INDIAN RAILWAYS YEAR BOOK 2019 - 20

स्वच्छ भारत
एक कदम स्वच्छता की ओर

सत्यमेव जयते

Bharat Sarkar
Government of India
Rail Mantralaya
Ministry of Railways
(Railway Board)

राष्ट्रीय जल मिशन
National Water Mission

INDIAN RAILWAYS

YEAR BOOK
2019-20

सत्यमेव जयते

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

Contents

Key Statistics

	Unit	2018-19	2019-20
PLANT & EQUIPMENT:			
Capital-at-Charge	₹ in crore	#3,48,601.77	**@3,74,921.58**
Total Investment	”	5,73,641.66	**6,40,408.27**
Route Length	Kms.	67,415	**67,956**
Locomotives	Nos.	12,147	**12,729**
Passenger Service Vehicles	”	67,604	**70,236**
Other Coaching Vehicles	”	6,406	**6,372**
Wagons	”	*2,89,175	**2,93,077**
Railway Stations	”	7,321	**7,325**
OPERATION:			
Passenger: Train kms.	Millions	779	**769**
Vehicle kms.	”	26,482	**26,385**
Freight: Train kms.	”	415	**397**
Wagon kms.	”	19,364	**18,846**
VOLUME OF TRAFFIC:			
Passengers Originating	Millions	8,439	**8,086**
Passenger kms.	”	11,57,174	**10,50,738**
Tonnes Originating:$			
Revenue Earning Traffic	”	1,221.48	**1,208.41**
Total Traffic (incl. non-revenue)	”	1,225.29	**1,212.22**
Net Tonne kms.$			
Revenue Earning Traffic	”	7,38,523	**7,07,665**
Total Traffic (incl. non-revenue)	”	7,38,923	**7,08,034**
EMPLOYMENT AND WAGES:			
Regular Employees	Thousands	1,228	**1,254**
Wage Bill of Regular Employees	₹ in crore	1,35,171.13	**1,54,214.71**
Average Annual Wage Per Regular Employee	₹ in units	10,97,370	**12,30,641**
FINANCIAL RESULTS:			
Revenue	₹ in crore	1,89,906.58	**1,74,356.60**
Expenses	”	1,84,780.30	**1,71,319.21**
Miscellaneous Transactions	”	-1,352.42	**-1447.77**
Net Revenue (before dividend)	”	3,773.86	**1,589.62**
Rate of Return on Capital	Percent	1.08	**0.29**
Dividend on Capital **	₹ in crore	0	**0**
Shortfall(-)/Excess(+)	”	3,773.86	**1,589.62**

@ Includes investment (₹ 53,449.91 crore) from Capital Fund.
# Includes investment (₹ 53,449.91 crore) from Capital Fund.
$ Excludes Konkan Railway.
* Revised
** No dividend was payble during 2019-20

Other Important Statistics

S.No.	Item	Unit	2018-19	2019-20
I	**Rail Network**			
1	Route Kilometres			
	(i) BG	Kms.	62,891	**63,950**
	(ii) MG	"	2,839	**2,402**
	(iii) NG	"	1,685	**1,604**
	Total (all gauges)	"	67,415	**67,956**
2	Running Track Kilometres (Total all gauges)	"	95,981	**99,235**
3	Total Track Kilometres (Total all gauges)	"	1,23,542	**1,26,366**
4	Electrified Route Kilometre (Total all gauges)	"	34,319	**39,329**
II	**Rolling stock**			
1	Number of Locomotives	(in units)		
	(i) Steam	"	39	**39**
	(ii) Diesel	"	6,049	**5,898**
	(iii) Electric	"	6,059	**6,792**
	Total	"	12,147	**12,729**
2	Number of Wagons	"	2,89,175	**2,93,077**
3	Number of Coaches-	(in units)		
	(i) Passenger Carriages (including DEMU/ DHMU)	"	57141	**58,853**
	(ii) Other Coaching Vehicles	"	6,406	**6,372**
	(iii) EMU and MEMU Coaches	"	10,439	**11,360**
	(iv) Rail Cars	"	24	**23**
	Total	"	74,010	**76,608**
III	**Loco Utilisation**			
1	Tractive effort per loco			
	(i) BG	Kgs.	38,537	**39,037**
	(ii) MG	"	16,226	**16,454**
2	GTKMs (excl. wt. of engine & dept.) per kg. of tractive effort.			
	(i) BG	Kms.	3,863*	**3,699**
	(ii) MG	"	401	**316**
3	Engine kilometres per day per engine in use (Pass.) (B.G)			
	(i) Diesel	Kms.	582	**559**
	(ii) Electric	"	678	**593**

S.No.	Item	Unit	2018-19	2019-20
4	Engine kilometres per day per engine in use (Goods)(B.G)			
	(i) Diesel	Kms.	351	**380**
	(ii) Electric	"	387	**336**
5	NTKMs per engine hour (BG) All traction		16,345*	**14,390**
6	Ineffective percentage of locomotives (B.G)	Percent		
	(i) Diesel	"	8.53	**8.19**
	(ii) Electric	"	7.11	**6.99**
IV	**Wagon Utilisation**			
1	Wagon KMs in terms of 8 wheelers	Million	19,364	**18,846**
2	Total Carrying Capacity (All Gauges)	Million Tonnes	16.95	**17.44**
3	Average carrying capacity - wagon	Tonnes		
	BG	"	61.85	**62.83**
	MG	"	31.61	**32.20**
4	Wagon Turn Round (in days) (BG)	Days	5.00	**5.30**
5	Wagon Kms. per wagon per day (BG)	Kms	203.9	**188.7**
6	NTKMs per wagon per day (BG)	Kms	7,747	**7,057**
7	Ineffective percentage of wagons (B.G)	%age	3.61	**3.07**
V	**Coach Utilisation**			
1	Vehicle Kms(Excluding Deptt../Rail Car etc.)	Millions		
	(i) Suburban (EMU)	"	2,098	**2,102**
	(ii) Non Suburban	"	24,384*	**24,283**
	Total	"	26,482*	**26,385**
2	Vehicle Kms per vehicle day (B.G)	Kms.	533	**534**
3	Ineffective percentage of coaches(B.G) (Passenger Carriage)	Percent	6.07	**6.14**
VI	**Train Utilisation**			
a.	**Passenger Train Performance**			
1	Number of Passenger trains runs daily	Nos.	13,523	**13,169**
2	Passenger Train Kms	Millions	779	**769**
b.	**Goods Train Performance**			
1	Number of Goods trains runs daily	Nos.	9,146	**8,479**
2	Goods Train Kms.	Millions	415	**397**
3	Average Speed of All Goods Train (B.G.)			
	(i) Diesel	Kms./ Hour	22.3	**23.4**
	(ii) Electric	"	23.8	**25.4**
	(iii) All Traction	"	23.2	**23.6**
4	Average Net load of Goods train (B.G)(All traction)	Tonnes	1,738	**1,728**

S.No.	Item	Unit	2018-19	2019-20
5	Average Gross load of Goods train (B.G)(All traction)	Tonnes	2,925	**2,990**
VII	**Volume of traffic**			
a.	**Passenger Traffic (Suburban + Non-Suburban)**			
1	Passenger Originating	Millions	8,439	**8,086**
2	Passenger Kilometres	Millions	11,57,174	**10,50,738**
3	Average Lead	Kms.	137.1	**129.9**
4	Passenger Earnings	₹ in crores	51,067	**51,067**
5	Average rate per PKMs	Paise	44.13	**48.22**
	Number of Passenger carried per day	Millions	23.12	**22.15**
b.	**Freight Traffic (Revenue)**			
1	Tonnes originating	Millions	1,221.48	**1,208.41**
2	Lead (originating)	Kms.	605	**586**
3	Freight Earnings excl. Demurrarge/Wharfage	₹ in crores	1,22,580.31	**1,11,472.30**
4	Frieght NTKMs	Millions	7,38,523	**7,07,665**
5	Average rate per NTKMs	Paise	165.98	**157.52**
6	Earnings per million tonne	₹ in crores	100.35	**92.25**
7	Freight carried per day (including non-revenue)	Millions Tonnes	3.36	**3.32**
VIII	**Train Accidents (Excl. KRCL)**	Nos.	59	**54**
1	Collisions	”	0	**5**
2	Derailment	”	46	**40**
3	Level Crossing	”	6	**1**
4	Fire in trains	”	6	**7**
5	Miscellaneous	”	1	**1**
6	Accident per million train kms	”	0.05	**0.05**
IX	**Density**			
1	Net Tonne Kms per route Km. (BG)	Km.	11.74	**11.07**
2	Passenger Kms per route Km. (BG)	”	18.34	**16.42**
3	Gross Tonne Kms per route Km. (BG)	”	33.59	**32.05**
X	**Comsumption of Fuel/Energy by Locomotive**			
	(i) Diesel	Million litres	2,749.01	**2,379.87**
	(ii) Electric	Million KWH	17,681.79	**18,409.90**
	* revised			

Some Selected Financial Ratio

S. No.	Item	Unit	2018-19	2019-20
(A)	**Financial Ratios**			
1.	Operating ratio	%age	97.29	**98.36**
2.	Rate of return on Capital	%age	1.08	**0.29**
3.	Working ratio of IR	%age	91.9	**91.9**
4.	Operating ratio with subsidy (Cost recovery)	%age	77.4	**74.22**
5.	Operating ratio for Coaching (passenger) and Goods (Fright)			
	i. Goods	%age	58.72	**73.11**
	ii. Coaching	%age	192.49	**207.84**
6.	Debt Servicing as percentage of OWE and as a percentage of Gross receipts.			
	i. Debt servicing as percentage of OWE	%age	13.6	**13.9**
	ii. Debt servicing as percentage of Gross Receipts	%age	10.0	**11.9**
7.	Capex to Revenue ratio – Capex (from internal generation) /Revenue	%age	2.5	**1.0**
(B)	**Earning/ Yield Ratios (Based on Apportion Earning)**			
8.	Passenger yield/ PKMs	In Paise	44.13	**48.22**
9.	Freight yield/NTKMs	In Paise	165.98	**157.52**
	Productivity index			
	i. Employee Productivity		*6,68,790	**6,24,315**
	ii. Infrastructure Productivity		66,46,180	**61,93,414**
(C)	**Asset Utilization**			
10.	Utilization of Assets			
	i. NTKMs per wagon per day -(BG)	KMs	7,747	**7,057**
	ii. Wagon KMs per Wagon day -(BG)	KMs	203.9	**188.7**
	iii. Wagon turn around - BG	In days	5.00	**5.30**
	iv. Average Load per Wagon - BG	Tonnes	60.8	**61.30**
(D)	**Operating Indices**			
11.	Average speed of Goods Train – (BG) – All traction	KM/hour	*23.3	**23.6**

S. No.	Item	Unit	2018-19	2019-20
12.	Infective percentage of Rolling Stock – (BG)			
	i. Diesel Locos	%age	8.53	**8.19**
	ii. Electric Locos	%age	7.11	**6.99**
	iii. EMU Coaches	%age	14.4	**12.2**
	iv. Passenger Carriages	%age	6.07	**6.14**
	v. Other Coaching Vehicles	%age	5.18	**5.08**
	vi. Wagons	%age	3.61	**3.07**
13.	Specific Fuel Consumption (Consumption per 1000 GTKMs) – (BG)			
	i. Passenger service - Diesel	Litres	3.74	**3.59**
	ii. Goods services - Diesel	Litres	1.97	**1.92**
14.	Specific Energy Consumption (Consumption per 1000 GTKMs) – (BG)			
	i. Passenger service- Electricity	K.Wt. Hrs.	*19.7	**18.4**
	ii. Goods services -Electricity	K.Wt. Hrs.	5.83	**6.13**
15.	Punctuality Index – Punctuality (M/Exp. Trains) –(BG)	%age	69.23	**75.69**
16.	Accident per Million train Kilometers		0.05	**0.05**

*revised

Outside view of Sealdah Station of Eastern Railway

Economic Review

Macroeconomic outcome

The World Economic Outlook (WEO) of IMF, April 2019 highlights that after strong growth in 2017 and early 2018, global economic activity slowed notably in the second half of 2019-20 reflecting a confluence of factors affecting major economies. As a result, global growth was projected to slow from 3.6 percent in 2018 to 3.3 percent in 2019 before returning to 3.6 percent in 2020. Beyond 2020, global growth was set to plateau at about 3.6 percent over the medium term, sustained by the increase in the relative size of economies, such as those of China and India, which were projected to have robust growth in comparison to slower growing advanced and emerging market economies. In India, growth was projected to pick up from 7.1 percent in 2018 to 7.3 percent in 2019 and 7.5 percent in 2020, supported by the continued recovery of investment and robust consumption amid a more expansionary stance of monetary policy and some expected impetus from fiscal policy. However, with the onset of the pandemic, the World Economic Outlook, June 2020 has revised the global growth to 2.9% in 2019, -4.9% in 2020 and 5.4 % in 2021. The growth projections for India are revised to 4.2% in 2019, (-) 4.5% for 2020 and 6% in 2021.

RBI in its Monetary policy Statement dated 4th April for 2019-20 stated that favourable factors such as an increase in financial flows to the commercial sector, stabilization of crude oil and other commodity prices, consumption and investment-enhancing proposals in the Union Budget 2019-20, and the expectation of a normal monsoon are expected to boost economic activity. However, there could be headwinds from greater than expected moderation in global growth and global trade as well as unanticipated volatility in global financial markets. Reserve Bank of India projected real GDP growth to improve from 7.0 percent in 2018-19 to 7.2 percent in 2019-20 and 7.4 percent in 2020-21. However, the provisional estimates of 2019-20 brought out by National Statistical Office at the end of May 2020 unravelled a slowdown in the economic activity.

Gross Domestic Product (GDP) Growth

GDP at constant (2011-12) prices or real GDP in the year 2019-20 was estimated at ₹145.65 lakh crore, as against the GDP of ₹139.81 lakh

crore for the year 2018-19. The growth in real GDP during 2019-20 is estimated at 4.2 percent as compared to the growth rate of 6.1 percent in 2018-19 (Table 1). Earlier during the year, the Second Advance Estimates of National Income released by National Statistical Office(NSO) on 28th February, 2020 had estimated a growth of 5.0 percent in real GDP for the year 2019-20.

Table 1: GDP and GVA at constant prices 2011-12 (In ₹ Crore)

	2015-16	2016-17 3rd RE	2017-18 2nd RE	2018-19 1st RE	2019-20 PE
GDP at constant	11369493 (8.0)	12308193 (8.3)	13175160 (7.0)	13981426 (6.1)	**14565951 (4.2)**
GVA at basic Price	10491870 (8.0)	11328285 (8.0)	12074413 (6.6)	12803128 (6.0)	**13301120 (3.9)**

Source: National Statistical Office (NSO), Press release dated 31st May, 2019
PE: Provisional Estimate
RE: Revised Estimate
Growth rate over previous year indicated in brackets

Real Gross Value Added (GVA) i.e GVA at basic constant (2011-12) prices for the year 2019-20 which reflects the production or supply side method of calculating GDP is estimated at ₹133.01 lakh crore (Provisional Estimates) in comparison with ₹128.03 lakh crore (First Revised Estimate) for the year 2018-19, thus registering a year-on-year growth rate of 3.9 percent in 2019-20 as against 6.0 percent in the year 2018-19. The decrease in GVA in 2019-20 was mainly caused by subdued growth in Manufacturing, Electricity, Construction, Trade, Hotel, transport, communication and services as well as Financing, Real Estate & Professional Services.

The sectors which registered a growth rate of over 4.0 percent in 2019-20 (PE) in GVA at constant (2011-12) prices are Agriculture, Forestry and Fishing (4 percent); Electricity, Gas, Water Supply & other utility services (4.1 percent); Financial, Real Estate & Professional Services (4.6 percent) and 'Public administration, defence and other services' (10.0 percent) (Table 2).

Table 2: Sector-wise Growth in GVA at Basic Prices (%) at 2011-12 prices

	2017-18	2018-19 (1sr RE)	2019-20 (PE)
I. Agriculture, Forestry & Fishing	5.0	2.4	**4**
II. Industry			
Mining & Quarrying	5.1	-5.8	**3.1**
Manufacturing	5.9	5.7	**0.03**
Electricity, Gas, Water Supply & other utility services	8.6	8.2	**4.1**
Construction	5.6	6.1	**1.3**

III. Services			
Trade, Hotels, Transport, Communication and services related to broadcasting	7.8	7.7	**3.6**
Financing, Real Estate & Professional Services	6.2	6.8	**4.6**
Public Administration, defence and other services	11.9	9.4	**10**
GVA at Basic Price	6.9	6.0	**3.9**

Source: National Statistical Office (NSO), Press release dated 31st May, 2019 and 29 May, 2020.
PE: Provisional Estimates

Agriculture

The growth rate in Agriculture and allied sectors at 5.9 percent in 2017-18 (Table-2), has shown a decline thereafter. In 2018-19, growth rate in Agriculture and allied sector declined to 2.4 percent and thereafter it increased to 4.0 percent in 2019-20. As per the 4th Advanced estimates, the foodgrains production in 2019-20 is 296.65 million tonnes. This is higher by 11.44 million tonnes as compared to 285.21 million tonnes during last year (Table 3). All the categories of foodgrains registered an increase in production in 2019-20 over the previous year.

