1998 and since then it has been successfully operating passenger and freight trains. The Corporation has expertise in construction of turnkey Railway Projects and at present is undertaking part of USBRL project at J&K including few others.

Train Operating Performance:

On an average fifty Passenger Trains per day and 17 freight trains including Roll on-Roll off services are run on the single line section and punctuality performance is excellent. The passenger earnings during the year was ₹556 crore registering an increase of 4% over the corresponding earning of ₹538 crore last year and the freight earnings during the year was ₹459 crore, which was 30% more than last year's freight earnings of ₹354 crore. In all, 2 new trains were introduced during the year.

Project Performance: USBRL

USBRL Project, J&K- Construction of Katra-Dharam Section of Uddhampur-Srinagar-Baramulla Rail Link–So far, we have completed 23.87 km. tunnel excavation, out of total 28.61km. 12 tunnels have been made through out of 14 tunnels and work is in progress in balance 2 tunnels. A turnover of ₹460 crore (Rupees Four hundred and sixty crore) in USBRL Project was achieved during the year. The cumulative turnover achieved up to 2015-16 was ₹2,866 crore (Rupees Two thousand eight hundred and sixty six crore).

Financial Performance:

		(₹ in crore)
	2014-15	**2015-16**
Total Income	1323.00	**1625.00**
Operating Margin	233.00	**314.00**
Profit After Tax	39.39	**129.50**
Net Worth	1354.00	**1483.00**

RAIL TEL CORPORATION OF INDIA LIMITED (RAILTEL)

RailTel was formed in September 2000 with the objective of creating nationwide Broadband Telecom and Multimedia Network to facilitate Railways in 'expeditious' modernizing of their operation and safety systems and network by providing state-of-the-art communication infrastructure, and to generate revenue through commercial exploitation of its telecom network.

RailTel is holding Internet Service Provider (ISP) Category 'A' license, National Long Distance (NLD) service license and Unified License authorized for International Long Distance service from DoT. In addition, registration as Infrastructure Provider Category- I (IP-I) has also been obtained from DoT by RailTel.

RailTel has deployed state of the art STM-16/64/DWDM network on more than 44,000 RKMs OFC backbone across the country, and is expanding the telecom network by laying 12000 KM of OFC network in 6 North Eastern States.

Performance during last three years.

a. In the last three years, the Company has earned more than Rs.100 crore profit before tax.

b. The Company is a Mini Ratna Category 1 since May, 2012.

c. The Company also implemented ERP tool covering all departments including Finance & Accounts, P&A/HR, Marketing, Projects & Operations

across the country during the year 2014. The Company employs 537 personnel as on 31st March, 2016 besides outsourced manpower.

d. The Company has discharged its corporate social responsibility (CSR) and it had incurred an expenditure of Rs. ₹3.21 crores towards CSR activities during the year 2015-16.

e. The important financial parameters over the last two years are as under:

Financial Performance:-

Particulars	2014-15	(₹ in crore) 2015-16
Share Capital	321	**321**
Gross Income	554	**649**
Gross Operating Margin	256	**275**
Net Profit after Tax	121	**104**
Net Worth	1004	**1059**
Dividend paid to Ministry of Railways	17	**42**

Important Achievements:-

i) Station Wi-Fi: **-** RailTel have partnered with Google to provide fast Wi-Fi across 400 railways stations bringing access to internet to millions of Rail commuters.

ii) RailTel has built two Tier-III Data Centres at Hyderabad & Gurgaon which shall be leveraged to provide host of cloud based services to the customers.

iii) RailWire - Retail Broadband Service: It is a collaborative model in partnership with local entrepreneurs & local cable operators for providing access network. Presently, there are more than 1 lakh Railwire broadband customers in the SMEs/household segment.

iv) RailTel in partnership with OEM has started providing Tele-presence service on an OPEX model to various customers. RailTel's plan is to leverage this platform for providing services to various Government Departments/PSUs and Enterprises on annual rental model thereby saving CapEx for the customer. Railways have utilized this infrastructure effectively for over a year now with RailTel enabling over 110 functions of Railways for various passenger services and train inaugurations and presently connecting all Zonal, Divisional HQs and Production units.

v) Pursuing diversification of business, RailTel, based on its expertise developed in the field of Telecom & networking, is focusing on system integration projects for its various customers specially in Government/ PSU Department in the field of Information and Communication Technology(ICT).

INDIAN RAILWAY CATERING AND TOURISM CORPORATION LIMITED

Indian Railway Catering and Tourism Corporation Limited (IRCTC), was incorporated on 27th September 1999 under the Companies Act, 1956 as an extended arm of the Indian Railways to upgrade, professionalize and manage the catering and hospitality services at stations, on trains and other locations and to promote domestic and international tourism through development of budget hotels, special tour packages, information & commercial publicity and global reservation systems. The authorised share capital of the company is ₹50 crores and paid up share capital is ₹20 crores, fully subscribed by Ministry of Railways, Government of India.

Financial Performance Highlights

		(₹ in crore)
	2014-15	**2015-16**
Total Income	1,141.21	**1,505.74**
Profit before Tax	214.03	**308.66**
Dividend	26.13	**75.45**

Catering & Hospitality:

As on 31.03.2016, IRCTC had 33 mobile units (17 Duronto, 06 Rajdhani, 02 Shatabdi and 08 Mail Express trains), 4 Base Kitchens, 10 Jan Aahars and 2 Refreshment Rooms after the complete transfer of licensee units and partial transfer of departmental units. IRCTC also managed on-board catering services in 36 pairs of Mail/Express, 1 Rajdhani and 2 Shatabdi trains through award of temporary licenses for onboard catering services.

The Company commissioned 30 Food Plazas/Fast Food Units during the year, making the total number of operational units to 198. During the year 2015-16, 21 Food Plazas/Fast Food Units were certified with ISO 22000:2005, taking the total number to 131 out of 190 licensee-operated units as on 31st March, 2016.

The services of E-catering through an exclusive website www.ecatering.irctc.co.in which was launched on 23.01.2015 are now available for passengers along with telephone calls and SMSs. Also, a mobile application with name "Food on Track" has also been developed for facilitation of online ordering by passengers while on move. As per Rail Budget Announcement 2016-17, the Company has been advised to extend E-catering to all 409 A-1 & A Category stations.

Executive Lounges at Agra Cantt. and Jaipur have been constructed and commissioned by IRCTC during the year.

In order to provide clean and hygienic bed rolls to the rail passengers, E-bed rolls scheme was launched at four major stations on 7th and 10th February 2016 and a total of 877 bed rolls were sold till 31st March 2016.

As per the Railway Budget announcement 2016, IRCTC has been entrusted to take over catering services of Indian Railways in a phased manner. Therefore, it has been decided that Company will gradually exit from Non Railway Catering business and redeploy the available manpower for monitoring/operation of mobile units including Base Kitchen.

During 2015-16, Duronto/Rajdhani Trains, NRC Units, Food Plazas/ Fast Food Units and Base Kitchens/Food Pick-up Points were covered under Customer Satisfaction Surveys. The overall score of Rajdhani & Duronto was 84% and 80% in final round.

Internet Ticketing:

E-ticketing now accounts for 58.5% of reserved tickets in India booked online, leaving behind several high profile e-commerce sites worldwide. On an average, more than 5.45 lakh tickets were sold daily through IRCTC's website during 2015-16. On

1st April 2015, IRCTC achieved highest ticket bookings i.e. 13,45,519 tickets in a day.

Number of E-tickets booked, number of passengers booking E-tickets, E-ticketing Revenue Collection from users and service charge collected on E-tickets excluding service tax during the year as against previous year are as under:

Year	2014-15	**2015-16**
No. of E-Tickets Booked (in Lakhs)	1,830.80	**1,992.80**
No. of Passengers who Booked E-tickets (in Lakhs)	3,288.45	**3,595.82**
E-ticketing Revenue Collection (₹ in Crores)	20,620.99	**24,022.65**
Service Charge ₹in Crores)	256.34	**551.49**

During the year, various initiatives were taken to increase non business revenue through monetizing the digital resources available with us. Some of the relevant measures are detailed below:

- Launched several products for booking tickets using mobile phones;
- Through co branding, IRCTC tied up with Amazon which has given annual revenue of ₹18 crore;
- Banner advertisement on IRCTC's website is done through Google which has given an advertisement revenue of ₹20 crores;
- The unreserved ticketing through mobile app UTS has been extended to eight new sections of NR, ER, SCR and SER;
- The tourism portal and the Maharajas' Express websites have been given a new makeover and
- Next Generation E-Ticketing System (NGeT) Capacity has been enhanced from 7,200 tickets per minute to 15,000 tickets per minute,

enquires have increased from 1,000 per second to 3,000 per second, and concurrent user connections have increased to 3,00,000 from 1,20,000 connections.

The total Revenue in Internet Ticketing was ₹ 632.15 crore in 2015-16 as compared to ₹308.12 crore in 2014-15 leading to a 105% increase (approx.) in revenue. This is mainly due to increase in service charges by Railways and good marketing efforts, upgraded infrastructure and improved customer care.

Travel & Tourism:

During the year 2015-16, 'Gatiman' type Rail Tour packages, Helicopter packages i.e. Mumbai Darshan by Helicopter, Semi Luxury Trains i.e. Desert Circuit & Heritage Circuit, agreement with OYO hotel for online hotel booking, initiation of Medical Tourism facility, Gandhi Circuit Trains, Kisan Yatra, etc. have been launched on IRCTC's Tourism Portal i.e. **www.irctctourism.com.**

IRCTC is operating all inclusive Tour packages including Rail, Land and Domestic & International Air packages across India as well as abroad, which includes confirmed Rail travel/ air ticket, road transfers, accommodation, meals and sightseeing.

IRCTC had generated approx. 2,700 air tickets per day in 2015-16 in comparison to approx. 2,000 air tickets per day in 2014- 15 through its air portal www.air.irctc.co.in.

The Maharajas' Express, one of the wings of this segment, has been awarded as the World's leading Luxury Tourist Train for four consecutive years i.e. 2012, 2013, 2014 & 2015 at the World Travel Awards. This train is operated on 5 different itineraries covering places like Ajanta, Udaipur, Jodhpur, Bikaner, Jaipur, anthambore, Agra, Balasinor, Gwalior, Orchha, Khajuraho, Varanasi and Lucknow.

During the year 2015- 16, IRCTC made tie ups with:

- OYO hotels for online hotel bookings.
- Hospital chains in Chennai and Secunderabad to provide medical treatment at reasonable price.
- M/s Pawan Hans for Helicopter service at Delhi.
- Ministry of Railways for providing Corporate Travel Services to Ministry as well as PSUs of Railways.
- Punjab State Government for operation of State Special Trains for elderly residents of state.
- MOUs with various State Tourism Development Corporations for developing tourism from & to the States.

During the year 2015-16, a total of 52,226 passengers availed of IRCTC tour packages i.e. Rail Tour packages, Holiday packages, Customised and Special tour packages.

Travel & Tourism Business of IRCTC has generated an income of ₹375.02 Crore in the year 2015-16 as compared to ₹362.37 crore in the year 2014-15 recording a growth of 3.49%.

Packaged Drinking Water (Rail Neer):

At present, IRCTC has six operational Rail neer plants located at Delhi, Patna, Palur, Ambernath, Amethi and Parassala, out of which Rail neer Plant at Amethi and Parassala are under PPP mode. Two more plants are also being set up, out of which, company owned plant is proposed at Bilaspur (Chhattisgarh) and plant at Nagpur is proposed under PPP mode.

The total production of Rail Neer at Nangloi, Danapur, Palur, Ambernath and Amethi plants was 14.40 crore bottles against total production of 11.95 crore bottles in previous year.

During the financial year 2015-16, Rail Neer business registered an income of ₹118.48 crores as against ₹81.03 crores achieved during year 2014-15. This does not include sale of Rail Neer through departmental catering, amounting to ₹15.54 crores as against ₹15.11 crores in the previous year.

PIPAVAV RAILWAY CORPORATION LIMITED (PRCL)

Pipavav Railway Corporation Limited (PRCL), the flagship joint venture Company of Ministry of Railways and Gujarat Pipavav Port Limited (GPPL) with equal equity participation was formed to execute the Surendranagar – Rajula – Pipavav Port (APM Terminals, Pipavav) gauge conversion & new line project. This is the first railway infrastructure project executed through private sector participation. PRCL has concessionaire rights to construct, operate and maintain this project line for 33 years. PRCL is entitled to the rights, obligation and duties of a Railway Administration enumerated in the Railways Act, 1989 and has rights to give volume discounts on transportation of cargo.

PRCL has permission to run container trains on rail corridors serving the Ports of Pipavav, Mundra, Chennai, Ennore, Vizag and Kochi and their hinterlands.

During 2015-16, PRCL handled 6,475 trains including 5,167 container trains (which includes 1,058 double stack container trains) and transported 8.55 million tonnes of cargo. The total apportioned earnings were ₹250.42

crore from freight operations during 2015-16, and a net profit of ₹91.64 crore as against ₹43.64 crore during the previous year.

15 pairs of passenger trains are running on different sections of Pipavav Railway. The comparative figures of 2014-15 and 2015-16 are:

	2014-15	**2015-16**
Number of Container trains	4,039	**4,109**
Number of Double Stack containers train	1,367	**1,058**
Number of Bulk trains	930	**697**
Number of empty trains run	809	**611**
Total number of trains run	7,145	**6,475**
Cargo (in Million Tonnes)	10.70	**8.55**
Gross Apportioned revenue (₹ in crore)	272.64	**250.42**
Net Profit (₹ in crore)	43.64	**91.64**
Net Worth (₹ in crore)	269.77	**361.42**
Number of passenger trains	15 pairs**	**15 pairs****

** includes 4 mail/express trains, which are running weekly and 11 mail/express/ passenger trains run daily

Apart from container transportation, PRCL handles bulk traffic of food-grain, onion, salt, soda ash, cement, gypsum, fertilizers and coal. The Company earned profit of ₹ 95.26 crore (PBT) during 2015-16

Innovation – Market Expansion

In the first phase of enhancing track capacity on the section, the work of construction of one loop each at Kundli and Lathidad stations has been undertaken at an estimated cost of approx ₹8.90 crore, to cater to the increased traffic on PRCL Section and completed in 2015.