Table 3: Production of selected agricultural commodities (million tonnes)

Items	2015-16	2016-17	2017-18	2018-19	2019-20
Food grains	251.54	275.11	285.01	285.21	**296.65**
Wheat	92.29	98.51	99.87	103.60	**107.59**
Rice	104.41	109.70	112.76	116.48	**118.43**
Coarse Cereals	38.52	43.77	46.97	43.06	**47.48**
Pulses	16.32	23.13	25.42	22.08	**23.15**

Source: Department of Agriculture, Cooperation and Farmers Welfare, 4th Advance Estimate of Production of Foodgrains for 2019-20 as on 19.08.2020.

Industry

As per the national accounts data of the NSO, Index of Industrial Production (IIP), which broadly comprises of mining, manufacturing and electricity, was (-)0.8 percent in 2019-20 as compared to 3.8 percent in 2018-19 (Table 4). Mining sector witnessed a decline in growth rate of 1.6 percent in 2019-20 compared to 2.9 percent in 2018-19. Manufacturing sector witnessed a decline in growth rate from 3.9 percent in 2018-19 to (-)1.4 percent in 2019-20 and in Electricity sector, it declined from 5.2 percent in 2018-19 to 1.0 percent in 2019-20.

Table 4: Sectoral Growth Rates of Industrial Sector based on IIP (%)

(Base: 2011-12 = 100)

	Weight	2015-16	2016-17	2017-18	2018-19	2019-20
Industry Group						
General Index	100.00	3.3	4.6	4.4	3.8	**-0.8**
Mining	14.3725	4.3	5.3	2.3	2.9	**1.6**
Manufacturing	77.6332	2.8	4.4	4.6	3.9	**-1.4**
Electricity	7.99432	5.7	5.8	5.4	5.2	**1.0**

Source: National Statistical Office (NSO), Ministry of Statistics and Programme Implementation, Press release dated 12th June, 2020.
Note: Growth is over the corresponding period of previous year.

In terms of use-based classification, the growth rate of IIP for Primary goods declined from 3.5 percent in 2018-19 to 0.7 percent in 2019-20. Capital goods, declined (-)13.8 percent in the year 2019-20, as against 2.7 percent in 2018-19. Intermediate goods recorded increase of 8.8 percent in 2019-20, as against 0.9 percent in 2018-19. Infrastructure/construction goods declined from 7.3 percent in 2018-19 to (-) 4.0 percent in 2019-20. Consumer durable goods declined from 5.5 percent in 2018-19 to (-) 8.7 percent in 2019-20. Consumer non-durables also declined from 4.0 percent in 2018-19 to 0.2 percent in 2019-20.

Infrastructure Industries

The index of 8 core infrastructure supportive industries (comprising coal, crude oil, natural gas, petroleum refinery products, fertilizers, finished carbon steel, cement and electricity) comprising weight of 40.27 percent in the items included in IIP, declined from 4.4 percent in 2018-19 to 0.4 percent in 2019-20. Crude oil, Natural Gas, Cement and Coal with a growth rate of (-)5.9 percent, (-)5.6 percent, (-)0.9 percent and (-)0.4 percent, respectively were the worst performing infrastructure industries in 2019-20. Refinery products and Electricity also witnessed a low growth rate of 0.2 and 0.9 percent, respectively. Fertilizers and Steel industries moved ahead with a growth of 2.7 and 3.4 percent in the year 2019-20 (Table 5).

Table 5: Growth (%) in Core Industries (Base: 2011-12=100)

Sectors	Weight	2015-16	2016-17	2017-18	2018-19	2019-20
Coal	10.3335	4.8	3.2	2.6	7.4	**-0.4**
Crude oil	8.9833	-1.4	-2.5	-0.9	-4.1	**-5.9**
Natural Gas	6.8768	-4.7	-1.0	2.9	0.8	**-5.6**
Refinery Products	28.0376	4.9	4.9	4.6	3.1	**0.2**
Fertilizers	2.6276	7.0	0.2	0.03	0.3	**2.7**
Steel	17.9166	-1.3	10.7	5.6	5.1	**3.4**
Cement	5.3720	4.6	-1.2	6.3	13.3	**-0.9**
Electricity	19.8530	5.7	5.8	5.3	5.2	**0.9**
Overall	100.0000	3.0	4.8	4.3	4.4	**0.4**

Source: Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade, April 2020.

External Sector

Foreign Trade

The year 2019-20 registered a decline in growth rate of exports by (-)4.98 percent, as compared to 9.15 percent growth in 2018-19. The oil exports registered a decline of (-) 7.80 percent and non-oil exports also witnessed a decline of (-) 4.01 percent during the year 2019-20. The growth rate of imports also declined by (-) 7.65 percent in 2019-20 as against 10.34 percent growth in 2018-19, with oil imports and non-oil imports registering a growth of (-) 8.13 percent and (-) 9.25 percent, respectively in 2019-20 (as per RBI Bulletin dated 10.06.2020 and 11.06.2019). The trade deficit, accordingly, which was at US$ (-)180.28 billion in 2018-19 was US$ (-)157.51 billion in 2019-20.

Table 6: Export, Import and Trade Deficit (in US $ billion)

Item	2018-19	Growth* (%)	2019-20	Growth* (%)
Exports	337.24	9.15	**320.43**	**-4.98**
Imports	517.52	10.34	**477.94**	**-7.65**
Trade Balance#	-180.28		**-157.51**	

Source: RBI Annual report, 21th August, 2020.

Exports minus Imports ; *Over the previous year

Current Account Deficit (CAD)

Table 7: Current Account Balance (in US $ billion)

Year	2015-16	2016-17	2017-18	2018-19	2019-20 (P)
Trade Balance	-130.08	-112.44	-160.04	-180.28	**-157.51**
Net Invisibles	107.93	98.03	111.32	123.03	**132.85**
Current Account Balance	-22.15	-14.42	-48.72	-57.26	**-24.66**
Current Account Balance as a Ratio to GDP (%)	-1.1	-0.6	-1.8	-2.1	**-0.9**

Source: Annual data from 2015-16 to 2019-20 is from RBI Annual report dated 21st August, 2020.

(P) : Provisional

Foreign Capital Inflows

Net foreign direct investments (FDI) increased by 40.05 percent from US$ 30.71 billion in 2018-19 to $ 43.01 billion in 2019-20. Net Portfolio

investment increased to US$ 1.40 billion in 2019-20, as compared to US$ (-)0.62 billion in the year 2018-19 (Table 8).

Table 8: Net Foreign Direct Investment (FDI) and Net Portfolio Investment

(In US$ billion)

	Net FDI	Net Portfolio Investment
2015-16	36.02	-4.13
2016-17	35.61	7.61
2017-18	30.29	22.12
2018-19	30.71	-0.62
2019-20(P)	**43.01**	**1.4**

Source: RBI Bulletin dated 21th August, 2020.
(P): Provisional

Foreign Exchange Reserves & Exchange rate

India's foreign exchange reserves were at US $ 477.81 billion at the end of March 2019 as compared to US $ 412.87 billion at the end of March 2018. Robust capital flows particularly during Q1 and Q3 of 2019-20, led to an accretion in foreign exchange reserves, which reached a historic high of US 487.2 billion as on March 6, 2020. Consequent upon the 6-month US dollar sell/buy swap auction undertaken twice by the Reserve Bank in March 2020 to provide liquidity to the foreign exchange market and valuation losses caused by a sharp appreciation of the US dollar against major currencies, foreign exchange reserves, however, dipped to US$ 477.81 billion as at end-March 2020 (RBI Annual Report, 2019).

Fiscal outcome

The major fiscal indicators of the Central Government are presented in Table 9. In 2019-20, the prominent changes are evident for tax to GDP ratio and there is a reduction in primary deficit as a percent of GDP in 2019-20. Comparison of Budget Estimates of expenditure in 2019-20 over 2018-19 PA suggests that Central Government budgetary expenditure is envisaged to increase by one percentage point of GDP in 2019-20. The entire increase is on revenue account with capital spending remaining unchanged as percent of GDP. Within revenue expenditure, more than forty percent of the increase is explained by increase in interest payments and major subsidies. The Medium Term Fiscal Policy (MTFP) Statement presented with the Budget 2019-20, pegged the fiscal deficit target for 2019-20 at 3.3 percent of GDP, which was further expected to follow a gradual path of reduction and attain the targeted level of 3.0 percent of GDP in 2020-21 and continue at the same level in 2021-22.

Table 9: Components of Revenue and Expenditure of the Central Government

(as percent of GDP)

	2015-16	2016-17	2017-18	2018-19 (PA)	2019-20 (BE)
Revenue Receipts	8.7	8.9	8.4	8.2	**9.3**
Gross Tax Revenue	10.6	11.2	11.2	10.9	**11.7**
Total Expenditure	13.0	12.9	12.5	12.2	**13.2**
Revenue Expenditure	11.2	11.1	11.0	10.6	**11.6**
Capital Expenditure	1.8	1.9	1.5	1.6	**1.6**
Interest payment	3.2	3.2	3.1	3.1	**3.1**
Major subsidies	1.8	1.3	1.1	1.0	**1.4**
Revenue Deficit	2.5	2.1	2.6	2.4	**2.3**
Fiscal Deficit	3.9	3.5	3.5	3.4	**3.3**
Primary Deficit	0.7	0.4	0.4	0.4	**0.2**

Source: Economic Survey 2019-20

PA- Provisional Actuals

BE- Budget Estimates

Inflation

Headline Wholesale Price Index (WPI) for all commodities averaged 4.26 percent in 2018-19 and declined sharply to 1.67 percent in 2019-20. This was mainly on account of the fuel inflation, which was 11.58 percent in 2018-19 declined to (-) 1.83 percent in 2019-20 combined with a decrease in the inflation for manufactured products from 3.60 percent in 2018-19 to 0.34 percent in 2019-20 reflecting weakening of demand pressures in the economy. However, WPI inflation in primary articles group increased from 2.76 percent in 2018-19 to 6.78 percent in 2019-20 (Table 10).

Table 10: Annual Inflation rate (%) based on WPI (Base 2011-12=100)

Items/Groups	Weight (%)	April-March (Average)	
		2018-19	2019-20
All Commodities	100	4.26	**1.67**
Primary articles	22.61756	2.76	**6.78**
Fuel and Power Group	13.15190	11.58	**-1.83**
Manufactured Products	64.23054	3.60	**0.34**

Source: Computed from base data released by the Office of the Economic Adviser, Department for Promotion of Industry and Internal Trade.

Headline Inflation (Average of months April-March) measured in terms of Consumer Price Index (CPI) (Base 2012= 100), rural and urban

combined, which had crossed 4 percent over previous two consecutive years, declined to 3.6 percent in 2017-18 and then further, from 3.4 percent in 2018-19 rose to 4.8 percent in 2019-20. After trending below the target of 4 percent during the first half of 2019-20, headline inflation spiked during the second half and reached a multi-year peak of 7.6 percent in January 2020 (highest in 68 months). An atypically prolonged south west monsoon along with unseasonal rains during the kharif harvest period led to crop damages and supply disruptions which pushed up food prices, especially those of vegetables, from September to December 2019. Thereafter, with the fading of these pressures and encouraging prospects for the rabi crop, food inflation started easing from January 2020. Fuel inflation eased sequentially from April to June 2019 and moved into deflation during July-November 2019, pulled down by favourable base effects and muted price pressures in major fuel items (RBI Annual Report, 2019).

Major commodities carried by Indian railways

The following table shows the percentage of total production plus imports of some of the major commodities carried by the Indian Railways during the last 5 years:

Table 11: Percentage of total production plus imports of select major commodities carried by the Indian Railways

	Coal	Iron Ore	Cement	Foodgrains	Fertilizers	Pol Products
2015-16	65.45	70.78	36.99	18.13	87.53	16.54
2016-17	62.77	69.05	36.66	15.95	87.01	15.16
2017-18	62.83	66.68	37.43	15.26	85.46	14.87
2018-19(R)	62.85	62.64	34.55	13.78	85.91	14.55
2019-20(P)	**60.03**	**62.72**	**32.88**	**13.10**	**84.23**	**14.58**

(P) Provisional (R) Revised

Source: Calculated on the basis of production and import data received from various Ministries and Railway loading data received from Directorate of Economics and Statistics of Ministry of Railways.

Table 12: SELECTED ECONOMIC INDICATORS

	ITEM		Unit / Base	2015-16	2016-17 3rd RE	2017-18 2nd RE	2018-19 1st RE	2019-20 PE
I.	(a)	**Net National Income**						
	(i)	At 2011-12 prices	₹ Crore	9963681	10782092	11540556	12219693	**12733366**
	(ii)	At current prices	₹ Crore	12162398	13492657	15149545	16789288	**17999754**

(b)	**Per capita income**						
(i)	At 2011-12 prices	(In Rupees)	77659	83003	87828	92085	**94954**
(ii)	At current prices	(In Rupees)	94797	103870	115293	126521	**134226**
II.	**Gross Capital Formation**						
	Railways						
(i)	At 2011-12 prices	₹Crore	60512	64226	69505	78622	**NA**
(ii)	At current prices	₹Crore	68631	74049	83559	96806	**NA**

Source: National Accounts Data, Ministry of Statistics and Programme Implementation

PE-Provisional Estimates

III.	**Foreign Trade:**						
(a)	Value of exports	₹Crore	1716384	1849433	1956514	2307726	**2219854**
	Value of imports	₹Crore	2490305	2577675	3001033	3594674	**3360954**
(b)	Value of exports	US $ Million	266365	280138	308970	330078	**313217**
	Value of imports	US $ Million	396444	392580	469006	514078	**473988**

Source: For US million $ 2015-16 to 2017-18 RBI, Annual Report 2019-20 and Directorate General of Commercial Intelligence and Statistics, Ministry of Commerce and Industry for 2018-19 and 2019-20 as as on 25.06.2020. For ₹ cr. data also Ministry of Commerce and Industry.

IV. Index of Agricultural Production (Triennium ending 2007-08 =100)

		Weight	2015-16	2016-17	2017-18	2018-19	**2019-20**
(a)	All Crops	(100.00)	120.8	132.8	139.4	136.6	**141.8**
(b)	Foodgrains	(50.7)	115.7	131.1	136.8	134.4	**139.6**
(c)	Non-foodgrains	(49.3)	126.1	134.7	142.1	138.8	**144.1**

Source: Handbook of Statistics (2019-20), Reserve Bank of India

V. Index of Industrial Production (2011-12=100)

		Weight	2015-16	2016-17	2017-18	2018-19	**2019-20**
(a)	General Index	(100.0)	114.7	120.0	125.3	130.1	**129.0**
(b)	Mining	(14.3725)	97.3	102.5	104.9	107.9	**109.6**
(c)	Manufacturing	(77.6332)	115.9	121.0	126.6	131.5	**129.6**
(d)	Electricity	(7.9943)	133.8	141.6	149.2	156.9	**158.4**

Source: NSO, Ministry of Statistics and Programme Implementation, Press release dated 12th June, 2020 for 2018-19 and 2019-20

SELECTED ECONOMIC INDICATORS (Contd.)

	ITEM	Unit/ Base	2015-16	2016-17	2017-18	2018-19	2019-20
VI.	**Wholesale Price Index (Financial Year Average with weights) (Base 2011-12=100)**	Weight					
(a)	All Commodities	(100.00)	109.7	111.6	114.9	119.8	**121.8**
(b)	Primary Articles	(22.62)	124.6	128.9	130.6	134.2	**143.3**
(c)	Fuel & Power	(13.15)	86.5	86.3	93.3	104.1	**102.2**
(d)	Manufactured Products	(64.23)	109.2	110.7	113.8	117.9	**118.3**
VII.	**Wholesale Price Indices of Important Commodities used by Railways**	Weight					
(a)	Non-coking coal	(1.40)	109.6	110.5	112.5	119.0	**119**
(b)	Minerals Oils	(7.95)	73.9	73.3	82.5	96.7	**92.3**
(c)	Electricity	(3.06)	105.3	104.2	103.7	109.6	**111.8**
(d)	Manufacture of Basic Metals	(9.65)	92.0	91.1	101.4	112.2	**106.2**
(i)	Inputs into Steel Making	(1.41)	85.4	82.9	98.2	113.0	**100.6**
(ii)	Ferrochrome	(0.11)	102.5	114.4	121.6	121.1	**112.4**
(iii)	Ferromanganese	(0.03)	95.2	104.4	121.5	124.1	**117.7**
(iv)	Ferrosilicon	(0.02)	99.3	88.4	94.6	100.5	**94.9**
(v)	Other Ferro alloys	(0.03)	96.2	100	118.2	122.3	**117.5**
(vi)	Manufacture of Non-Ferrous Metals	(1.69)	100.9	100.1	107.9	112.2	**107**
(e)	Manufacture of Electrical Equipment	(2.93)	109.0	108.2	109.6	111.7	**111.3**
(f)	Manufacture of Chemicals & Chemical Products	(6.47)	112.6	111.0	112.5	119.1	**117.5**
(g)	Manufacture of Non-metallic mineral products	(3.20)	110.5	109.8	112.7	115.9	**116.7**
(h)	Cotton dyed/printed Textile	(0.05)	114.9	118.0	124.0	128.7	**128.3**
(i)	Timber/wooden plank, sawn/re-sawn	(0.05)	121.5	122.6	116.2	119.9	**118.8**
(j)	Manufacture of Cement, Lime and plaster	(1.64)	109.9	110.6	113.8	114.3	**119.5**
(k)	Lube Oils	(0.29)	120.8	116.8	114.0	124.8	**131.7**
(l)	High Speed Diesel	(3.10)	73.4	74.4	84.4	97.1	**93.7**
VIII.	**Consumer Price Index (Industrial Workers) (Base 2012=100) as on Sep. 15, 2017**		265	276	284	300	**323**

Source: WPI data from Office of Economic Advisor
CPI data from Handbook of Statistics (2019-20), RBI

Planning

In the year 2019-20 the following assets were acquired and task accomplished.