Under its Corporate Social Responsibility,Company has taken up rural development activities in Raska Village, which included construction of 25000 liters capacity overhead water tank and 100 bio-toilets for the village. Other CSR activities include projects related to education of girl child, welfare of senior citizens, etc.

RAIL VIKAS NIGAM LIMITED (RVNL)

Rail Vikas Nigam Limited (RVNL), a CPSE under the Ministry of Railways was incorporated in 2003 to raise non-budgetary resources for implementation of rail capacity augmentation projects and their implementation on a fast track basis.

Cumulatively, up to 31.03.2016, RVNL has completed 6280.48 km of project length covering 213.82 km of New Lines, 1,997.59 km of Doubling,

1,590 km of Gauge Conversation and 2,479.07 km of Railway Electrification, 3 Railway Workshops and 1 Cable Stayed Bridge at Bardhhaman. 49 projects assigned to RVNL have been fully completed. During 2015-16, RVNL completed 697.66 km of project length including 352.59 km of Doubling, 17 km of New Line and 328.07 km of pure Railway

Electrification works and an additional 230.14 km of electrification as part of doubling and other projects. For the past five years, RVNL has been contributing more than 1/3rd of total project length completed on Indian Railways under Doubling & Railway Electrification Plan Heads.

Financial Performance: (₹ in crore)

		(₹ in crore)
	2014-15	**2015-16**
Total Turnover	3,141.97	**4,541.30**
Profit afterTax	185.72	**287.59**
Divident Paid to MOR	37.20	**115.10**

In addition to borrowings from IRFC for implementation of projects, comprising of ₹3,151.8 crore, RVNL's role in resource mobilization has resulted in the setting up of 6 project specific Special Purpose Vehicles (SPVs) with a total anticipated cost of ₹6139 crore against which the equity contribution of RVNL is ₹615 crore, i.e.10%(approx). Balance funds of ₹5524 crore will be provided by the equity share of stakeholders and through debt raised from Financial Institutions. The SPVs of RVNL include Kutch Railway Company Ltd., Krishnapatnam Railway Company Ltd., Bharuch Dahej Railway Company Ltd., Haridaspur Paradip Company Ltd., Angul Sukinda Railway Ltd. & Dighi Port Railway Company Ltd. of which Kutch Railway Company Ltd. and Bharuch Dahej Railway Company Ltd. are fully functional while Krishnapatnam Railway Company Ltd. is partially functional. RVNL has also become an Equity Partner in Indian Port Rail Corporation Limited (IPRCL) with 12 Major Ports under Ministry of Shipping for undertaking railway related projects and activities in major ports.

RVNL's subsidiary,'High Speed Rail Corporation of India Ltd.' (HSRC), was incorporated in July 2012 for development and implementation of High Speed Rail Projects in the country. HSRC has been assigned the task of carrying out a number of pre-feasibility/feasibility studies for High Speed Corridors.

In addition to its regular activities, RVNL is making special efforts to meet its responsibility to the marginalized communities where its projects are located by implementing various "Corporate Social Responsibility" projects with a focus on health & education related activities in which an amount

of ₹5.94 crore was spent during 2015-16 , compared to ₹4.54 crore in the previous year.

RAIL LAND DEVELOPMENT AUTHORITY (RLDA)

Rail Land Development Authority (RLDA) is a statutory Authority, under the Ministry of Railways, set-up by an Amendment to the Railway Act, 1989, for development of Railway Land as entrusted by the Central Government for commercial use for the purpose of generating revenue by non-tariff measures. RLDA has been constituted in terms of Extraordinary Gazette Notification dated 31-10-2006, as amended on 05-01-2007. The Rules for functioning of RLDA have also been notified in the Extraordinary Gazette dated 04-01-2007.

Business of the Authority:

- **Commercial Development of Vacant Railway Land:** Sites for commercial development are entrusted to RLDA by the Ministry of Railways. During the year 2015-16, total earning of ₹30.06 crore have been realised by RLDA .

  The number of sites for commercial development with RLDA is 48 in 2015-16.

- **Construction of Multi Functional Complexes (MFCs):** From 2009-10 onwards, RLDA has been assigned the responsibility of developing Multi Functional Complexes (MFCs) through IRCON, RITES, RVNL and Private developers, with an aim to provide multiple facilities like shopping, food stalls/restaurants, book stalls, PCO booths, ATMs, Medicines and variety stores, budget hotels, parking spaces and other similar amenities to rail users at Railway stations. Land for MFCs are leased to PSUs on 30 to 45 years lease on revenue sharing model. However, RLDA adopted combination model (upfront lease Premium and fixed Annual Lease Rent model) for development through private developers for which bidders are selected through open competitive and transparent bidding process. In all, 40 MFCs were assigned to PSUs for development {IRCON (24), RITES (14) and RVNL (2)}, out of these 38 MFCs have been completed by them & 19 MFCs have been Commissioned by IRCON. RLDA has been entrusted 123 MFCs for development through private developers. Out of these 33 MFCs have been awarded and 3 MFCs at Bhuj, Junagarh and Salem have been completed. However, 30 MFCs have been recommended for de-entrustment, due to non feasibility or being commercially unviable.

- **Redevelopment of Stations:** Expert Group for Modernization of Indian Railways, with Sam Pitroda as Chairman recommended modernization of 100 major railway stations immediately and a total of 770 stations in 10 years. For redeveloping railway stations, a MoU was signed between IRCON and RLDA for formation of an SPV for taking up the project, and Indian Railway Stations Development Corporation Ltd. (IRSDC) was created with an authorized share capital of ₹100 crore and paid up share capital is ₹40 crore. IRSDC has been entrusted 7 stations for redevelopment till the end of the year 2015-16. A further 400 stations are proposed to be developed as per international standards through Swiss challenge method.

DEDICATED FREIGHT CORRIDOR CORPORATION OF INDIA LIMITED (DFCCIL)

Dedicated Freight Corridor Corporation of India (DFCCIL) is a Special Purpose Vehicle set up under the administrative control of Ministry of Railways to undertake planning & development, mobilization of financial resources and construction, maintenance and operation of the Dedicated Freight Corridors. DFCCIL was incorporated on 30th October 2006 under Indian Companies Act 1956.