	Heads		2019-20
1.	Locomotives including Trade	(Nos.)	**828**
2.	Wagons (BLC+ Private Wagons)	(")	**15,447**
3.	Coaches including	(")	**7,557**
	(i) EMUs	(")	**339**
	(ii) MEMUs	(")	**638**
	(iii) DMUs	(")	**54**
4.	Route Kms of track electrified	(Kms.)	**4,378**
5.	New lines constructed	(Kms.)	**359.71**
6.	Double/Multiple lines provided	(Kms.)	**1,458.22**
7.	Track renewals (both primary & secondary renewal)	(Kms.)	**4,500**
8.	Gauge Conversion to BG from MG/NG	(Kms.)	**408.5**

The Plan allocation (Revised Estimates) and Actual Net Expenditure for 2019-20 compared with 2018-19, were as follows:

(₹in crore)

Plan Head		2018-19		2019-20	
		Allocation (R.E.)	Actual Net Expenditure	Allocation (R.E.)	Actual Net Expenditure
CIVIL ENGINEERING					
1	New Lines (Construction)	@25,315.39	9,395.53	**@@22,974.26**	**µ12,683.17**
2	Gauge Conversion	#3,486.56	4,055.00	**##3,129.27**	**4,140.15**
3	Doubling	$17,254.19	15,168.33	**$$23,777.58**	**22,385.67**
4	Traffic Facilities- Yard Remodeling and Others	%2,522.10	1,146.70	**%%1,941.71**	**1,626.22**
5	Road Safety Works - Level Crossings	742.61	678.45	**546.44**	**570.54**
6	Road Safety Works - Road Over/ Under Bridges	&6,637.28	3,522.22	**&&4,718.88**	**3,520.92**
7	Track Renewals	8,471.63	8,241.66	**7,068.87**	**7,802.63**
8	Bridge Works	509.05	528.27	**751.83**	**777.50**
9	Staff Quarters	274.79	283.39	**516.84**	**480.92**
10	Amenities for Staff	271.20	223.24	**-**	**ØØ**
11	New Lines (const.)– Dividend free Projects	β1,150.00	1,879.87	**β β 3,300.00**	**Ø**
	TOTAL	66,634.80	45,122.66	**68,725.68**	**53,987.72**

MECHANICAL					
1	Rolling Stock	^32,079.11	28,108.17	**^^42,670.58**	**37,101.78**
2	Leased Assets–Payment of Capital Component	9,112.92	9,111.51	**10,557.53**	**10,462.21**
3	Machinery and Plant	441.86	436.34	**430.92**	**448.11**
4	Workshops including Production Units	£1,748.92	2,006.60	**££2,121.02**	**2,119.12**
	TOTAL	43,382.81	39,662.62	**55,780.05**	**50,131.22**
ELECTRICAL ENGINEERING					
1	Electrification Projects	?7,016.50	5,931.32	**? ?7,593.55**	**7,124.63**
2	Other Electrical Works including Traction Distribution Works.	*1,558.80	600.85	****603.61**	**¥481.30**
	TOTAL	8,575.30	6,532.17	**8,197.16**	**7,605.93**
SIGNAL AND TELECOMMUNICATION					
1	S and T Works	1,256.24	1,537.02	**1,374.70**	**1,620.69**
	TOTAL	1,256.24	1,537.02	**1,374.70**	**1,620.69**
OTHERS					
1	Computerization	227.97	174.37	**423.45**	**282.81**
2	Railway Research	18.76	23.68	**43.58**	**26.80**
3	User's Amenities	Ω 5,910.71	1,585.76	**ΩΩ 2,583.39**	**1,902.90**
4	Investment in PSUs/JV/SPV etc. (Govt. & Non-Govt.)	11,251.00	12,678.36	**16,634.98**	**16,924.88**
5	Other Specified Works	261.98	288.16	**708.94**	**455.73**
6	Training/HRD	89.97	56.43	**102.55**	**85.73**
7	Inventories	250.00	270.32	**200.00**	**915.50**
8	M.T.Ps.	997.98	1,163.97	**1577.50**	**1,515.18**
	TOTAL	19,008.37	16,241.05	**22,274.39**	**22,109.54**
	GRAND TOTAL	®1,38,857.52*	©1,09,095.52	**1,56,351.98**	**† 1,35,455.10**

*revised

Revised Estimates

@ Includes ₹385 crore under EBR(IF) and ₹16,930 crore under EBR(PPP). It also includes ₹2,788 crore for National Project & Projects of National importance.

@@ Includes ₹2,900.50 crore for National Project and ₹544 crore for project of National Importance. It also includes ₹599.26 crore under EBR(IF) and ₹14,506 Crore under EBR(IF).

Includes ₹1,736.60 crore under EBR (IF) and ₹310 crore for National Projects.

Includes ₹6 crore for National Projects. It also includes ₹849.10 crore under EBR (IF).

$ Includes ₹1,046 crore under EBR (Bond) and ₹15,782.31 crore under EBR (IF).

$$ Includes ₹1,407 crore under EBR(IRFC) and ₹21,746.14 crore under EBR(IF).

% Includes ₹25.81 crore under EBR (IF) and ₹1,570 crore under EBR (PPP).

%% Includes ₹618.57 crore under EBR (IF) and ₹254.82 crore under EBR(PPP).

& Includes ₹2,000 crore under EBR (PPP).

&& Includes ₹1,022.51 crore under EBR (PPP).

β Provision for Udhampur Srinagar- Baramulla National Project.

β β Provision for Udhampur Srinagar- Baramulla National Project.

^ Includes ₹2,6482.96 crore under EBR (Bond) and ₹2,000 crore under EBR (PPP).

^ ^ Includes ₹32,624 crore under EBR (IRFC) and ₹1,071 crore under EBR.

£ Includes ₹61.91 crore under EBR (IF).

££ Includes ₹24.38 crore under EBR(IF) and ₹100 crore under EBR(PPP)

? Includes ₹7,026.44 crore under EBR (IF).

? ? Includes ₹7,602.55 crore under EBR (IF).

* Includes ₹1,000 crore under EBR (PPP).

** Includes ₹120 crore under EBR (PPP).

Ω Includes ₹3,500 crore under EBR (PPP).

Ω Ω IncludeS ₹702 crore under EBR(PPP).

Actual Net Expenditure (2018-19 and 2019-20)

© Excluding actual expenditure of ₹24,281.14 crores under EBR(PPP) during 2018-19.

† Excluding actual expenditure of ₹12,609.38 crores under EBR(PPP) during 2019-20.

μ Includes ₹3,098.42 crores reported by Railways under new lines (const)- dividend free projects now merged with new lines(const.).

ØØ Staff Quarters and Amenities for Staff merged & reclassified as staff welfare.

Ø merged with Item No.1 i.e. New Line(const).

¥ Reclassified as other Electrical works including TRD

Productivity:

The following table shows the indices of growth of traffic output vis-a-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
2010-11	1,420	1,403	294	344	120	147	343
2017-18	1,571	1,715	393	413	128	160	494
2018-19	1,675	1,685	409	422	126*	162	*517
2019-20	**1,605**	**1,524**	**421**	**435**	**127**	**167**	**550**

*revised

Passenger Business

Indian Railways is commonly used mode of public transportation in the country. During 2019-20, it carried 8,086 million passengers as against 8,439 million in 2018-19. Passenger kilometres, which is calculated by multiplying the number of journeys by mean kilometric distance in case of each class was 1,051 billion as against 1,157 billion in the previous year. Passenger earnings decreased by 397.56 crore (- 0.78%) in comparison with 2018-19

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					Grand Total
		Upper class	Second Class			Total Non-suburban	
			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
2017-18	4,665	159	1,390	2,072	3,462	3,621	8,286
2018-19	4,784	179	1,499	1,977	3,476	3,655	8,439
2019-20	**4,597**	**186**	**1,452**	**1,851**	**3,303**	**3,489**	**8,086**

Also includes Sleeper Class

Table II. Passenger Kilometres

(in millions)

Year	Suburban (All classes)	Non suburban					Grand Total
		Upper class	Second Class			Total Non-suburban	
			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

2017-18	1,49,465	1,14,248	6,45,462	2,68,524	9,13,986	10,28,234	11,77,699
2018-19	1,46,678	1,26,641	6,64,503	2,19,352	8,83,855	10,10,496	11,57,174
2019-20	**1,37,130**	**1,31,696**	**6,53,336**	**1,28,576**	**7,81,912**	**9,13,608**	**10,50,738**

Also includes Sleeper Class.

Table III. Average Lead

(in millions)

Year	Suburban (All classes)	Non suburban					Grand Total
		Upper class	Second Class			Total Non-suburban	
			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
2017-18	32.0	720.4	464.4	129.6	264.0	284.0	142.1
2018-19	30.7	707.3	443.3	111.0	254.3	276.5	137.1
2018-19	**29.8**	**708.7**	**450.1**	**69.5**	**236.7**	**261.9**	**129.9**

#Also includes Sleeper Class.

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

	1960-61	1970-71	1980-81	1990-91	2000-01	2010-11	2018-19	2019-20
Non-Suburban:								
Second Class Ordinary	50.38	42.82	37.14	31.70	30.20	31.95	23.43	**22.89**
Second Class Mail/Express#	6.02	6.38	7.20	9.26	9.77	13.67	17.76	**17.96**
Upper Class	0.94	0.66	0.30	0.49	0.83	1.30	2.12	**2.30**
Total	57.34	49.86	44.64	41.45	40.80	46.92	43.31	**43.15**
Suburban(all classes)	42.66	50.14	55.36	58.55	59.20	53.08	56.69	**56.85**
Grand Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

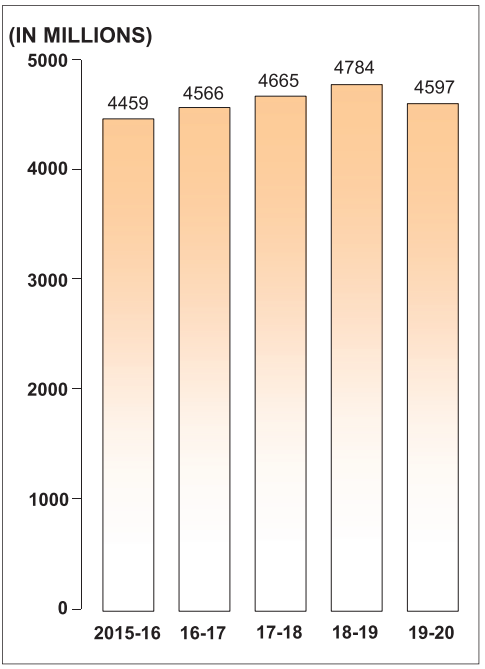
#Also includes Sleeper Class.

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

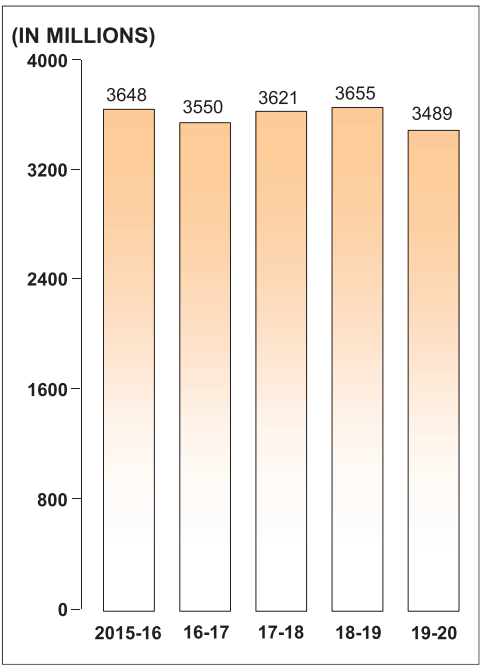
	1960-61	1970-71	1980-81	1990-91	2000-01	2010-11	2018-19	2019-20
Non-Suburban:								
Second Class Ordinary	51.75	44.77	36.26	30.20	26.10	28.47	18.96	**12.24**
Second Class Mail/Express#	28.65	32.05	41.58	46.70	48.70	51.16	57.42	**62.18**
Upper Class	4.45	3.72	2.46	2.95	5.75	6.36	10.94	**12.53**
Total	84.85	80.54	80.30	79.85	80.55	85.99	87.32	**86.95**
Suburban(all classes)	15.15	19.46	19.70	20.15	19.45	14.01	12.68	**13.05**
Grand Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Also includes Sleeper Class.

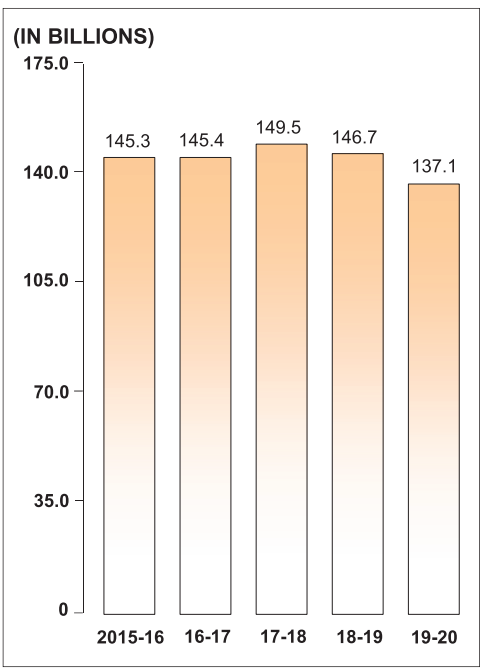
PASSENGERS ORIGINATING
SUBURBAN



PASSENGERS ORIGINATING
NON-SUBURBAN



PASSENGER KILOMETRES
SUBURBAN



PASSENGER KILOMETRES
NON-SUBURBAN

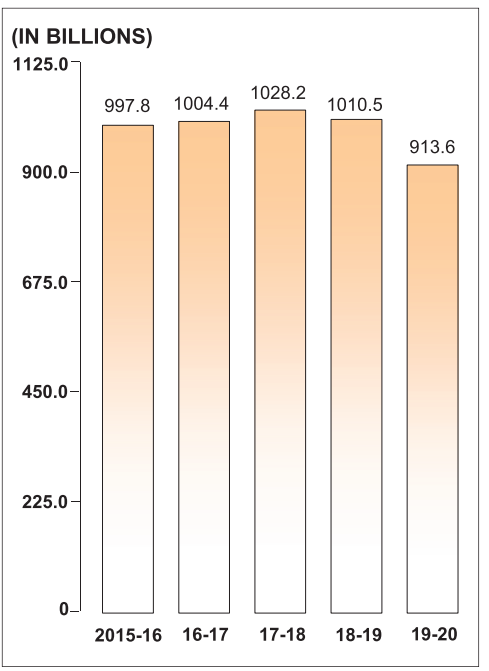


Table VI. Number of passenger trains run daily

Type of trains	Broad Gauge		Metre Gauge		Total (incl.NG)	
	2018-19	**2019-20**	2018-19	**2019-20**	2018-19	**2019-20**
EMU	5,875	**5,396**	-	**0**	5,881	**5,396**
Mail/Express	3,695	**4,048**	-	**8**	3,695	**4,058**
Ordinary Passenger Trains and Mixed Trains	3,779	**3,624**	64	**37**	3,947	**3,715**
Total	**13,349**	**13,068**	**64**	**45**	**13,523**	**13,169**

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

Type of trains	Broad Gauge	
	2018-19	**2019-20**
EMU	37.5	**37.9**
Mail/Express	*50.2	**50.6**
Ordinary Passenger Trains (incl. mixed)	33.5	**33.5**

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

Passenger Revenue :

Passenger earnings in 2019-20 were ₹50,669.09 crore. This was ₹397.56 crore (-0.78%) lower than the earnings in 2018-19. Suburban traffic contributed 5.61% to the total earnings. The remaining 94.39% came from non-suburban passengers. Earnings from Second and Sleeper Class Mail/Express passengers comprised 50.69% of the total passenger earnings.

Passenger revenue in terms of earnings per passenger kilometre for different classes during 2018-19 and 2019-20 was as under:

		(in paise)
Segment	2018-19	**2019-20**
Non-suburban:		
Upper class	139.78	**140.97**
Second Class-Mail/Express (incl. sleeper class)	38.95	**40.11**
Second Class-Ordinary	21.27	**23.78**
Non-suburban (all classes)	47.75	**52.35**
Suburban(all classes)	19.18	**20.73**
Overall average	44.13	**48.22**

Passenger revenue in different classes with corresponding number of passengers and Passenger Kms. in 2019-20 is given below:

Segment	No. of passengers		Passenger kms.		Revenue	
	Million	Percentage	Million	Percentage	₹ in cr.	Percentage
Non-suburban:						
Upper Class	186	2.30	1,31,696	12.53	18,564.80	36.44
Second Class Mail/ Express#	1,452	17.96	6,53,336	62.18	26,204.19	51.72
Second Class Ordinary	1,851	22.89	1,28,576	12.24	3,057.01	6.03
Total	3,489	43.15	9,13,608	86.95	47,826.00	94.39
Suburban (all classes)	4,579	56.85	1,37,130	13.05	2,843.09	5.61
Grand Total	**8,086**	**100.00**	**10,50,738**	**100.00**	**50,669.09**	**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
2017-18	87.74	2,053	680	24,140	47.0	20.8
2018-19	90.10	2,098	688	24,364	48.0	20.8*
2019-20	**88.70**	**2,102**	**679**	**24,283**	**47.1**	**18.7**

*revised

@Includes Mainline EMUs, DEMUs, DHMUs and suburban services other than EMU but excluding Rail Cars/Bus and Departmental.