Dedicated Freight Corridors (DFC) is one the most ambitious rail infrastructure project undertaken by Government of India. In the first phase, two corridors-the Eastern DFC (1840 route km) and Western DFC (1502 route km) spanning a total length of about 3,342 route km are being constructed. The Eastern Corridor, starting from Dankuni in West Bengal will pass through the states of Jharkhand, Bihar, Uttar Pradesh and Haryana to terminate at Ludhiana in Punjab. It will largely serve coal and steel traffic to northern parts of India. The Western Corridor, on the other hand, connecting Dadri in Uttar Pradesh to Mumbai- Jawaharlal Nehru Port (JNPT), will traverse through the states of Uttar Pradesh, Haryana, Rajasthan, Gujarat and Maharashtra and mainly meet requirements of container traffic.

Advantage & Features of DFC

Implementation of DFCs is expected to generate two major impacts on the freight movement-shift of freight from road thereby leading to increase in rail share and improvement in energy efficiency of freight rail through adoption of improved technologies leading to significant reduction in carbon footprints. The difference of rail transported freight over the road transported freight can easily be judged as one DFC train

will be able to take as many as 1,300 trucks off road. The DFC will come up with several distinct features which will be first time in Indian Railways. Freight carrying capacity will go up to 13,000 tonnes from the current 5,000 tonnes. Maximum speed of goods trains will be 100 kmph as against the current maximum speed of 75 kmph on Indian Railways. Similarly, average speed of freight trains will also increase from the current speed of 26 kmph to 70 kmph. The length of goods train will be increased from 700 meters to 1,500 meters. Double stack containers train will be operated on the Western DFC. DFC will use GPS based radia communication system for operating of trains. DFCC is designed to be a very lean organization with higher efficiency and cost effectiveness. As a result, the operation and maintenance cost is expected to be substantially low as compared to present Railway system.

Achievements during 2015-16

Award of Contracts

2015-16 has been a year full of achievements and innovations for DFCCIL. Contracts worth ₹24,102 crores were finalized as against contracts worth ₹13,000 crore finalized during the previous 6 years. There was a three-fold increase in capital expenditure to the tune of ₹8,516 crore during the year 2015-16 in comparison to ₹2,885 crore during the financial year 2014-15.

Progress of Work

The year saw commercial run of the first goods train on DFC track from Durgauti to Sasaram (56km) on the Eastern DFC. DFCC has completed track linking of 204 km in Estern DFC & Western DFC till 31-03-2016. There has been a five-fold increase in progress of Earthwork & Concereting in Rewari-Iqbalgarh section of WDFC as well as in Khurja-Kanpur section of EDFC. Trials of monitoring the progress of work through Drone was conducted in 42 kms in Western DFC and 56 kms in Eastern DFC for the first time in Indian Railways.

Land Acquisition

DFC is passing through 9 states, 61 districts and 2100 village. In both the sections 89.8% of land (excluding the PPP portion) was acquired till March 2016. This includes 5717 ha out of 6000 ha of WDFC and 4207 ha out of 5673 ha of EDFC. Total compensation of ₹7956 crore (WDFC:5017 crore, EDFC:2939 crore) have been paid against the land acquired till the said period.

Other Activities

Project Saksham, an endeavour for Skill development training of 1,039 PAPs/BPL persons leading to employment building was completed in association with CII, DFCCIL started two-way communication through social media platforms creating its Facebook page, Twitter handle and Youtube channel. DFCCIl's Corporate Office in New Delhi was awarded 5 star rating by Bureau of Energy Efficiency (BEE), Ministry of Power during the year.

Future Corridors

Following pronouncement of three new DFCs in the Rail Budget 2016-17 including 2,328 km long East-West Corridor from Kolkata to Mumbai, 2,327 km long North-South Corridor connecting Delhi & Chennai and 1,114 km long East Coast Corridor from Kharagpur to Vijaywada, preliminary Engineering & Traffic Survey (PETS) for these corridors have already been completed.

MUMBAI RAILWAY VIKAS CORPORATION LTD. (MRVC)

Mumbai Railway Vikas Corporation Ltd (MRVC Ltd), a CPSE of Government of India under Ministry of Railways (MOR) was incorporated under Companies Act 1956 on 12.07.1999, with an equity capital of ₹25 crore shared in the ratio of 51:49 between Ministry of Railways and Government of Maharashtra to implement the Rail Component of the integrated rail-cum-road urban transport project called Mumbai Urban Transport Project (MUTP), with a vision to developing modern infrastructure for efficient, safe and sustainable Railway system in Mumbai suburban section so as to provide adequate train services to the commuters.

Mumbai Urban Transport Project :

Railway projects were identified through the project preparatory studies with the main objective of bringing down over crowding during peak hour and segregating the suburban train operation from the main line passenger and freight services.

Mumbai Urban Transport Project – I :

The cost of the rail component of MUTP I was ₹4,452 crore out of which a loan of ₹1613 crore was taken from the World Bank. The balance expenditure had been shared equally between Government of Maharashtra and Ministry of Railways. All works have been completed and MUTP- I has been closed in March 2012

- Major benefits accrued after completion of MUTP - I :

- 458 additional services were introduced on Central & Western Railways
- 1,048 services were augmented from nine-car rakes to twelve-car
- Due to induction of additional rakes, capacity increased by 33%
- The vehicle km per day increased by 34%
- Conversion of existing 1500 V DC to 25 KV AC on WR has provided better train operation, energy saving
- Resettlement and Rehabilitation – more than 15,000 Project Affected Households(PAH's)

Mumbai Urban Transport Project – II :

MUTP II has been sanctioned by the Parliament in the budget of 2008-09 at total cost of ₹5,300 crore which is likely to be revised to ₹8,087 crore(approx.) at the time of completion of all Projects. MUTP II is partly funded by World Bank loan of ₹1,910 crore (USD 344 million) and balance from Government of Maharashtra and Ministry of Railways on 50:50 sharing basis. The work includes network expansion & capacity enhancement of Mumbai Suburban on Western and Central Railways.

Expected Benefits of MUTP II

- Segregate the suburban train operations from the main line passenger & freight services.
- Train running on the suburban lines of 12/15 car.
- Provision of additional 864 New Coaches-Increase of 30% over & above MUTP Phase-I.
- Completion of 1500 V DC to kV AC Traction conversion on Central Railway.
- Reduction in Journey time.
- Saving in Electrical Energy.

Running of 12-coach Electrical Multiple Unit (EMU) trains on Harbour Line (MUTP 2C):

This work was sanctioned separately during the Rail Budget 2012-13 at the cost of ₹714.10 crore. This work is named as MUTP 2C. The project is entirely funded by Government of Maharashtra and Ministry of Railways on 50:50 basis. The project involves infrastructure works for running of 12-car EMU trains at 16 stations on CR and 5 stations on WR. The work has been completed resulting in 33 % increase in passenger carrying capacity.