+ Excludes Departmental but includes Rail Cars/Bus, MEMU, DEMU and DHMU services.

Passenger Service Improvements:

During the year 2019-20, Indian Railways introduced new trains, extended the runs and increased the frequency of existing trains, as given below:

	Trains introduced	Runs extended	Frequency increased	Total
Non-suburban	109 trains	118 trains	40 trains	265
Suburban	44 trains	30 trains	-	86
Total	**153**	**148**	**40**	**351**

Ticketless Travel:

During 2019-20, 20.43 lakh checks were conducted against ticketless/ irregular travel (including carriage of unbooked luggage). About 350.13 lakh cases of ticketless/irregular travel/unbooked luggage were detected and ₹1,497.94 crore were realized on this account.

Passenger Amenities:

The allocation under the Plan Head "Passenger Amenities" in 2019-20 was ₹3,422.57 crore (Budget Estimate) and ₹4,881.40 crore (Revised Estimate).

1,253 stations have so far been identified for development under the Adarsh Station Scheme, out of which 1,196 stations have already been developed.

During the Year 2019-20, 180 stations were provided with water coolers, 41 stations were electrified and 83 passenger lifts and 80 escalators were provided at stations.

Passenger Reservation System (PRS):

New Generation e-Ticketing System (NGeT):

In order to improve user experience while booking Reserved Rail Tickets online on www.irctc.co.in., a new system (NGeT) with enhanced capacity and new features has been launched. The system has the capacity to book about 25000 tickets per minute. E-ticketing website for reserved tickets now handles about 72% 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 are also available for booking reserved tickets. Booking of e-tickets through International Credit/Debit Cards has also been enabled.

A new User Interface e-ticketing system has also been launched with

user friendly features for easier navigation. This new online ticket booking system provides easy and fast way of booking rail tickets by automating the journey planning and purchase of tickets.

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.

Paperless Unreserved Ticketing through Mobile Phones:

Paperless Unreserved Ticketing App on mobile phones was launched at Mumbai suburban and has since been proliferated over all zonal railways covering all the stations. This has eliminated the need for passengers to stand in queue for getting unreserved tickets. The ticket is delivered on the Mobile Phone (App) and is embedded with QR Code and other security features to avoid duplicacy, Passengers can book Journey, season and platform tickets using this app. This service has added to passenger convenience.

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

Currency Coin-cum Card Operated ATVMs was launched at New Delhi. About 460 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 3000 Smart Card based ATVMs have also been commissioned.

Parcel Management System (PMS):

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

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. National Railway Users' Consultative Council (NRUCC) , 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 Railways Users' Consultative Committees and Station Consultative Committees at important stations provide useful inputs to Railway Administration.

NRUCC has been reconstituted for a two year term from 01.02.2019 to 31.01.2021. DRUCCs have been reconstituted for a two year term from 01.10.2020 to 31.12.2021 and ZRUCCs have been reconstituted for a two year term from 01-09-2018 to 31-08-2020.

I. Induction of Smart Coaches:

In view of the latest development in rolling stock technology, its maintenance and increased level of passengers comfort. Indian Railways has introduced 24 smart coaches with ultramodern features like Smart Public address and passenger information system, Smart HVAC (Heating, Ventilation and Air Conditioning system), Smart security and surveillance system etc. in train service. In 2019-20, 22 Smart coaches were introduced.

II. Induction of semi-high speed Train-sets:

Semi High Speed Self Propelled Train-set was manufactured by Integral Coach Factory/Chennai with indigenous efforts, termed Train-18/ Vande Bharat Express. Vande Bharat Express State-of-the-art Train-set Vande Bharat services have been introduced between New Delhi -Varanasi and New Delhi- Shri Mata Vaishno Devi Katra in 2019-20. These trains have ultra modem features like quick acceleration, Substantial reduction in travel time, having maximum speed of 160 kmph, on board infotainment and GPS based passenger information system, automatic sliding doors, retractable footsteps and Zero discharge vacuum bio toilets etc. The Train-18 has contemporary features as per global standards.

1st train started from 17th February, 2019 between Delhi-Varanasi 2nd train started on 5th October, 2019 between New Delhi - Shri Mata Vaishno Devi Katra.

III. Increasing production of LHB coaches

Ministry of Railways has decided for large scale proliferation of LHB coaches which are technologically superior with features like Anti climbing arrangement, Air suspension (Secondary) with failure indication system and less corrosive shell. These coaches have better riding and aesthetics as compared to the conventional ICF coaches. The Production units of Indian Railways are now producing only LHB coaches from April 2018 onwards. The production of LHB coaches are continually increased during the years: 1,469 LHB coaches in 2016-17, 2,480 LHB coaches in 2017-18 and 4,429 LHB coaches in 2018-19, and 6,277 LHB coaches in 2019-20.

IV. Focus on amenities for unreserved passengers

(a) Antyodaya Train Service:

These are long distance fully unreserved train comprising of LHB general second class coaches with vestibules. These have additional facilities like cushioned luggage racks, additional hand hold in doorway area for the comfort of standing passengers, provision of J hooks near longitudinal luggage racks for hanging carry bags, enhanced number of mobile charging points, Fire extinguishers with anti-theft arrangement, more pleasing colour scheme for interior and exteriors, provision of MU cable in each coach for running train service with loco at both ends. At present 16 Antyodaya trains are running in service. 04 Antodaya trains have been introduced in 2019-20 by conversion of Jan Sadharan Express.

(b) Deen Dayalu coaches :

General second class coaches for unreserved passengers with additional facilities like Cushioned luggage racks, Additional hand hold in doorway area, provision of J hooks for hanging carry bags, Bio-toilets, Enhanced mobile charging facility, Water level indicator, Pleasing Interiors, Improved exterior colour scheme and polymerized floor coating in toilets. So far, around 2,200 Deen Dayalu coaches turned out by Production Units during 2016-17 to 2018-19 and are in service. Of these 880 Deen Dayalu coaches turned out 2019-20.

V. Focus on improving amenities for reserved passengers

(a) Humsafar Trains:

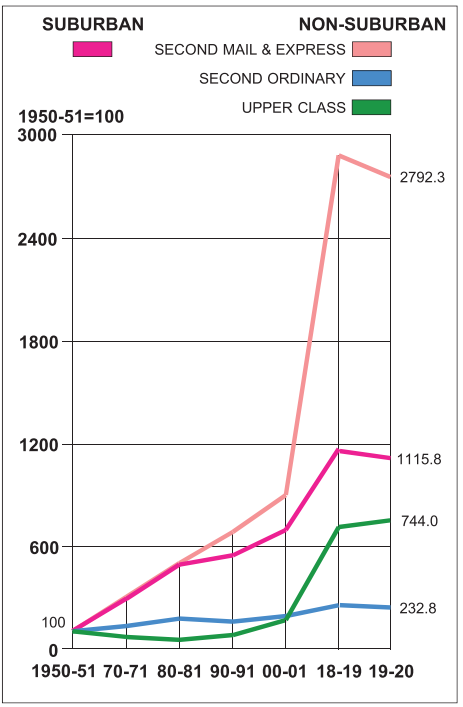
Humsafar trains having additional amenities in the coaches have been introduced for providing comfortable Air-Conditioned III Tier travel. Following major features have been introduced:-

GPS based Passenger information system, Passenger announcement system, Dust bins in each bay, 4 lane coffee vending machine, improved aesthetics and pleasing colour scheme, passenger announcement System, Closed-Circuit Television (CCTV) based surveillance system, Integrated Braille displays etc. 38 Humsafar trains have been introduced in service till date, including 04 trains in 2019-20.

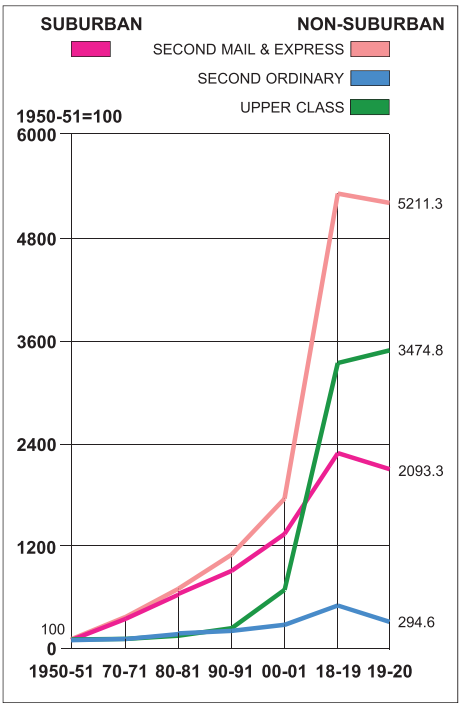
(b) Tejas Trains :

Indian Railways has introduced Ultra modem TEJAS trains with speed potential of 200 KMPH have been introduced. At present, 4 Tejas trains have been introduced in service over Indian Railways out of which 02 were introduced in 2019-20.

INDEX OF GROWTH OF ORIGINATING PASSENGERS



INDEX OF GROWTH OF PASSENGER KILOMETRES



These ultra modern trains have following major distinguished features: Automatic entrance doors, Infotainment system (LCD Screens), Passengers Information display system (Electronic Reservation chart System), GPS based Passenger information system, Fire and Smoke detection system, Superior toilet fittings, Sealed vestibules, LED lights, CCTV, Aesthetically pleasing colour scheme etc

(c) Uday Trains:

Utkrisht Double Decker Air-conditioned Yatri (UDAY) trains have been conceptualized as double-decker rakes with improved amenities such as, a dedicated vending machine with dining facilities in each of the four coaches in the rake, Decorative vinyl wrapping on both exterior and interior of the coach, Water borne solar reflective coating on the roof and PU painting on the end walls, High quality and high aesthetic passenger friendly fittings in the toilets, Defused LED lighting, Powder coated seat frames and snack tables, Aesthetically designed seat covers, All luggage racks are spray painted for aesthetic look, All foot steps are buffed and powder coated, Vynatile floor provided with clear coat, All stainless steel items like passage door, vestibule door, moldings etc., are buffed, PIS and infotainment system with Wifi, 7 dedicated LCD screens provided in coach and Dining table and chairs in middle deck etc.

One Uday rake was introduced in service between Bangalore City - Coimbatore (Train No.22665/56) in year 2019-20. 2nd rake was introduced in service in year 2019-20.

(d) Vistadome Coaches:

Vistadome coaches with enhanced viewing area including on roof to enable tourists to enjoy panoramic view while travelling. The feature has been well received especially in Railways having scenic beauty and heritage Hill railways. "Him Darshan Express" was introduced on 25.12.2019 with 6 Vistadome coaches and 01 First AC coach between Kalka- Shimla route of Northern Railways. Presently, 24 Vistadome coaches are available over various sections of Indian Railways.

(e) 1st Shatabdi with Bio-Vacuum Toilets:

1st in service Train No. 12005 KLK-NDLS Kalka Shatabdi between New Delhi Kalka section fitted with Bio-Vacuum toilets on 27.01.2020.

VI. Focus on improving safety in new manufactured coaches

Instructions have been issued for provision of following items in coaches during manufacturing at Production Units to improve the safety features of these coaches:

(1) Fire detection and suppression system in all newly manufactured Power Cars and Pantry Cars.

(2) Fire and Smoke detection system in all newly manufactured AC coaches.

(3) Double Acting AC compartment doors in all newly manufactured AC coaches.

(4) Fire extinguishers in all newly manufactured coaches.

(5) Automatic plug type doors in all newly manufactured Humsafar and Uday train coaches.

VII. Improving interiors of Coaches

(a) Project Swarn

Project Swarn was started to upgrade the condition of Rajdhani and Shatabdi Express Trains, with the objective of significantly improving the passenger experience across the nine dimensions which include coach interiors, toilets, onboard cleanliness, staff behavior, catering, linen, punctuality, security, on-board entertainment. Real time feedback is also a part of Project Swarn. Under this scheme, 65 rakes of Rajdhani and Shatabdi have been upgraded. Of these, 10 rakes have been upgraded in 2019-20.

(b) Upgradation of rakes of Mail/Express train (Project Utkrisht)

Project Utkrisht IR has also launched Project Utkrisht in order to improve the condition of ICF type coaches running in Mail / Express trains. Up gradation of 640 rakes of Mail / Express trains has been taken up under Project Utkrisht for improvement in patronized train services. Work in 385 rakes has already been completed under Project Utkrisht. Out of these, 289 rakes were upgraded in 2019-20.

VIII. Other facilities to improve train facilities

(a) Quick Watering Facilities

For effective enroute watering of train within 10 minutes, 44 stations have been provided with Quick Watering Facilities. Out of these, 29 stations have been provided with Quick Watering Facilities in 2019-20.

(b) Automatic Coach Washing Plants

For better and quick exterior washing of trains, Automatic Coach Washing Plants have been provided at 18 locations. Out of these, Automatic Coach Washing Plants have been provided in 10 locations in 2019-20.

(c) Proliferation of Bio- Toilets

As a part of "Swachh Bharat Mission", Indian Railway is proliferating bio-toilets on all its coaching stock so that no human waste is discharged from coaches on to the track. IR has fitted 2,42,821 Bio Toilets in 68,658 Nos, of coaches. Of these, 14,734 has been fitted in 2019-20.

Installation of IR-DRDO Bio-Toilets in Year	No. of coaches
2010-11 to 2013-14	3,647
2014-15	3,374
2015-16	3,961
2016-17	8,788
2017-18	15,017
2018-19	19,137
2019-20	14,734
Total	**68,658**

Cleanliness and Hygiene

Cleanliness at Stations :

- Provision of integrated Mechanized cleaning contracts with improved processes, machinery and updated management systems at 953 stations. Award of rag picking/garbage disposal contracts at 1310 stations.
- Provision of washable concrete aprons at stations.
- Zonal Railways have been authorized regarding operation and maintenance, including cleanliness of toilets through contracts on 'Pay and Use' basis at various categories of stations. More than 848 stations have Normal Pay and Use toilets and about 77 stations have Deluxe Pay and Use toilets.
- Installation of dustbins at stations to facilitate the passengers to throw garbage has been a thrust area of Swachh Bharat Abhiyan. Separate dustbins for biodegradable and non-biodegradable waste are also being provided at major stations.
- About 700 stations are using CCTV cameras for monitoring cleanliness.
- To avoid the dropping of night soils on the PF lines, bio-toilets installed in all passenger coaches under Swachh Bharat Abhiyan.
- Comprehensive pest and rodent control treatment for controlling the menace of bugs and rodents is being carried out.
- 503 Plastic bottle crushing machines installed at 370 stations.
- Independent third party survey of passenger perception on cleanliness standards of 407 major railway stations carried out first time in 2016 and repeated in 2017 and 2018. In 2019, this survey was carried out at 720 stations.

Cleanliness on Trains :

- Mechanized Cleaning of Coaches at both ends is being carried out through professional agencies in around 155 coaching depots. Machines like high pressure jet cleaners, floor scrubbers, wet and dry vacuum cleaners, hand held buffing machines etc. are deployed for the purpose.
- On Board Housekeeping Service (OBHS) has been provided in more than 1100 pairs of important long distance Mail/Express trains for cleaning of coach toilets, doorways, aisles and passenger compartments during the run of the trains.

- 'Clean My Coach' service is now being upgraded to 'Coach Mitra' facility in about 1060 pairs of OBHS trains for any cleaning requirement in the coach through SMS. Clean Train Station (CTS) scheme has been prescribed for limited mechanized cleaning at 39 stations.
- Provision of dustbins is being done in AC and non AC coaches.
- 68 Mechanized laundry for clean supply of linen in AC coaches.
- Standard bid document (SBD) and General Condition of Contract for Services (GCCS) have been issued with enabling provision to improve handling and effectiveness of cleaning contracts.
- Third party audit-cum-survey on cleanliness of 209 important trains covering 485 rakes completed first time in 2018 including survey by independent auditors travelling on all rakes in both directions and passenger feedback. Next 3rd party audit on cleanliness of 327 trains having 710 rakes has been planned.
- Considering the efforts of Railways, Ministry of Railways has been adjudged as the best by a Ministry for implementation of 'Swachhta Action Plan" and was awarded by Hon'ble President of India on 6th Sept, 2019.

Some Green Initiatives

Assessment and rating of IR's major Workshops and Production Units as Green Industrial Units started with 'GreenCo' Certification of 2 Workshops and 1 Production Unit in 2016-17. 39 Workshops, 7 Production Units, 6 Diesel Sheds and 1 Stores Depot have been 'GreenCo' certified. 24 of these 53 units were certified in 2018-19 and 08 more in the year 2019-20.