Self – Sufficiency

Stores imported by IR constitute 3.08% of the total stores purchased. The cost of stores imported in the last three years are as under:

			(₹ in crore)
Item	2013-14	2014-15	**2015-16**
Diesel loco parts and fittings	1801.41	1,006.62	**900.53**
Electric loco parts and fittings	166.26	110.01	**42.70**
Carriage, Wagon and EMU parts and fittings	124.28	100.31	**205.65**
Electrical stores	42.46	4.44	**46.87**
Engineering stores	(-)15.05	5.18	**2.38**
Ball and Roller Bearings	5.48	0.95	**0.37**
General stores covering acids, chemicals, drugs, etc.	73.61	89.61	**99.19**
Other items including metal ferrous, complete units of rolling stock i.e. bogies, wheel -sets, couplers, etc.	(-)9.49	97.63	**32.80**
Grand Total	2.188.96	1,414.75	**1330.49**

Strategy for Self-Sufficiency:

Steps have been taken by Indian Railways in developing indigenous sources in the country for the items presently being imported. Simultaneously, adequate capacity has been developed for manufacturing a range of components in workshops owned by IR as well as in public/private sector units with indigenous designs and competency.

The import content of raw material/components, in terms of percentage of total production cost (excluding proforma charges) for different types of rolling stock manufactured in Indian Railway Production Units for the year 2015-16 is furnished below:

	LOCOMOTIVES/COACHES	2014-15	2015-16
DLW	WDG-4	19.66	**20.76**
	WDP-4D	17.87	**19.76**
	WDG-4D	12.38	**21.21**
	WDG-5	53.19	**74.84**
	WDS-6	2.48	**3.26**
RCF	ACCN/EOG/LHB (3 Tier AC LHB)	3.54	**3.54**

	ACCW/EOG/LHB (2 Tier AC LHB)	2.92	**2.72**
	FAC/EOG/LHB (1st Tier AC LHB)	2.92	**2.73**
	WLRRM/EOG/LHB	3.14	**3.18**
	ACCB/EOG/LHB	2.91	**2.75**
	FCZAC/LHB	2.93	**2.74**
	SCZAC/LHB	2.92	**2.74**
	LFCWAC	2.44	**2.16**
	LWSCN	5.96	**5.61**
	LWSCZ	3.82	**3.47**
	LGS	5.42	**4.91**
	LWCZDAC	2.32	**-**
CLW	WAG-9	2.24	**2.44**
	WAP-7	2.18	**2.57**
	WAP-5	3.00	**3.15**
MCF	LWACCW	4.02	**3.59**
	LWACCN	4.13	**4.74**
	LWSCN	6.39	**7.12**
ICF	LGS	-	**1.32**
	LSCN	-	**1.37**
	LACCW	-	**1.13**
	LACCN	-	**0.92**
	LWLRRM	-	**0.78**
	DEMU DPC HHP	0.74	-
	SPART DPC 1	0.74	-
	LWACCW	1.93	-
	SCN LHB	2.34	-

Locomotives:

Locomotives are manufactured by Chittaranjan Locomotive Works (CLW), Chittaranjan and Diesel Locomotive Works (DLW), Varanasi. During 2015-16 CLW manufactured 280 BG Electric Locomotives including 215 state-of-the-art 3-phase 6000 HP electric locomotives. DLW produced 330 BG diesel locos including 317 indigenous High Horse Power Locomotives and 9 Diesel Locomotives for non-railway customers.

Diesel Loco Modernisation Works:

Diesel Loco Modernizations Works (DMW) at Patiala, upgraded 115 diesel electric locomotives from 2600 HP to 3100 HP. DMW also manufactured 11 new Locomotives for Indian Railways. DMW exported spares worth ₹ 1.31 lakhs to Mozambique.

Passenger Service Vehicles:

During the year, Integral Coach Factory (ICF), Chennai manufactured 1,997 coaches including 396 EMUs, 159 DEMUs, and 27 High Speed Self Propelled Accident Relief Trains (SPART). Rail Coach Factory (RCF), Kapurthala manufactured 1,603 coaches including 484 light weight LHB coaches with higher passenger comfort and amenities. A new Rail Coach factory set up at Raebareli manufactured 330 LHB coaches during 2015-16.

Wagons:

The bulk of wagon requirement of IR is met from wagon manufacturing units in both public and private sectors supplemented by Railway workshops. During the year 2015-16, total 13,412 wagons were inducted in Indian Railway system. Out of these, 1,275 wagons (including 545 BLC wagons) were manufactured by Railway Workshops and the remaining 12,137 wagons including 1,014 BLC wagons were manufactured by Wagon Industry.

Wheels and Axles :

Rail Wheel Factory (RWF), Bengaluru, produced 42,000 wheel-sets during 2015-16. It also manufactured 1,83,001 wheels and 77,419 axles. A new Rail Wheel Plant set up at Bela produced 12,076 wheels during 2015-16.

Signalling:

Railways signalling installations use a number of specialized equipments for safe running of trains. With upgradation in technology and shift towards electrical/electronic system of signalling, the demand for these equipments has gone up. To attain self- sufficiency in meeting this increased demand, IR's Signal Workshops on Southern, South Central, North Eastern, Eastern and Central Railways have been manufacturing items like Axle-Counters, Electric Point Machines, various types of relays, Tokenless Block Instruments etc.

The quantity of important items produced by these workshops during 2014-15 and 2015-16 is as under:

		Production (Nos.)	
S.No.	Items	2014-15	**2015-16**
1	Relays	68755	**59712**
2	Point Machines	2860	**3872**
3	Tokenless Block Instruments	178	**113**
4	Double line Block Instruments	285	**321**
5	Axle Counters	51	**69**
6	Panels	120	**95**

Traction Motor Shops:

IR has in-house facility for rewinding, repairing and re-shafting of traction motors of electric locomotives and EMU/MEMU at its workshops at Nasik Road, Kanpur, Tatanagar and Kancharapara. Rewinding, repairing and re-shafting of 3-phase traction motors provided in the 'state-of-the-art' electric locomotives is being carried out only at Traction Motor workshop at Nasik Road.

The quantum of important jobs carried out by these shops are as under:

Item	No. of jobs undertaken	
	2014-15	**2015-16**
Rewinding		
TAO 659 TM armature	256	**210***
HS 15250A TM armature	594	**394***
EMU TM armature	477	**551**
3-phase TM stator	29	**43**
3-phase TM rotor	52	**102**
Re-shafting		
TAO 659/HS 15250A TM armature	715	**693***
3-phase TM rotor repairs	62	**62**
EMU TM armature	206	**259**

* Due to reduction in arisings.

Gantry Crane in operation at Inland Container Depot, Northern Region, Tughlakabad

Materials Management

Stocking Depots

In order to ensure uninterrupted supply of materials, the Zonal Railways and Production Units have 262 stocking depots spread all over the Railway Network. These depots stock over 1.3 lakh components.

Disposal of unserviceable Items

Another important function of the Materials Management is generation of revenue through disposal of surplus and obsolete items and industrial wastes. Total revenue generated through disposal of various unserviceable items and other items was ₹2,801.27 crores during 2015-16.

Expenditure on Purchases

Expenditure on procurement of materials needed for operation, maintenance and production etc. (excluding cost of ballast, track related items, materials supplied by contractors for civil construction works) was ₹ 43,131.49 crores in 2015-16.