16 Railway Stations have achieved Green Certification, 7 out of these achieved Green Certification in 2018-19 and 5 more in 2019-20. 21 more Railway Buildings, Offices, Campuses and other establishments are also Green Certified including 4 Railway Schools, 2 Supervisor Training Centres (STCs) and 2 Railway Hospitals.

More than 235 Railway Stations have been certified for implementation of Environment Management System to ISO:14001 in the year 2019-20.

Catering Services:

Indian Railways provide catering services to the travelling passengers through Pantry Cars (in 419 pairs of trains), Train Side Vending (TSV) on 946 trains, E- catering available on 358 stations with an average of 22,203 meals per day and Static Units at Stations. Static Catering Units include 674

Major Static Units (Food Plaza,Fast Food Units, Jan Ahaar, Cell Kitchens, Base Kitchens, Refreshment Rooms and Automatic Vending Machines) and 8824 Minor Static Units (all stalls, trollys) on Indian Railways. In addition, there are 1804 Water Vending Machine, 682 Multi Purpose Stalls, 896 Bookstalls, 71 Miscellaneous/Curio Stalls, 04 exclusive Chemist Stalls and 02 Bookstalls cum Chemist Corners operational at stations to ensure availability of items of travelling needs of passengers.

In its endeavour to bring noticeable improvement in catering services on Indian Railways. A number of new initiatives have been taken during 2019-20 which include the following:

- 07 Base Kitchen Units have been upgraded during 2019-20 entailing civil works, electrical works and requisite kitchen equipments, reaching a total of 53 upgraded Kitchens.
- CCTV Cameras have been installed in 28 Base Kitchens/Kitchen Units to monitor Kitchen activities on real-time basis with streaming available on the IRCTC website as well as Rail Drishti.
- All food boxes served in mobile (post-paid) and static units to bear QR code or stickers giving details like MRP, name of contractor, weight, date of packing and symbol of veg/non-veg food item. QR Code has been installed in 29 Base Kitchens/ Kitchin Units.
- To generate printed bill and invoice reflecting all details of transactions under taken at catering units, hand held POS machines are being provided. Currently, 5,121 POS machines are in operation on 419 pairs of trains. In addition, 3,011 POS machines are operational on 2,836 Static Units.
- Awareness Campaigns for passengers like "No Bill-The food is for FREE". No Tips' stitched/displayed on uniforms etc. have been launched. 12,256 nos. of metallic plates displaying these campaigns have been installed in 360 Mail/Express trains.

Freight Operation

Revenue earning freight traffic handled during 2019-20 was 1,208.41 million tonnes. NTKMs earned during the year were 708 billion. Total loading and freight output inclusive of non-revenue traffic were 1,212.22 million tonnes and 708 billion NTKMs respectively. Commodity wise loading of revenue earning traffic was as follows:

	Tonnes carried* (Millions)		Absolute Variation over last year	Percentage to total
	2018-19	2019-20		
Coal				
i) for steel plants	59.05	**57.07**	-1.98	4.72
ii) for washeries	0.09	**0.13**	0.04	0.01
iii) for thermal power houses	257.76	**252.92**	-4.84	20.93
iv) for other public users	288.94	**276.75**	-12.19	22.90
Total	605.84	**586.87**	-18.97	48.56
Raw material for steel plants except iron ore	25.77	**25.57**	-0.20	2.12
Pig iron and finished steel				
i) from steel plants	31.82	**31.43**	-0.39	2.60
ii) from other points	22.17	**21.7**	-0.47	1.80
Total	53.99	**53.13**	-0.86	4.40
Iron ore				
i) for export	5.62	**17.47**	11.85	1.44
ii) for steel plants	89.02	**85.55**	-3.47	7.08
iii) for other domestic users	42.70	**50.35**	7.65	4.17
Total	137.34	**153.37**	16.03	12.69
Cement	117.34	**110.10**	-7.24	9.11
Foodgrains	39.31	**37.53**	-1.78	3.10
Fertilizers	51.83	**51.39**	-0.44	4.25
Mineral Oil (POL)	43.01	**44.68**	1.67	3.70
Container service				
i) Domestic containers	11.91	**11.31**	-0.60	0.94
ii) EXIM containers	48.26	**49.77**	1.51	4.12
Total	60.17	**61.08**	0.91	5.06
Balance other goods	86.88	**84.69**	-2.19	7.01
Total	1,221.48	**1,208.41**	-13.07	100.00

*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	73.20	100.00	37,565	100.00	513	100.00
1960-61	119.80	163.70	72,333	192.60	603	117.60
1970-71	167.90	229.40	110,696	294.70	659	128.50
1980-81	195.90	267.60	147,652	393.10	754	147.00
1990-91	318.40	435.00	235,785	627.70	741	144.40
2000-01	473.50	646.90	312,371	831.50	660	128.70
2010-11	921.73	1,259.20	625,723	1,665.71	679	132.4
2017-18	1,159.55	1,584.08	6,92,916	1,844.58	598	116.57
2018-19	1,221.48	1,668.69	7,38,523	1,965.99	605	117.93
2019-20	**1,208.41**	**1,650.83**	**7,07,665**	**1,883.84**	**586**	**114.23**

II. Movement of bulk commodities in the last four years

S. No.	Commodity group	2016-17		2017-18		2018-19		2019-20	
		Million Tonnes	Percent-age	Million Tonnes	Percent-age	Million Tonnes	Percent-age	Million Tonnes	Percent-age
1	Coal	532.83	48.17	555.20	47.88	605.84	49.60	586.87	48.56
2	Foodgrains	44.86	4.06	43.79	3.78	39.31	3.22	37.53	3.10
3	Iron & Steel	52.41	4.74	54.36	4.69	53.99	4.42	53.13	4.40
4	Iron ore	137.55	12.43	139.80	12.06	137.34	11.24	153.37	12.69
5	Cement	103.29	9.34	112.96	9.74	117.34	9.61	110.10	9.11
6	POL (Mineral oils)	42.42	3.83	43.11	3.72	43.01	3.52	44.68	3.70
7	Fertilizers (Chemical manures)	48.34	4.37	48.53	4.18	51.83	4.24	51.39	4.25
8	Limestone and Dolomite	2.31	27.70	2.39	30.35	2.48	30.63	2.54	2.48
9	Stones (including gypsum) other than marble	14.78	1.34	19.57	1.68	21.58	1.77	18.24	1.51
10	Salt	4.97	0.45	4.95	0.43	4.86	0.40	4.30	0.36
11	Sugar	2.35	0.21	2.47	0.21	3.02	0.25	2.89	0.24
	Total	**1009.33**	**91.25**	**1052.44**	**90.76**	**1108.47**	**90.75**	**1093.13**	**90.46**
12	Commodities other than above	96.82	8.75	107.11	9.24	113.01	9.25	115.28	9.54
	Grand Total	**1106.15**	**100.00**	**1159.55**	**100.00**	**1221.48**	**100.00**	**1208.41**	**100.00**

III. Freight Train Kilometers 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
2017-18	396	11.5	18,457	64.3
2018-19	415	11.8	19,364	64.9
2019-20	**397**	**11.0**	**18,846**	**62.5**

IV. Tonnes Originating, Net Tonne Kms. and Earnings from bulk commodities in 2019-20

S. No.	Commodity group	Tonnes originating		Net tonne kilometres		Earnings	
		In million	%age to total	In million	%age to total	₹ In crore	%age to total
1	Coal	586.87	48.56	293051	41.41	54426.68	48.82
2	Foodgrains	37.53	3.10	52641	7.44	6153.66	5.52
3	Iron & steel	53.13	4.40	45029	6.36	7286.65	6.54
4	Iron ore	153.37	12.69	50320	7.11	10965.90	9.84
5	Cement	110.10	9.11	63933	9.04	8744.82	7.84
6	POL (Mineral oils)	44.68	3.70	30774	4.35	5928.06	5.32
7	Fertilizers (Chemical manures)	51.39	4.25	47162	6.66	5807.65	5.21
8	Limestone & dolomite	30.63	2.54	16537	2.34	2559.41	2.30
9	Stones (incl. gypsum) other than marble	18.24	1.51	8920	1.26	1333.29	1.20
10	Salt	4.30	0.36	7787	1.10	649.69	0.58
11	Sugar	2.89	0.24	4689	0.66	466.86	0.42
	Total	**1093.13**	**90.46**	**620843**	**87.73**	**104322.67**	**93.59**
12	Commodities other than above	115.28	9.54	86822	12.27	7149.63	6.41
	Grand Total	**1208.41**	**100.00**	**707665**	**100.00**	**111472.30**	**100.00**

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

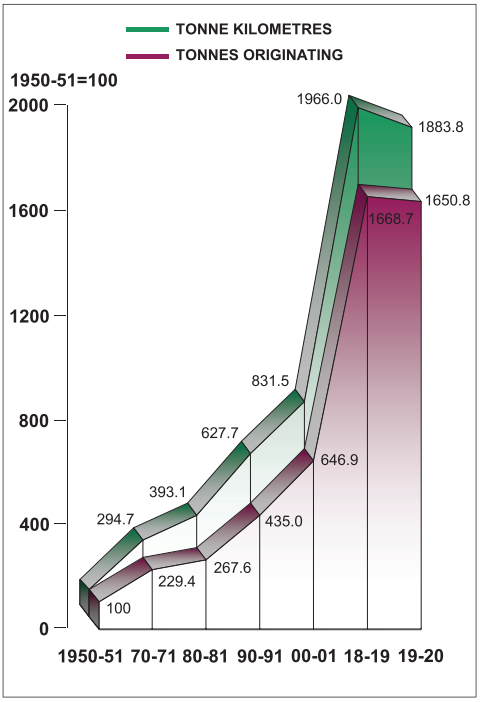
			2016-17	2017-18	2018-19	2019-20
Net tonne kilometres per wagon per day@		BG	7,359	7,405	7,747	**7,057**
Wagon kilometers per wagon per day@		BG	204.20	206.5	203.9	**188.7**
Net tonne kilometres per engine hour	Diesel	BG	14,184	14,426	13,001*	**11,241**
	Electric	BG	17,761	19,227	18,802*	**16,548**
Net tonne kilometres per engine day on line	Diesel	BG	2,36,241	2,45,908	2,89,419	**2,40,027**
	Electric	BG	3,28,105	3,58,454	3,89,070	**2,93,461**

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

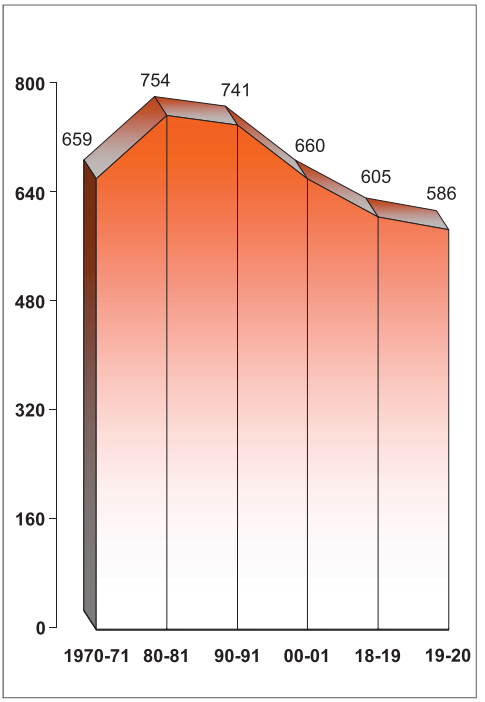
VI. Share of Tonnage, Earnings and Net tonne kms. of 30 selected commodities in 2019-20

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	586868	48.57	54426.68	48.83	293051	41.41
2	Iron Ore	153373	12.69	10965.90	9.84	50320	7.11
3	Cement	110100	9.11	8744.82	7.84	63933	9.03
4	Iron & Steel	53132	4.40	7286.65	6.54	45029	6.36
5	Chemical Manures	51385	4.25	5807.66	5.21	47162	6.66
6	Total Exim Container	49772	4.12	1955.26	1.75	42183	5.96
7	Mineral Oils	44680	3.70	5928.06	5.32	30774	4.35
8	Food Grains	37530	3.11	6153.66	5.52	52641	7.44
9	Limestone & Dolomite	30625	2.53	2559.41	2.30	16537	2.34
10	RMC Carried In General Service Wagons	22769	1.88	1221.34	1.10	5152	0.73
11	Stone Other Than Marble and Gypsum	13483	1.12	820.03	0.74	5078	0.72
12	Total Domestic Container	11309	0.94	598.70	0.54	14503	2.05
13	Ores Other Than Manganese and Iron	8291	0.69	497.35	0.45	2385	0.34
14	Non-Ferrous Metal	6822	0.56	791.48	0.71	4015	0.57
15	Gypsum	4755	0.39	513.26	0.46	3843	0.54
16	Salt	4303	0.36	649.69	0.58	7787	1.10
17	Jute Manufactured	3341	0.28	314.41	0.28	2424	0.34

INDEX OF GROWTH OF FREIGHT
(REVENUE TRAFFIC)

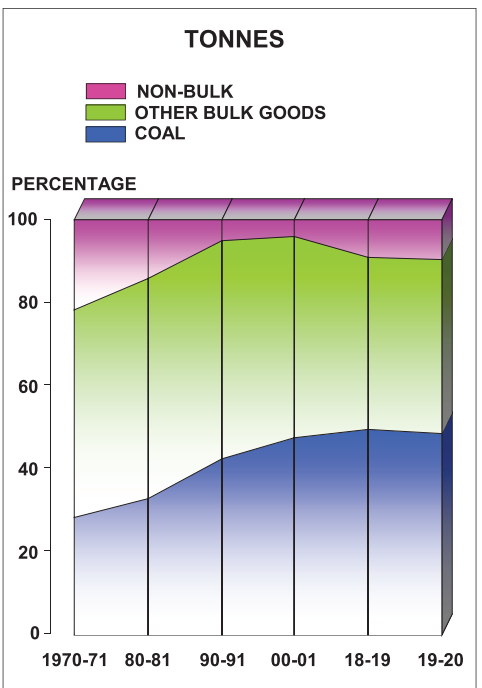


AVERAGE LEAD OF FREIGHT (KMS.)
(REVENUE TRAFFIC)

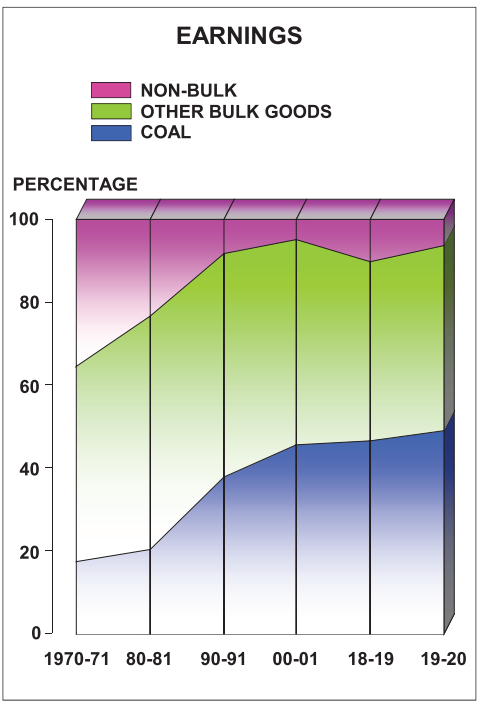


SHARE OF BULK COMMODITIES IN FREIGHT TRAFFIC

TONNES



EARNINGS



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
18	Sugar	2888	0.24	466.86	0.42	4689	0.66
19	Lime	2346	0.19	415.81	0.37	3206	0.45
20	Provisions	1867	0.15	231.88	0.21	2009	0.28
21	Edible Oils	1272	0.11	144.78	0.13	1581	0.22
22	Manganese Ores	985	0.08	96.82	0.09	610	0.09
23	Caustic Soda	914	0.08	71.55	0.06	506	0.07
24	Tobacco Country Unmanufactured	839	0.07	145.13	0.13	1324	0.19
25	Cement Manufactured	588	0.05	49.82	0.04	378	0.05
26	Sand	405	0.03	62.28	0.06	543	0.08
27	Fruits & Vegetable Fresh	330	0.03	34.87	0.03	537	0.08
28	China Clay	264	0.02	32.52	0.03	264	0.04
29	Soda Ash	199	0.02	43.29	0.04	350	0.05
30	Wood Unwrought (Other Than Firewood)	187	0.02	11.26	0.01	138	0.02

Freight Structure:

There was no increase in freight in 2019-20. However, various initiatives were taken during this period which includes Round-trip based charging of ultra short lead (0-50Km) Container traffic, Large scale de-notification of commodities from notified commodities i.e. lower rates available for transportation of these commodities when transported on container, withdrawal of Busy Season Charge, withdrawal of supplementary charge for Mini Rake/Two point booking, Distance relaxation for Mini rake operation has been increased to 1500 km and for two point combinations upto 500km, reduction in levy of Terminal Access charge etc.

Freight Marketing:

Development of Private Freight Terminals (PFT) through private investment:

Private Freight Terminal (PFT) policy - Private Freight Terminal (PFT) facilitates rapid development of a network of freight terminals with private investment. The focus of the policy is to provide efficient and cost effective logistics services with warehousing solution to end users. So far, proposals for development of 117 PFTs have been received, out of which 67 PFTs

have already been notified/commissioned and operationalized.

During the year 2019-20, 5 PFTs have been commissioned

Procurement of rakes for freight traffic by inviting private investment

i. General Purpose Wagon Investment Scheme (GPWIS)

The scheme allows investment by End users, Public Sector Undertaking (PSUs), Port Owners, Logistics Providers and Mine Owners in General Purpose Wagons. The scheme permits eligible parties to invest in minimum of one rake of general purpose wagons for movement in any of the approved circuit(s) to carry any commodity.

During the year 2019-20, approval has been accorded for 103 rakes, out of which 25 rakes have been inducted and are in operation.

ii. Liberalized Wagon Investment Scheme (LWIS):

The scheme allows investment by End Users (viz. producers, manufacturers and consumers of goods) in Special Purpose Wagons (SPW) and High Capacity Wagons (HCW). So far approval has been accorded for procurement of 133 rakes, out of which 54 rakes have been inducted.

During the year 2019-20, approval has been given for 49 rakes and 03 rakes have been inducted.

iii. Special Freight Train Operator (SFTO):

The scheme allows investment in procurement of Special Purpose Wagons (SPW) and High Capacity Wagons (HCW) for transportation of non-traditional commodities like Molasses, Fly ash, Edible oil, Caustic Soda, Chemical, Petrochemicals, Alumina & Bulk Cement etc. So far approval has been accorded for procurement of 37 rakes, out of which 16 rakes have been inducted.

During the year 2019-20, approval has been given for 09 rakes and 04 rakes have been inducted

iv. Automobiles Freight Train Operator Scheme (AFTO):

The scheme permits procurement and operation of Special Purpose rakes by private parties in transportation of automobile sector. So far approval has been accorded for procurement of 59 rakes, out of which 27 rakes have been inducted.

During the year 2019-20, 08 rakes have been inducted.

v. Liberalized Special Freight Train Operator Scheme (LSFTO) :

A liberalized Special Freight Train Operator Scheme has been launched on 16.3.2020, which incorporates positive features of both LWIS and SFTO Policies. The liberalized scheme allows investment in procurement of Special Purpose Wagons (SPW) and High Capacity Wagons (HCW) for transportation of non-traditional commodities like Molasses, Fly ash, Edible oil, Caustic Soda, Chemical, Petrochemicals, Alumina & Bulk Cement etc. Investment under the LSFTO Policy can be done by End Users (viz. producers, manufacturers and consumers of goods), Transport & Logistic company, Port & Land Terminal Operators, Warehousing Companies, Container Train Operators and Wagon Leasing Companies.

vi. Wagon Leasing Scheme (WLS):

This Scheme introduced the concept of leasing of railway wagons on IR. The scheme aims at induction of rakes through PPP route with the private sector for High Capacity Wagons, Special Purpose Wagons and wagons for container movement. Wagon Leasing Companies can lease wagons under AFTO, GPWIS, SFTO, LWIS, LSFTO schemes and also to Container Train Operators.

Claims:

IR paid ₹19.13 crores as claim compensation for goods/parcel/luggage during the Financial Year 2019-20 as compared to ₹46.38 crores paid in the corresponding period of the last year. The trend of claims settlement in the preceding five periods is given below:-

Year	Number of Claims received	Number of Claims paid	Gross amount of compensation paid (₹ in crores)
2015-16	12,607	1,469	11.57
2016-17	8,533	1,747	43.45
2017-18	7,251	1,062	29.35
2018-19	*5,799	*873	46.38
2019-20	**5,640**	**1,196**	**19.13**

*revised

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	-
2017-18	-	368	393	-	-	-
2018-19	-	351	387	-	-	-
2019-20	**-**	**380**	**336**	**-**	**-**	**-**

(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	-
2017-18	-	594	718	30	232	-
2018-19	-	582	678	33	285	-
2019-20	**-**	**559**	**593**	**30**	**144**	**-**

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.

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
2017-18	4,062	383
2018-19	3,863	401
2019-20	**3,699**	**316**

*revised

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
2017-18	10.92	-	18.46	1.50	31.61	0.32
2018-19	*11.74	-	*18.34	*1.12	*33.59	0.20
2019-20	**11.07**	**-**	**16.42**	**0.20**	**32.05**	**21.4**

*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
2017-18	7.74	-	13.09	1.39	22.43	0.30
2018-19	*8.08	-	*12.62	1.09	*23.12	0.20
2019-20	**7.44**	**-**	**11.03**	**0.19**	**21.54**	**0.20**

*revised

D. Coach Utilisation:

In 2019-20 the vehicle Kms. per vehicle day was 534 on BG and 114 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
2017-18	555	125
2018-19	533	115
2019-20	**534**	**114**

E. Average freight train load:

The average net load per train in 2019-20 was 1,728 tonnes on BG The average gross load per train was 2,990 tonnes on BG.

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
2017-18	1,763	-	3,025	-
2018-19	1,738	-	2,925	-
2019-20	**1,728**	**-**	**2,990**	**-**

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:

Year	Broad Gauge			Metre Gauge All traction
	Diesel	Electric	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
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
2017-18	22.7	23.6	23.3	-
2018-19	*22.7	23.6	23.3	-
2019-20	**23.4**	**25.4**	**23.6**	**-**

*revised

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

During 2019-20, NTKMs per engine hour stood at 14,390 for BG. NTKMs per goods train hour for BG was 42,154.

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
2017-18	17,474	-	40,439	-
2018-19	*16,345	-	*40,652	-
2019-20	**14,390**	**-**	**42,154**	**-**

H. Wagon Utilisation:

On an average, a wagon moved 188.7 kms. per day on BG in 2019-20. NTKMs per wagon per day on BG was 7,057. NTKMs per annum per tonne of wagon capacity on BG was 40,996. These indices of wagon utilization are given below:

(in terms of 4-wheelers)

Year	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
2010-11 +	57,953	7,300	262.1	31.6	9,247	663
2017-18	43,778	-	206.5	-	7,405	-
2018-19	45,718	-	203.9	-	7,747	-
2019-20	**40,996**	**-**	**188.7**	**-**	**7,057**	**-**

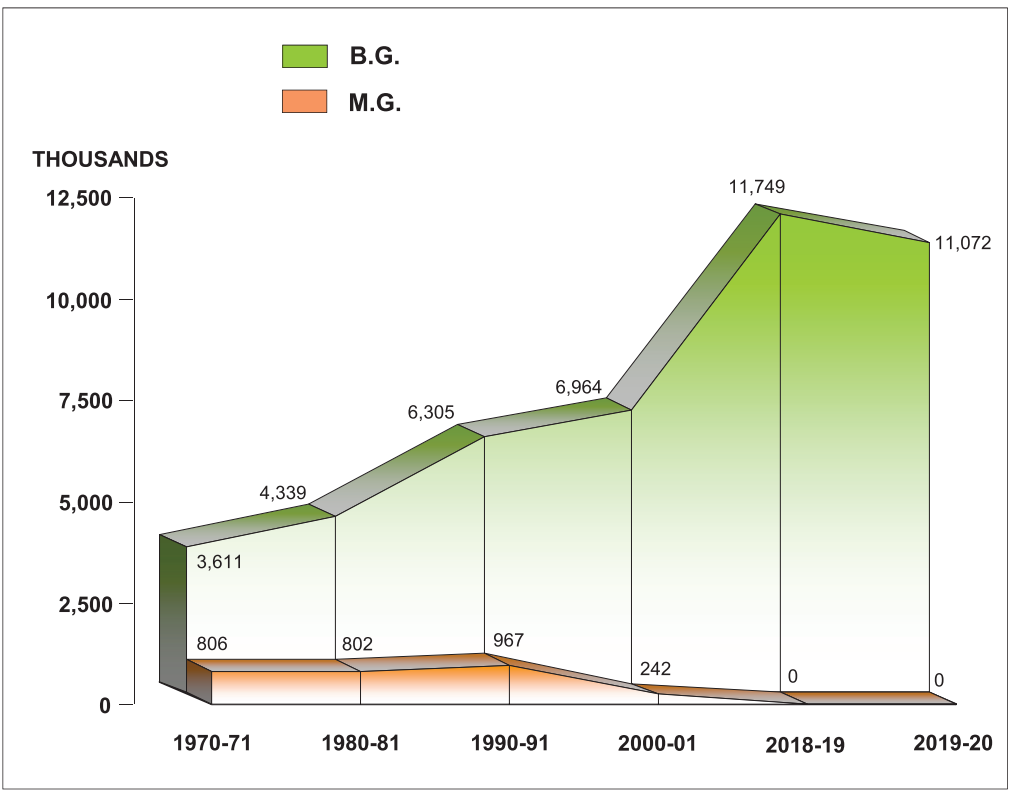
(+) in terms of 8 wheelers from 2010-11 onwards.

I. Wagon turn-round (in days):

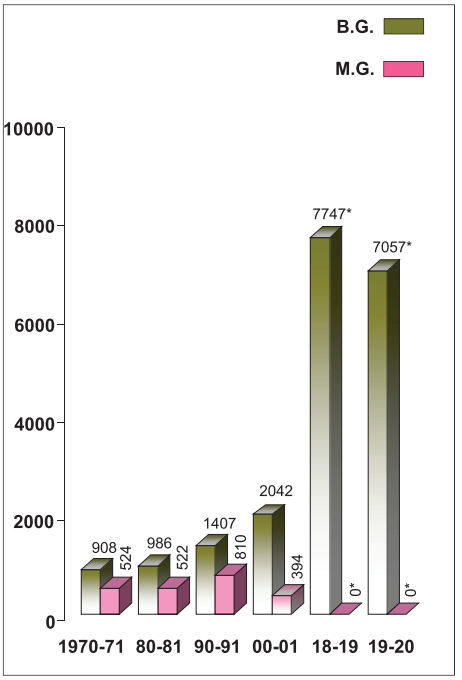
The turn-round time of wagons, representing operational cycle time is given in the following table:

Year	B.G.
1950-51	11.0
1960-61	11.2
1970-71	13.3
1980-81	15.2
1990-91	11.5
2000-01	7.5
2010-11	4.97
2017-18	5.21
2018-19	5.00
2019-20	**5.30**

NTKMS PER ANNUM PER ROUTE KM.

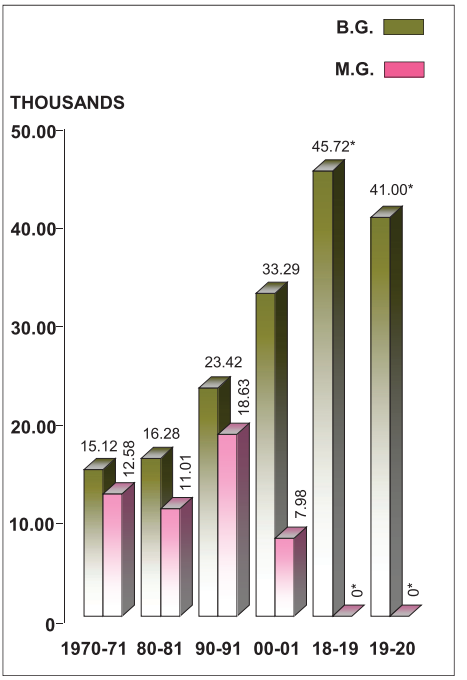


NET TONNE KILOMETRES PER WAGON PER DAY



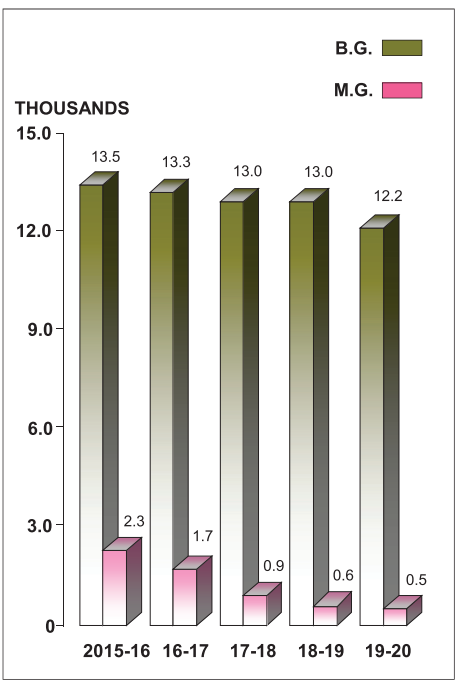
* In terms of eight wheelers

NET TONNE KILOMETRES PER ANNUM PER TONNE OF WAGON CAPACITY

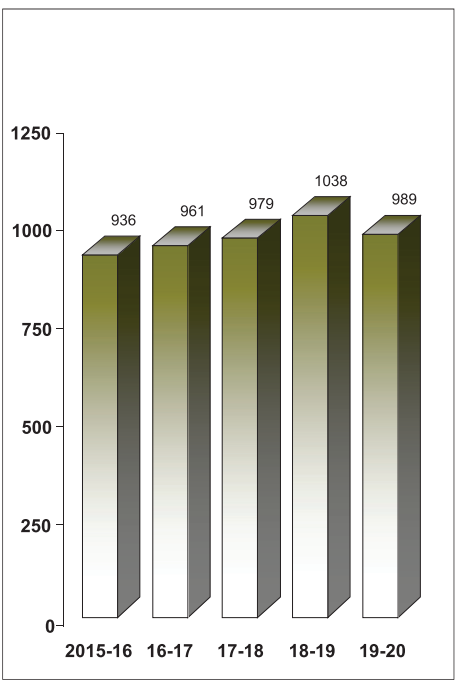


* In terms of eight wheelers

TRAIN KILOMETRES PER RUNNING TRACK KM



TRAIN KILOMETRES PER EMPLOYEE



Safety

There were 54 consequential train accidents in the year 2019-20 as compared to 59 accidents during 2018-19. Accident per million train Kms, an important index of safety, on IR remained at the same level of 0.05 in the year 2019-20 as compared to previous financial year 2018-19.

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

Year *	Collision	Derailments	Level Crossing Accidents	Fire in trains	Misc. Accidents	Total	Accident Per Million Train Kms.
2015-16	3	64	35	0	4	106	0.10
2016-17	5	77	20	1	0	103	0.09
2017-18	3	53	13	3	0	72	0.06
2018-19	0	46	6	6	1	59	0.05
2019-20	**5**	**40**	**1**	**7**	**1**	**54**	**0.05**

*Excludes KRCL.

Casualties and Compensation:

The number of passengers injured or killed in train accidents and compensation paid in last five years are as under:

Year	No. of passengers #		Casualties per million passengers carried	Compensation paid in lakh*
	Killed	Injured		
2015-16	40	126	0.02	263.00
2016-17	195	346	0.07	303.00
2017-18	28	182	0.03	188.51
2018-19	16	90	0.04	641.15
2019-20	**0**	**73**	**0.05**	**376.10**

#Excludes KRCL.

#The compensation paid during a year relates to cases settled and not necessarily to the number of accidents/casualties during that year.

Causes of Train Accidents:

Out of 54 consequential train accidents which occurred on IR during 2019-20, 49 were due to human failure. These include 44 accidents due to the failure of railway staff and 5 were due to persons other than Railway staff. 4 accidents were due to Equipment failure and 1 accident was due to Incidental factor. Final cause of one accident is under investigation.

Damage to Railway Property:

The cost of damage to railway property and duration of interruption to through communication caused by consequential train accidents during 2018-19 and 2019-20 are as under:

Year#	Cost of Damage (in Lakh)		Interruption to through communication (Hours)
	Rolling Stock	Permanent Way	
2018-19	2219.84	833.95	555.55
2019-20	**3,232.97**	**566.87**	**309.47**

#Excludes KRCL.

Rashtriya Rail Sanraksha Kosh (RRSK)

'Rashtriya Rail Sanraksha Kosh (RRSK)' has been introduced in 2017-18 for replacement/renewal/upgradation of critical safety assets, with a corpus of ₹one lakh crore for five years, having annual outlay of ₹20,000 crore. Since its inception, expenditure of ₹16,091 crore in 2017-18, ₹18,015 crore in 2018-19 and ₹15,024 crore in 2019-20 (Prov.) has been made out of the Fund for safety works. In 2020-21 also, a provision of ₹20,000 crore has been made under RRSK.

The Funds under RRSK are utilised for safety works relating to Traffic Facilities, Rolling Stock, Level Crossings Road Over/Under Bridges, Track Renewal, Bridge Works, Signal and Telecommunication Works, other Electrical Works, TRD Works, Machinery and Plant, Workshops, Training/ HRD, Passenger Amenities and Other Specified Works.

Ministry of Finance has issued 'Guidelines for Operation of Rashtriya Rail Sanraksha Kosh (RRSK)', which inter alia, includes Monitoring Framework for RRSK. It stipulates setting up of Monitoring Committee headed by CEO/ NITI Aayog to examine performance. It is also laid down that the progress will be reviewed annually by 'Cabinet Committee on Economic Affairs (CCEA)'headed by Hon'ble Prime Minister.

Measures to Improve Safety

- **Safety Focus:** 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:** Periodical Safety Audits of different Divisions by multi-disciplinary teams of Zonal Railways as well as Inter-Railway Safety Inspections were conducted on regular basis. During the year 2019-20, 85 Internal Safety Audits and 31 Inter-Railway Safety Inspections were carried out.
- **Training facilities:** Refresher training imparted to Non-Gazetted staff during 2019-20 is 1,69,061.