A broad analysis of purchases made is given below:-

		(₹ in crore)
	2014-15	**2015-16**
Stores for operation, repairs and maintenance	11,078	**11,700**
Stores for construction	1,190	**1,444**
Fuel	15,304	**13,036**
Stores for manufacture of Rolling Stock and purchase of Complete units	15,192	**16,951**
Total	**42,764**	**43,131**

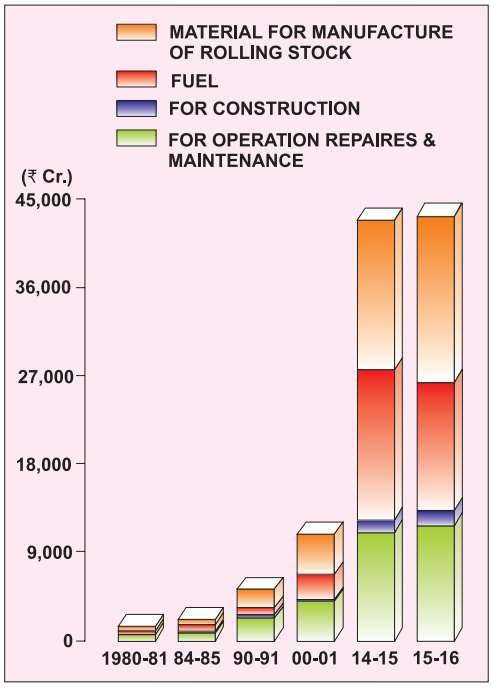
Modernisation:

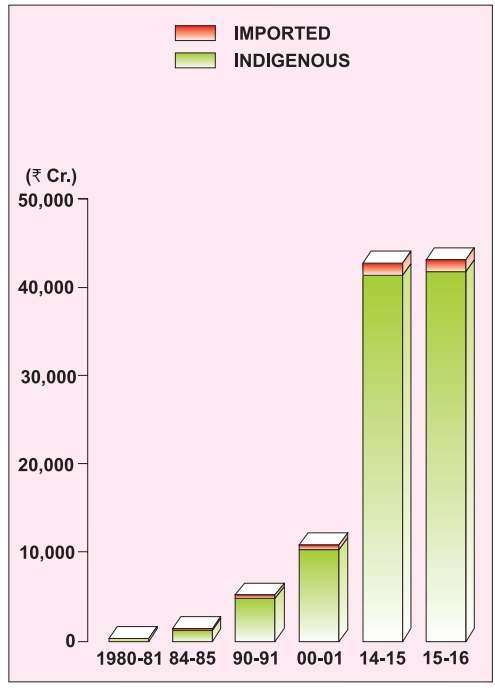
IR started e-auction during 2012-13. About 97.4% of its scrap during 2015-16 was sold through e-auction. E-procurement was expanded to all the Zonal Railways and Production Units. In line with Government directive, all procurement by Stores Directorate (except cash purchase) is now done by e-procurement. E-procurement includes purchase of machinery & plant, imported purchase etc.

Agency of Procurement

Zonal Railways and Production Units mostly procure the materials they need but depend on Railway Board for purchase of a few items. Certain

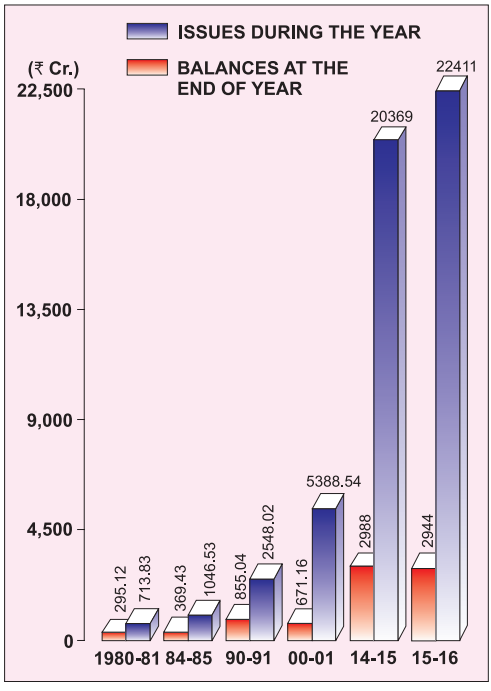
VALUE OF STORES PURCHASED



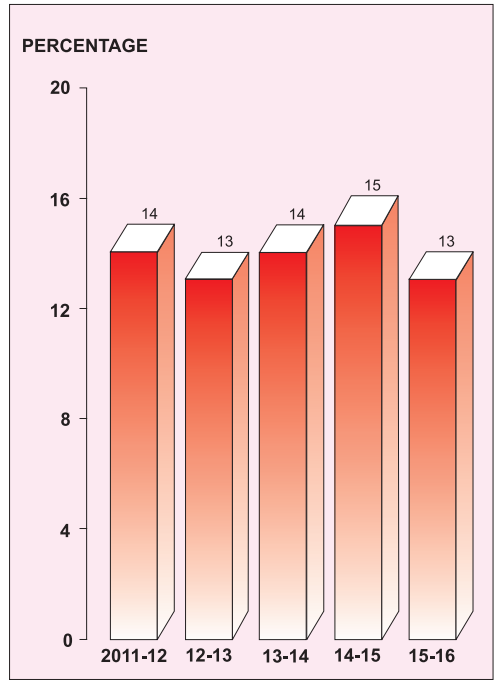


STORES-BALANCES & ISSUES (TOTAL WITHOUT FUEL)

(ZONAL RAILWAYS AND PRODUCTION UNITS)



INVENTORY TURNOVER RATIO (EXCLUDING FUEL)



purchases are reserved for procurement through the Director General of Supplies and Disposals (DGS&D). Out of ₹ 43,131.49 crores worth of stores procured in 2015-16, 70% was done by Zonal Railways and Production Units, 27% by Railway Board and the balance 3% through DGS&D and other sources.

Stores worth ₹ 3,861.12 crores were bought from Small Scale Sector and Khadi and Village Industries in 2015-16. Public Sector Undertakings contributed 30% and other industries contributed 70% towards supplies.

Indigenous Vendor Development

The value of Indigenous stores (₹ 41,801.39 crore) in 2015-16 constituted almost 97% of the total purchases. However, Indian Railway has to depend on imports for certain high technology components for its recently acquired diesel and electric locomotives, coaches, and also for sophisticated signal & telecom equipments and raw materials which are not available in adequate quantity with required quality within the country.

Inventories

During 2015-16, the Turn Over Ratio (TOR)-the main efficiency indicator for Inventory Management-was 13% (without fuel) and 11% (with fuel).

The Inventory (without fuel) held by the Stores Departments on Indian Railways as a whole was ₹ 2,943.62 crores (₹ 3,595.35 crores with fuel) during the period against total issues of ₹ 22,410.89 crores (₹ 32,961.14 crore with fuel).