Measures to avoid collision

To enhance efficiency and safety in train operations, Modern Signalling Systems comprising of Panel Interlocking/Route Relay interlocking/Electronic Interlocking (PI/RRI/EI) with Multi Aspect Colour Light Signals are being progressively provided. So for 6,018 stations (covering about 96 % of interlocked Broad Gauge stations) on Indian Railways have been provided with such systems, replacing the obsolete Multi Cabin Mechanical Signalling System, thus optimising operational cost involved in its operation as well as enhancing safety by reducing human intervention. During 2019-20, 12 Major Stations namely, Tilak Bridge, Faridabad, Ballabgarh, Madurai, Bhilai Marshaling, Jabalpur, Chakradharpur, Jaipur, Abu Road, Tundla, Danapur and Patratu have been provided with Route Relay Interlocking (RRI)/ Electronic Interlocking (EI). Panel Interlocking has been provided at 55 stations and Electronic Interlocking at 350 stations, have been provided during the financial year 2019-20.

To avoid collisions, technological aids are briefly enumerated below:

- **Complete Track Circuiting:** To ensure track occupation verification, Track Circuiting has been completed at about 34597 locations up to 31.03.2020 covering 'A', 'B', 'C', 'D Special' and 'E Special' route. Total 6,147 stations have been provided with complete track circuiting.
- **Block Proving by Axle Counter (BPAC):** To enhance safety and improved mobility automatic verification of complete arrival of train at a station, Block Proving by Axle Counter (BPAC) is being provided at stations having centralized operation of points and signals. As on 31.03.2020, Block Proving by Axle Counters (BPAC) has been provided on 5,663 block sections.

- **Intermediate Block Signalling:** Provision of Intermediate Block Signalling (IBS) has proved very useful in enhancing line capacity without extra recurring revenue expenditure in form of operating manpower and amenities required while developing and operating a block station. As on 31.03.2020, Intermediate Block Signalling has been provided in 602 block sections on Indian Railways.
- **Automatic Block Signalling:** For augmenting Line Capacity and reducing headway on existing High Density Routes on Indian Railways, Signalling provides a low cost solution by provision of Automatic Block Signalling. As on 31.03.2020, Automatic Block Signalling has been provided on 3,309 Route Km.

Train Collision Avoidance System (TCAS): Train Collision Avoidance System (TCAS) has been developed by RDSO and three Indian manufacturers. Successful trials have been completed on 250 Route Km. Works are in progress on 1200 Route km of section on South Central Railway. It has now been decided to adopt TCAS as National ATP for implementation on Indian Railways. It shall be provided on High Density Network (HDN) & freight dense Highly Utilized Network (HUN) routes on priority in next 4-5 years. TCAS has been approved for speed upto 160 kmph. TCAS is also being upgraded to work with Automatic Signalling and Central Traffic Control (CTC) System, thus objectives of line capacity enhancement can also be met.

Centralized Traffic Control (CTC) in Indian Railways: It is a computer based system which facilitates control and management of multiple Signalling installations covering a number of stations from a single location. It also provides a real time simulation of railway traffic centrally helping in real time traffic planning for punctual train operations. Controllers can manage train movements directly from CTC centre on real time basis. Centralized Traffic Control (CTC) covering 250 Route km of Double line section with 29 stations on Aligarh - Kanpur Route has been operationalised. Further works of CTCs on about 7000 Route Km covering all Zonal Railways are sanctioned and entire HDN Routes covering Golden Quadrilateral & Golden Diagonals shall be provided with CTC.

Train Management System (TMS): Provides real-time status of train positions, all train movements and a complete view of the section covered on a giant screen provided in the divisional control centre. Punctuality reports, rake and crew links, train graphs, and unusual occurrence reports are generated in the control office. The overall display panel, known as the 'Mimic Indication Panel', is designed to present detailed status of the system at a glance. It is expected that with commissioning of TMS/CTC

projects, our controllers shall be able to efficiently manage train operations. Besides providing real time train running information in the control offices, passengers shall also be provided with accurate arrival/departure information at stations through automatic working of the Passenger information System at Stations.

This system has been provided on Suburban sections of Mumbai on Western & Central Railways and Howrah of Eastern Railway. Similar System shall also be provided at Khurda Road in East Cost Railway, Delhi in Northern Railway, Sealdah in Eastern Railway, Kharagpur in South Eastern Railway and Chennai in Southern Railway.

Interlocking of Level Crossing Gates: Indian Railways have provided interlocking with Signals at 11,639 Level Crossing Gates as on 31.03.2020, to enhance the safety at Level Crossings.

- **Sliding Boom at Level Crossing Gate:** Provision of Interlocked Sliding Boom has become very effective in minimizing disruption to train services when Level Crossing Gates get damaged by road vehicles especially in suburban areas. With provision of Sliding Boom Interlocking, Signalling System continues to function normally with minimum effect on train operation. 5092 Nos. of busy interlocked gates have been provided with Sliding Booms as on 31.03.2020 in addition to lifting barriers and further busy gates are also being progressively covered.

Self-Sufficiency

Signalling Workshop: Railway Signalling installations use a number of specialized equipment for smooth & 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 at Podanur on Southern Railway, Mettuguda on South Central Railway, Gorakhpur on North Eastern Railway, Howrah on Eastern Railway, Byculla on Central Railway, Sabarmati on Western Railway, Ajmer on North Western Railway, Kharagpur on South Eastern Railway and Ghaziabad on Northern Railway have been manufacturing items like Electric Point Machines, Token less Block Instrument, Double Line Block Instruments, Axle Counters, various types of Relays etc.

Track Structure

Modern track structure consisting of 60kg, 90 Ultimate Tensile Strength (UTS) rails, Prestressed Concrete Sleeper (PSC) Normal/Wide base sleepers

with elastic fastening, fanshaped layout turnout on PSC sleepers, Steel Channel/H-beam Sleepers on girder bridges is used, while carrying out primary track renewals.

- Long rail panels of 260M/130M length are being manufactured at the steel plant to minimize number of Alumino Thermit joints in the track.
- Provision of Thick Web Switches (TWS) is planned for all important routes of IR. To expedite provision of TWS, procurement of Thick Web Switches has been decentralized to zonal railways.
- Ultrasonic Flaw Detection (USFD) testing of rails to detect flaws and timely removal of defective rails. Vehicular USFD system has been introduced on Northern Railway, North Central Railway, West Central Railway and Western Railway.
- GPS trackers are being provided on keyman & patrolmen to monitor their movement & to report any unsafe condition noticed by them instantaneously.
- Mechanization of track maintenance is being carried out to reduce human errors.
- Track management system has been introduced on Indian Railways for development of database and decision support system and to decide rationalize maintenance requirement and optimize inputs.

Measures to Curb Accidents at Unmanned Level Crossings:

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

Level Crossing: Indian Railway has decided to progressively eliminate the level crossings for the safety of Road users and train passengers. During the year 2019-20, 1,273 Nos. of manned level crossings have been eliminated. All unmanned Level Crossings on Broad Gauge have already been eliminated.

Road Over/Under Bridges: To improve safety of train operations 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.

During the year 2019-20, 145 ROBs and 1,170 RUBs/subway have been constructed under cost sharing, railway cost/accommodation works, Deposit/BOT term and by NHAI over Indian Railway.

Measures to Improve Safety of Coaches: Measures taken to strengthen the safety and reliability of Railway coaches. Indian Railways is taking following steps to further strengthen the safety and reliability of Railway Coaches.

- **Introduction of Automatic Fire and Smoke Detection system in AC Coaches:** To improve fire safety in running trains, Automatic Fire and Smoke Detection System are being provided in AC coaches. The specifications have been upgraded integrating the air brake system in the coaches with the fire and smoke detection system. At present in nearly 2063 AC coaches, this system has been fitted. The work is being carried out in a phased manner. Further, instructions have been issued to Production Units that all newly manufactured AC coaches shall be provided with Automatic Fire and Smoke Detection System.
- **Fire detection suppression system in Pantry cars and Power cars:** Power Cars are more prone to fire due to presence of Diesel Alternator sets along with fuel tanks and other high voltage equipments. Also, Pantry Cars are more prone to fire due to cooking being carried out in these coaches. In this respect Automatic Fire Detection and Suppression system are being provided in Power cars and Pantry cars. At present 1128 Power cars and 278 Pantry cars are fitted with this system. The work of retrofitment is being carried out progressively. Further, instructions have been issued that the system should be provided in all newly manufactured LHB Power cars and LHB Pantry cars by the Production Units (PUs).
- **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 specification of major furnishing items, now a new parameter related to fire retardancy (i.e. heat release rate) has been introduced as per international norms.
- **Provision of Fire Extinguishers:** Dry chemical powder type fire extinguishers are provided in all Air-conditioned coaches, Second class-cum-guard and luggage van and Pantry cars. Instructions have been issued to Production Units to provide fire extinguishers in all newly manufactured non-AC coaches as well. Provision in existing coaches is also being carried out by Zonal Railways.

- **Large scale proliferation of LHB coaches:** Ministry of Railways has decided for large scale proliferation of LHB coaches which are technologically superior with features like Anti climbing arrangement, Air Suspension (Secondary) with failure indication system and less corrosive shell. These coaches have better riding and aesthetics as compared to the conventional ICF coaches. The Production units of Indian Railways are now producing only LHB coaches from April 2018 onwards. The production of LHB coaches are continually increased during the years. 1,469 coaches in 2016-17, 2,480 coaches in 2017-18, 4,429 coaches in 2018-19 and 6,277 coaches in 2019-20.
- **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 EMUs & DMUs coaches for sub-urban trains. Air springs have now been developed for mainline coaches as well and have been fitted in large scale in newly manufactured coaches. Production Units have been advised to use Air springs in all newly manufacture LHB coaches.
- **Provision of Automatic door closure mechanism in coaches:** Provision of Automatic door closure mechanism has been planned on coaches to prevent accidental falling of passengers from running trains. Three air-conditioned EMU (Electric Multiple Unit) rake with Automatic doors has been manufactured at Integral Coach Factory, Chennai for Western Railway, Mumbai. Integral Coach Factory/Chennai has also turned out coaches for Kolkata Metro with Automatic door closure mechanism. Automatic door closure mechanism has also been provided in the coaches of Tejas rake running between Mumbai - Goa and Chennai-Madurai.

Provision of Double Acting doors in coaches: Double Acting door in coaches are two way swing AC compartment doors for easy evacuation of passengers. Such doors need to be provided in the AC coaches so as to improve the fire worthiness and enable passengers to quickly evacuate from the coach in the event of fire.

Sanction under the Rolling Stock Programme (RSP) exists for the provision of Double Acting doors in 6500 coaches and the work is being carried out in a phased manner in 3124 nos. of coaches it has been provided. In addition to this instructions have been issued to Production Units that all newly manufactured AC coaches shall be provided with Double Acting doors.

Other 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 meeting with Zonal Railways:** Chairman and Board members have conducted Safety Review Meetings with General Managers and PHODs of zonal railways during their visits as well as through video conference.
- **Intensive Footplate Night Inspections:** Intensive Footplate Inspections including night inspections have been conducted at the level of SAG, branch officers and supervisors in the field.

Railway Foot Over Bridge at Ranchi Station South Eastern Railway

The Network

Indian Railways (IR) is one of the world's largest rail networks with 67,956 Route Kilometres of route lengths as on 31.03.2020. Out of 67,956 RKMs, BG constitutes 63,949 RKMs (94.10%), MG 2,402 RKMs (3.54%) and NG 1,809 RKMs (2.36%). The growth of its Route length, Running and Track Kms since independence is as follows :-

Year	Route Kms.	Running Track Kms.	Total Track Kms.
1950-51	53,596	59,315	77,609
1960-61	56,247	63,602	83,706
1970-71	59,790	71,669	98,546
1980-81	61,240	75,860	1,04,480
1990-91	62,367	78,607	1,08,858
2000-01	63,028	81,865	1,08,706
2010-11	64,173	87,114	1,14,037
2016-17	66,918	93,902	1,21,407
2017-18	66,935	94,270	1,22,873
2018-19	67,415	95,981	1,23,542
2019-20	**67,956**	**99,235**	**1,26,366**

Zones /Headquarters	Route Kms.	Running Track Kms.	Total track Kms.
Central, Mumbai	4,152	6,563	8,827
Eastern, Kolkata	2,820	5,174	7,220
East Central, Hajipur	4,220	6,151	9,954
East Coast, Bhubaneshwar	2,800	4,693	6,009
Northern, New Delhi	7,323	10,024	13,558
North Central, Allahabad	3,522	6,003	6,436
North Eastern, Gorakhpur	3,473	4,515	4,894
Northeast Frontier, Maligaon, (Guwahati)	4,239	4,785	6,473

North Western, Jaipur	5,643	7,620	8,027
Southern, Chennai	5,087	7,376	9,103
South Central, Secunderabad	6,382	8,903	10,872
South Eastern, Kolkata	2,713	5,305	6,549
South East Central, Bilaspur	2,457	3,882	5,193
South Western, Hubli	3,578	4,650	5,880
Western, Mumbai	6,509	8,424	10,659
West Central, Jabalpur	3,010	5,112	6,617
Metro Railway, Kolkata	28	55	95
Total	**67,956**	**99,235**	**1,26,366**

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 2019-20.

State/Union Territory	Route Kms.	Running Track Kms.	Total Track Kms.
Andhra Pradesh	3,965	6,075	7,714
Arunachal Pradesh	12	12	26
Assam	2,519	2,702	3,662
Bihar	3,794	5,418	7,663
Chhatisgarh	1,152	2,183	2,914
Delhi	184	346	706
Goa	69	69	111
Gujarat	5,301	6,357	7,938
Haryana	1,703	2,652	3,243
Himachal Pradesh	312	317	376
Jammu & Kashmir	298	366	493
Jharkhand	2,596	4,383	6,296
Karnataka	3,542	4,837	6,083
Kerala	1,045	1,745	2,087
Madhya Pradesh	5,148	8,216	9,702
Maharashtra	5,829	8,712	11,631
Manipur	13	13	18
Meghalaya	9	9	13

Mizoram	2	2	6
Nagaland	11	11	23
Odisha	2,652	4,443	5,506
Punjab	2,265	2,768	3,622
Rajasthan	5,998	8,174	9,190
Tamil Nadu	4,036	5,492	6,836
Telangana	1,828	2,596	3,223
Tripura	265	265	337
Uttarakhand	346	451	528
Uttar Pradesh	8,808	12,957	16,001
West Bengal	4,217	7,624	10,309
Union Territory			
Chandigarh	16	18	83
Pondicherry	22	22	26
Total	**67,956**	**99,235**	**1,26,366**

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

With its more than 167 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 22.15 million passengers and 3.32 million tonnes of freight each day during 2019-20.

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 & CEO, Railway Board. Members of the Railway Board include Member (Finance), Member (Infrastructure), Member (Traction & Rolling Stock) and Member (Operations & Business Development) 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 31.3.2020, the Indian Railways had		(in Kms.)
(i) Route length	-	67,956
(ii) Running Track length	-	99,235
(iii) Total Trackage	-	1,26,366
The following works were carried out during 2019-20		
(i) Track renewal	-	4,500
(ii) Construction of New Line	-	359.71
(iii) Gauge conversion from MG/NG to BG	-	408.50
(iv) Track conversion from single to double line	-	1,458.22

New Lines:

During 2019-20, 359.71 Kms. of new lines have been completed on the following sections:-

Railway	Section	Km.
Eastern	Hansdiha -Prayahat	15.3
East Central	Islampur -Nateswar	21
	Ghoswar - Vaishali	30
	Sheikhpura-Sarajamalpur	12.5
East Coast	Nayagarh Town-Mahipur	12
	Talcher - Sunakhani	20
	Haridaspur-Kendrapara	43
Northern	Virbhadra -Yog Nagari Rishikesh	5.7
North Frontier	Belonia-Sabroom	39
North Western	Thaiyat Hamira-Sanu	58
South Central	New Pidiguralla - Savalyapuram	45.85
	Vellikallu-Chirlopalli	14.86
South East Central	Kharsia- Korichapper	42.5
	Total	**359.71**

Gauge Conversion:

During 2019-20, 408.49 Kms of track was converted from MG/NG to BG as detailed below:

Railway	Section	Km.
East Central	Garahbaruari -Saraigarh	25
	Mandanmishra - Jhanjharpur	9
	Garhbaruari - Supaul	11
North Eastern	Lakhimpur - Mailani	61.29
	Pilibhit -Bisalpur	38
North Western	Dahar-Ka-Balaji (Jaipur) Ringus	56.5
	Himmat Nagar-Raighadh	24
	Udaipur-Kharwa Chanda	26
Southern	Madurai-Usilampatti	37
South East Central	Nainpur - Lamta	36
Western	Mahesana - Vadnagar	34
	Mathela - Nimar Kheri	50.7
	Total	**408.49**

Doubling:

During 2019-20, 1,458.22 Kms of double/multiple lines track were completed as detailed below:

Railway	Section	Km.
Central	Chitoda-Sonegaon	13
	Shenoli-Bhavaninagar Takari	14
	Daund Chord Line	1.03
	Kopargaon-Yeola	13.52
	Buti-Bori-Sindi	19
	Pune -Phursungi - Alandi	23.22
	Wadsinge - Bhalwani	34.72
	Savalgi -Kalaburagi(Gulbarga)	13
	Boroti -Dudhani -Kulali	23.49
Eastern	Azimganj-Lalbag Court	7.2
	Lailakhmamalkha-Kahalgaon	16
	Sujnipara -Nimtita	6.72
	Debipur-Rasulpur	12.85
	Nimtita-Dhulianganga	9.92
	Mile-5B-N/Alipur	1.67
	Lal bagcourt-Khagraghat Road	7.4
	Kankinara -Naihati 4th line	2.65