Printing and Stationery:

Eleven General Printing Presses, Eight Ticket Printing Presses and 'Books and Forms Depots' on Indian Railways, meet the entire requirement of passengers traffic for Card Tickets, Blank Computer Stationery, SPTM Rolls, PRS Ticket Rolls for Shatabdi and Rajdhani Tickets and Money Value Books and Forms.

General Printing Presses gave an out-turn of 52.72 crore A-2 standard size impressions in 2015-16. Considerable progress was made in implementing Government's directive to print Forms and Rule Books in bilingual form by expanding the capacity for Hindi composing through DTP. In order to avoid loss of revenue to the Railways, the availability of vital money value items like Parcel Way Bill, Railway Receipts, Excess Fare Tickets, Luggage Tickets, Blank Paper Tickets including Time Tables, etc. has been ensured throughout the year by all Zonal Railways. The Ticket Printing Presses printed 14.74 crore Card Tickets in 2015-16. The Book and Form Depots stocked 5,486 different items. Transactions of receipts and issues at these Depots were worth ₹ 67.85 crore and ₹ 71.69 crore, respectively, in 2015-16.

Security

The Railway Protection Force (RPF) is an 'Armed Force of the Union' constituted under the RPF Act, 1957 for better protection and security of railway property, passenger areas, passengers and matters connected therewith. The Force is empowered under the 'Railways Act, 1989' to deal with offences related to alarm chain pulling, roof traveling, touting, ticketless travel, unauthorized entry into coaches earmarked for ladies, unauthorized vending, trespass, etc. and under the 'Railway Property (Unlawful Possession) Act 1966' to deal with offences related to theft, dishonest misappropriation and unlawful possession of railway property.

The Sanctioned strength of RPF is 76,563. The administrative set-up of the Railway Protection Force is as per the administrative set-up of the Indian Railways. RPF has a Special Force called Railway Protection Special Force (RPSF) which is organised on Battalion pattern. At present, there are 15 battalions of RPSF located in the various parts of the country. Out of the above, three Battalions, including one Mahila Battalion, have been recently set up.

Separate specialized intelligence units in the name of Special Intelligence Branch (SIB) and Crime Intelligence Branch (CIB) also function from Divisional as well as Zonal Railways for collection of special and criminal intelligence. Besides above, Stores, Dog Squad and Band are other constituent units of the Force at Divisional and Zonal Railways.

The sanctioned strength of GRP is about 38,000 over Indian Railways. Policing on the Railways is the constitutional responsibility of States. State Police have a separate wing in the name of Government Railway Police (GRP) for the registration of crimes, their investigation and maintenance of peace & order within railway premises as well as running trains. 50% of the cost on GRPs is shared by the Railways with respective States. Besides GRP, concerned District Police is responsible for protection and security of railway tracks, bridges and tunnels.

Measures initiated by the RPF for security of passengers and passenger area

- Escorting of about 2,500 important Mail/Express trains daily in addition to escorting of 2,200 important Mail/Express trains by the GRP personnel.

- Access control at important railway stations.
- Keeping vigil at station platforms, yards and circulating areas and surveillance through CCTV cameras.
- Prosecution of offenders for unauthorized vending/hawking, entry into ladies and reserved compartments, touting of tickets, trespassing, roof travelling, alarm chain pulling etc. under relevant provisions of the Railways Act. Performance of RPF under the provisions of the Railways Act during the year 2015 and 2016 is as under:

Year	No. of persons prosecuted (in lakh)	No. of persons convicted	Amount of fine realized (₹in crore)
2014-2015	17.90	17.25	50.75
2015-2016	**22.47**	**21.33**	**63.87**

- Detection of passenger related crime, arrest of criminals and handing over to GRP for further legal action.
- RPF/RPSF personnel have been deployed in vulnerable sections, naxal affected areas and northeast region to ensure smooth transportation of goods & passengers and to secure Railways during bandh, dharna, agitation etc.
- Liaison/Coordination has been maintained with GRP/State Police/ Central Intelligence Agencies to strengthen railway security.

Special measures for women security:

- Escorting of ladies special trains running in metropolitan cities by lady RPF personnel.
- Escorting of ladies compartments of suburban trains by RPF and GRP.
- Prosecution of offenders travelling in ladies compartments under relevant provisions of the Railways Act.
- Public awareness programmes with regard to security of women passengers.
- To improve representation of women in the Force, 10% of all posts advertized in the rank of Constable & SI earmarked are to be filled up by women.

Protection and security of railway property

Since the year 1966, RPF is prosecuting offenders under relevant provisions of the 'Railway Property (Unlawful Possession) Act, 1966' for unlawful possession of the railway property. This Act was amended in the

year 2012 and ambit of penal sections has been widened. Performance of the RPF, under the RP (UP) Act 1966, during last two years is as under:

Year	No. of cases detected	Value of property recovered (₹in crore)	No. of persons arrested
2014-2015	4,795	2.88	5,434
2015-2016	**4,636**	**4.79**	**5,321**

Training

At present, 14 Training Centers and one Central Training Institute (CTI) are catering to the training needs of RPF personnel. Specialized training/courses are also conducted for RPF Officers and staff at training institutes of other CPOs, CBI etc. RPF personnel are also undergoing training as per the training schedule chalked out by BPR&D for Police/ Central Armed Police Force.

RPF at overseas

Railway Protection Force forms part of Security Division of International Union of Railways (UIC), Paris, France, as representative of Indian Railways for coordination with security agencies engaged in railway security in the member countries.

RPF personnel are also working overseas under the aegis of UN Peace Keeping Missions in countries like Kosovo, Sudan, Haiti, etc. They are also rendering invaluable services at Indian Missions abroad under the Ministry of External Affairs in China, Russia, Bangladesh, Kenya among other countries.

Meritorious Service

64 RPF/RPSF personnel have been awarded with Police Medals for distinguished and meritorious services by the President of India in the year 2015 and 2016.

Technological advancements

Installation of CCTV Cameras

A total of 344 railway stations over Indian Railways have been provided with CCTV cameras over Indian Railways including 94 stations having CCTV cameras installed under Integrated Security System. A total of 202 stations have been identified as sensitive for the purpose of installation of Integrated Security System (ISS) comprising of CCTV surveillance system, access control, personal and baggage screening system and bomb detection & disposal system (BDDS).

All India Security Help Line (182)

A 24X7 security helpline No. 182 has been made functional through Security Control Rooms of RPF to provide round the clock security related assistance to passengers. An All India Toll Free Security Helpline '1800-111-322' has also been made operational at Railway Board to enable passengers to seek security related assistance round the clock.

Networking of RPF posts and Security Control Rooms (RSMS)

'RPF Security Management System' (RSMS) has been successfully implemented at 187 locations over Western and Central Railways and Security Control Rooms of RPF under pilot project.

Thus, RPF is toiling 24X7 to secure the Indian Railways in every possible manner so as to ensure smooth movement of freight and passenger traffic in coordination with the sister departments of railways, Government Railway Police/District Police and the civil administration which lead to realization of the essence of its motto "Yasho Labhasva".

Security checks at Howrah Station, ER

Vigilance

Vigilance Organisation plays a very important role in the area of management in the Railways. It investigates complaints, conducts sample checks in respect of managerial decisions, with a view to determine their conformity to objectivity, transparency and concordance with extant rules and procedures.

Vigilance working has four facets: (i) Preventive Vigilance (ii) Participative Vigilance (iii) Punitive Vigilance and (iv) Pro-active Vigilance.

Preventive Vigilance

The aim here is to disseminate knowledge across a wide cross section of railway officials, suggest system rationalization measures for imparting greater transparency and predictability catalyze use of technology in decision making and create greater awareness amongst the public on issues relating to corruption mitigation.

Some of the steps taken in this direction were:

- In 2015-16, a total of 21,893 preventive checks were conducted throughout the Railways.
- In 2015-16, a total of 27 bulletins, including "Chetna Ahwan" by the Railway Board, were released for circulation.
- Print and electronic media was extensively utilized by all Zonal Railways, Production Units and Public Sector for conducting extensive public campaigns during Vigilance Awareness Week, 2015.
- A total of 70 system rationalization measures were mooted in various Departments like Civil Engineering, Traffic Commercial, Electrical and S&T, Stores and Personnel etc in 2015-16.

Participative Vigilance

- **24 Hours Vigilance Helpline:** 24 hour vigilance helpline (Helpline No.155210) of the Railways. In addition to this, the email addresses of vigilance officers are posted on the website.
- **Vigilance Awareness Week:** is celebrated every year during the last week of October or first week of November to educate the general public

regarding the facilities available in the department and also ways and means to lodge complaints. The same was observed between 26th to 31st October in the year 2015.

- **Counseling:** As many as 87 Workshops/ seminars/ interactive sessions were conducted on topical issues by Vigilance in 2015-16 in which Officers, senior supervisors and other railway personnel representing various levels and disciplines participated; the primary focus was to inculcate greater awareness of rules, procedures and, most importantly, the pitfalls that need to be steered clear of.

  In the training programme that is conducted annually for Vigilance Inspectors and Investigating Inspectors at the Diesel Loco Shed/ Tughlakabad, a total of 80 personnel participated in two schedules from 18th – 22nd July, 2016 and 25th – 29th July, 2016.

Punitive Vigilance

A statement showing number of officials against whom disciplinary action in vigilance-investigated cases was initiated/finalized during April 2015 to March 2016 is given below:

Vigilance investigated cases	2015-16
Number of officials against whom disciplinary proceedings were initiated.	6,351
Number of officials against whom disciplinary proceedings resulted in imposition of major penalty	1,046
Number of officials against whom disciplinary proceedings resulted in imposition of minor penalty	5,672

Proactive Vigilance:

- Conducting surprise checks in areas of mass contact (like reservation offices, ticket booking counters, luggage/parcel and goods booking offices, on-board passenger-carrying trains etc), in the accountal/ disposal of scrap, loading of freight wagons and parcel vans (primarily with a view to detect/control incidences of overloading), etc. During the calendar year 2015, these measures resulted in realization of revenues to the tune of ₹91.13 crores.
- Scrutinizing at least 20% of Annual Property Returns filed by Officers.

Preserving IR's Heritage

Indian Railways with more than 160 years of rich history; presents a wide spectrum of both tangible and intangible heritage. Indian Railways is proud owner of four UNESCO accorded World Heritage Sites namely Darjeeling Himalayan Railway (1999), Nilgiri Mountain Railway (2005), Kalka Shimla Railway (2008) and Chhatrapati Shivaji Terminus, Mumbai (2004). There are two more in waiting or in the tentative list namely Matheran Light Railway and Kangra Valley Railway.

Indian Railways, in addition to being a special industrial relic, occupy a special place within the national heritage spectrum of India. The remains of rolling mill, cupola, brake block foundry, forging anvils of any old Railway Workshop are not only historical evidences or industrial relics but sense of belonging to the workshop.

Similarly iconic station and office buildings at Mumbai (Victoria Terminus, Bandra Suburban, Churchgate), Howrah, Garden Reach (BNR Office), Chennai Egmore, Royapuram, Lucknow, Madurai etc. bear identities of their respective cities.

The Station and Office buildings, locomotives, coaches, wagons, equipment, artifacts etc. when appropriately preserved and open for public display create memories of the past in the heart of the future generation and thus help maintaining a continuity of human experience.

Indian Railways, over the years, have been endeavoring sustained and focused approach for safeguarding its industrial as well as living heritage and to transmit it intact to future generations.

Today, Indian Railways maintain 34 Museums, Heritage Parks and Heritage galleries, spread all over India, for creating unique and rich experience to visitors about Railway heritage in India. The National Rail Museum in New Delhi, Regional Rail Museums at Chennai, Mysore and Howrah, are iconic tourist destinationsin their region.

Indian Railways have also preserved about 230 Steam Locomotives, 110 vintage coaches and wagons at prominent places including museums, heritage park etc., for public display. Many of these rolling stocks are more than 100 years old and they bring back memories of old glory to the mind of the visitors.

Indian Railways are also preserving about 16 Steam locomotives as working heritage. Although, not in regular service, these preserved steam locomotives are still capable of hauling tourist trains and ceremonial running. The Rewari Steam Shed has been rechristened as Rewari Heritage Steam Centre in 2002 for recreating the memories of working Steam Shed, a feat un-parallel in the World.Rewari Steam Centre now maintains six Broad Gauge and four Meter Gauge working steam locomotives, that include the iconic "Fairy Queen" (1855), placed in the Guinness Book of Record as being the oldest working locomotive in the World and "Akbar", that featured in many Bollywood movies like Sultan, Gadar etc.

The Darjeeling Himalayan Railway (DHR) and Nilgiri Mountain Railway (NMR), both UNESCO accorded World Heritage Sites, operate Steam services on regular basis. DHR and NMR, with working steam locomotive holding of fourteen and six respectively, attract steam lovers from India and abroad. The sight and sound of Steam Locomotives recreate smell and romance of a by-gone era.

Indian Railways have a large repository of built heritage like buildings, bridges, via ducts etc. As of now, about 25 bridges and 70 buildings are designated as Heritage Assets by Indian Railways. Notable among them are Jubilee Bridge near Kolkata, Yamuna bridge near Naini, Sonenagar Bridge, Pamban via duct, Bandra suburban station, Pratap Vilas Palace, Vadodara, Glenogle Bungalow, Mumbai, SER (erstwhile BNR) Headquarter, Kolkata etc. Indian Railways have been making special efforts to conserve these built heritages.

Preservation of Railway Heritage and unlocking its potential for making significant and meaningful contributions to India's knowledge society and Incredible India Campaign shall remain one of the prime social responsibilities of Indian Railways and its associated Public Sector Undertakings.

A slew of measures has been initiated recently to institutionalize rail heritage preservation. These include compilation of heritage inventory and publishing it on the website, collaboration with institutions and stakeholders for digitizing and providing online access to rail heritage inventory and visual tour of museums, capacity building of railway officers and introducing modules for training courses etc.