East Central	Bhagwanpur -Ghoswar	14.5
	Billi - Chopan	6
	Bachhwara-Mohiuddin Nagar	20
	Manpur -Wazirganj	19
	Gondwali - Mahadiya	7.5
	Mohiuddin Nagar -Shahpur Patoree	13
	Samastipur-Kishanpur	10
	Karnauti-Bakhtiyarpur	19
	Biratoli-Mahuamilan ROR	9
	Bhurkunda-Patratu	8
	Meralgram - Ramana	12
	Dudhinagar-Jharokhas	7
	Gomia -Dumri Bihar	7
East Coast	Kapilas Road-Salegaon	4.3
	Mallividu-L.Kota	7.42
	Suku -Paliba	7.6
	Khaliapali-Loisinga	11.15
	Deogaon Road -Saintala	17.22
	Saintala -Badmal	8.89
	Kesinga -Rupra Road	16.17
	Khariar Road-Nawapara-Lakhna	26.94
	Komakhan - Khariar Road	9.28
Northern	Khatauli-Muzaffarnagar	22
	Allahabad-Prayag	6
	Laksar -Ikkar	17
	Lohta-Manduadih Chord Line	3.2
	Muzaffarnagar - Deoband	24
	Tughlakabad -Palwal 4th line	13.26
	Delhi-Tilak Bridge	7
	Shrirajnagar-Kundanganj	15.27
	Amethi -Gauri Ganj	15.4
North Central	PTSC- Nandkhas	19.1
	Sarsoki-Usargaon	17.59
North Eastern	Chhapra Gramin-Khairah Byepass	10.7
	Manduadih-Hardattpur	6.15
	Hardatpur Kachhwa Road	21.93
Northeast Frontier	Lumding-Habaipur	25.05
	New Bongaigaon- Majgaon	8.55
North Western	Daurai- Mangaliyaws	19
	Bangurgram-Sendra	24
	Dhigawara-Bandikui	33

	Abu Road-Maval	9.51
	Bhimana-Abu Road	16.77
Southern	Ambalappuzha-Haripad	18
South Central	Kalluru-Garladinne	11
	Guntakal-Gulapalayamu	11.4
	Kalluru-Khadarpet	8.08
	Maltekd -Mugat	10.5
	Mirkhal-Limbgaon	31
	Perecherla-Satulur	24
	Pendekallu -Dhone	27.44
	Maula Ali 'C' Cabin-Ghatkesar	23.87
	Akividu-Bhimavaram	17
	Moturu-Akividu	40.33
South Eastern	Andul-Baltikuri	7.25
	Mohishila-Kalipahari	2.86
	Bisra -Jaraikela	14.6
South East Central	Robertson-Kirodimal Nagar	18.2
	Belpahar-Brajraj Nagar	9
	Lajkura-Belpahar	5
	Jamga-Belpahar 3rd line	32.6
South Western	Tumakuru-Gubbi	18
	Mulvad -Jumnal	13
	Ghatprabha-Chickodi	16
	Davangere-Harihar	13
	Kardi-Banasandra	11
	Alnavar-Devarayi	20.73
	Hubballi byepass	20.6
	Binkadakatti-Harlapur	23.17
Western	Unjha yard	3
	Sabarmati-Kalol	24
	Chamaraj-Digsar	7.86
	Shambhupura-Nimbahera	14.61
	Bhildi-Jasali	11.1
	Jasal-Diyodar	17.32
	Samakhiyali-Lakadiya	10.44
West Central	Saugor-Nariaoli	19
	Jhukehi chord line	2
	Sontalai-Bagratawa Patch	7
	Katangi Khurd-Salhana	18.07
	Ashoknagar-Pilighat	25
	Sogariya-Bhonra	28.29
	Itarsi-Powarkherda	8.06
	Total	**1,458.22**

Gauge-wise Details:

Broad gauge, though forming 94% of the route, generated 100% of the freight output (NTKms) and 99.9% of the passenger output (Pkms).

Route length as on 31.03.2020 on each gauge, indicating double/ multiple line, single line and electrified route, is given below:

Gauge	Single line			Double/multiple line			Grand Total
	Electrified	Non electrified	Total	Electrified	Non electrified	Total	
Broad (1676 mm)	16,036.12	22,878.79	38,914.91	23,292.76	1,741.59	25,034.35	63,949.26
Metre (1000 mm)	-	2,402.25	2,402.25	-	-	-	2,402.25
Narrow (762mm/610 mm)		1,604.12	1,604.12	-	-	-	1,604.12
Total	**16,036.12**	**26,885.16**	**42,921.28**	**23,292.76**	**1,741.59**	**2,5034.35**	**67,955.63**
%age to total RKMs	**-**	-	63.16	-	-	36.84	-

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 2019-20, traffic density (million GTKms. per running track km.) increased from 4.29 to 21.54 on BG.

Track Renewal and Maintenance:

During 2019-20, 4,500 kms in Complete Track Renewal (CTR) units of track renewal was carried out. The year wise details of Track Renewal done and expenditures incurred thereon are as under:

Year	Gross expenditure (₹ in cr.)	Track Renewal done (kms)
2016-17	6,397.97	2,487
2017-18	8,884.18	4,023
2018-19	9,690.05	4,181
2019-20	**9,390.27***	**4,500**

*Provisional

One Complete Track Renewal (CTR) units comprises of one km of Through Rail Renewal (0.5 CTR units) and one km of Through Sleeper Renewal (0.5 CTR units).

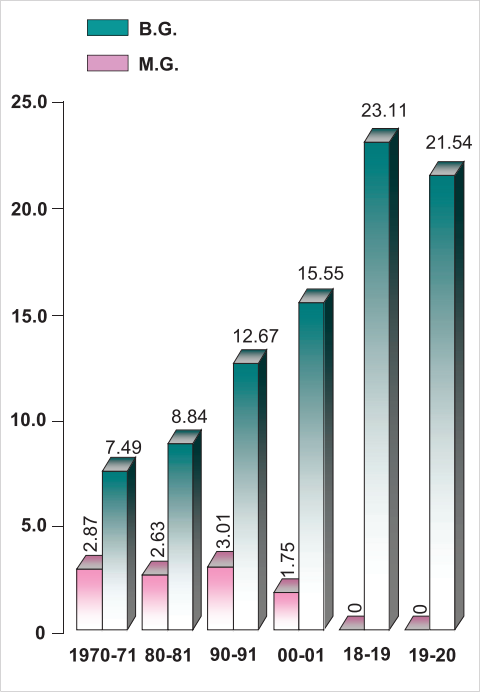
Track Upgradation:

The track constitutes the basis infrastructure of a railway system and bears the burden of coping with ever increasing traffic. Higher speed and heavy

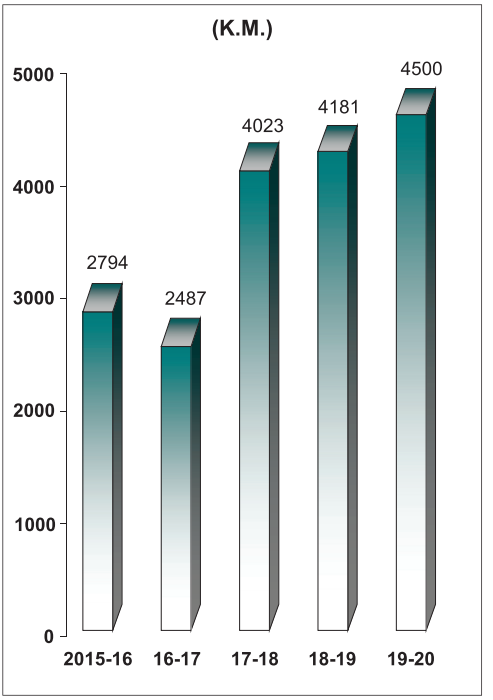
axle load operation of IR has necessitated up-gradation of the track structure. Several policy initiatives have been taken in order to modernize the track.

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 60kg 90UTS rails are used in place of 90R/52kg 72/90UTS rails. Similarly, long rail panels or welded rails are predominantly used in place of earlier fish plated joints. The sturdier turnouts using thick web switches is gradually introduced on trunk routes and high density routes. As on 31.03.2020, BG main lines of IR, about 89.61% of the length is covered by long welded rails, 99.34% with PSC sleepers and 97.85 % with 52kg/60kg 90 or higher UTS rails.

TRAFFIC DENSITY
MILLION GTKMS
PER RUNNING TRACK KM



TRACK RENEWALS
PER ANNUM



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 31.03.2020, 81,912 Km length of track on main lines of Indian Railways was with long welded rails and 8,713.7 Km length of track on main lines was with short-welded rails.

Bridges:

As on 01.04.2020, IR has 1,50,390 Bridges out of which 702 are important, 12,256 are major and 1,37,432 are minor Bridges. During the year 2019-20, 1,367 Bridges are Strengthened/Rehabilitated/Rebuilt to enhance safety of train operation.

Level Crossings:

Level crossings are meant to facilitate the smooth running of traffic in regulated manner governed by specific rules & conditions. Status of level crossings on IR as on 01.04.2020 is as under:

Total number of level crossings	:	21,323	
Number of manned level crossings	:	20,375	(95.6%)
Number of unmanned level crossings	:	948	(4.4%)

Indian Railway has decided to progressively eliminate the level crossings for the safety of road users and train passengers. During the year 2019-20, 1,273 Nos. of unmanned level crossings eliminated. All unmanned level crossings on Board Gauge have been eliminated.

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.

During the year 2019-20, 145 ROBs and 1,170 RUBs/Subways have been constructed under cost sharing, railway cost/accommodation works, Deposit/BOT term and by NHAI over Indian Railway.

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.

Land Management:

As on 31.03.2020 Indian Railways (IR) owns about 4.81 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)
Tracks and structures including Stations, colonies etc.	3.67
Afforestation	0.43

'Grow More Food' scheme	0.03
Commercial Licensing	0.04
Other uses like pisiculture	0.12
Encroachment	0.01
Vacant land	0.51
Total	**4.81**

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 land-use policy.

During 2019-20, Railway did mass plantation of 131.41 lakh trees. Now Railway has finalized a model agreement with Ministry of Environment & Forest to be entered by Zonal Railways with State Forest Department, to protect Railway land being declared as protected forest by Forest Department. Plantation will further improve in coming years. Moreover, now instructions have been issued to all Zonal Railways to make provision of 1% in all estimates to environment related matter. This will help in meeting the cost of plantation. As such, Railway is making all efforts to plant more and more trees.

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, construction/widening of roads 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, 75 sites have been entrusted to RLDA, for commercial development.

Necessary action for development of these sites is under process by RLDA. Besides, commercial development of vacant Railways land, RLDA has also been assigned the task of development of Multi Functional Complexes (MFCs).

Electrification

Executive Summary of Railway Electrification

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

In pre-independence period, electrification remained confined to 388 Route kilometers (RKMs) and it is only in the post-independence period that further electrification was taken up. Since then, there has been no looking back and the Indian Railways have slowly but steadily electrified its routes.

By March'2020, electrification on Indian Railways has been extended to 39,329 RKMs out of the total rail network of 67,956 RKMs. This constitutes 57.87% of the total Railway Network. On this electrified route, 67.3% of freight traffic & 59.6% of Passenger traffic is hauled with fuel cost on electric traction being merely 38.4% of the total traction fuel cost on Indian Railways. Further, Indian Railways has planned to electrify balance BG rail routes by 2021-22 to achieve 100% electrification of BG rail routes except some spur routes.

With the progressive electrification, metro cities of Delhi, Mumbai, Kolkata and Chennai have already been interconnected with electric traction. Mumbai-Chennai route is also electrified except Bhigvan-Gulbarga, on which electrification work is in progress and targeted for completion by end of 2020-21.

II Progress of Railway Electrification

(a) The progress of Electrification since independence is tabulated below:

Year	Cumulative Electrified (RKM)
1951	388
1961	748
1971	3,706
1981	5,345
1991	9,968
2001	14,856
2011	19,607
2018	29,228
2019	34,319
2020	**39,329**

(b) During year 2019-20, 4,378 RKM has been electrified.

III Sections Opened for Electric Traction after Statutory Inspection of Commissioner of Railway Safety in 2019-20.

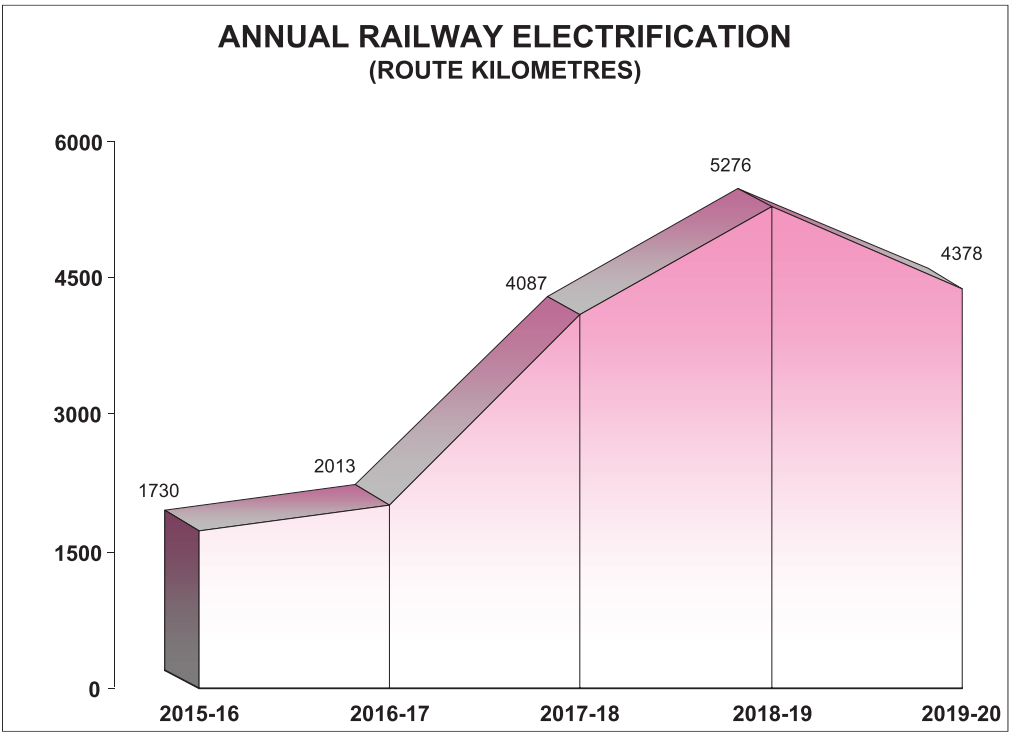
S.No.	Section	Railway	State	RKM
1.	Pune-Shindwane	CR	Maharashtra	32
2.	Kolhapur-Miraj-Dhalgaon	CR	Maharashtra	112
3.	Wani-Pimpalkhutti	CR	Maharashtra	66
4.	Jamalpur-Munger-Sahibpur Kamal	ER	Bihar	21
5.	Shivnarayanpur-Ammapali	ER	Bihar	23
6.	Bonidanga-Tinpahar-Sahibganj & Tinpahar-Rajmahal	ER	Jharkhand	75
7.	Ammapali- Sahibganj	ER	Jharkhand	12
8.	Ahmadpur-Katwa	ER	West Bengal	51
9.	Khagariya-Samastipur-Darbhanga-Jaynagar	ECR	Bihar	192
10.	Maheshpur-Rema-Mahesh Munda	ECR	Jharkhand	88
11.	Shanki-Tatisilwai	ECR	Jharkhand	30
12.	Kairala Rd-Mahedia	ECR	Madhya Pradesh	18
13.	Chopan-Karaila road	ECR	Uttar Pradesh	45
14.	Naupada-Patapatnam	ECoR	Andhra Pradesh	34
15.	Talcher-Sunakhani	ECoR	Odisha	18
16.	Patapatnam-Gunupur	ECoR	Odisha	56
17.	Lanjigarh-Junagarh	ECoR	Odisha	52
18.	Patiala-Dhuri	NR	Punjab	54
19.	Batala-Bharoli	NR	Punjab	66
20.	Beas-Amritsar	NR	Punjab	72
21.	Raja ka Sahaspur-Chandausi- Aonla	NR	Uttar Pradesh	64
22.	Utretia-Sirajnagar	NR	Uttar Pradesh	33
23.	Unnao-Unchahar	NR	Uttar Pradesh	110
24.	Mandawar-Bandikui	NCR	Rajasthan	29
25.	Dingwai-Badausa-Manikpur	NCR	Uttar Pradesh	89
26.	Chunar-Chopan	NCR	Uttar Pradesh	100
27.	Jalalpur-Thawe-Chhapra Katcheri	NER	Bihar	134
28.	Mendu-Farrukhabad-Kalyanpur	NER	Uttar Pradesh	289
29.	Mankapur-Katra-Ayodhya	NER	Uttar Pradesh	36
30.	Daliganj-Sitapur	NER	Uttar Pradesh	82
31.	Aluabari-Dumdangi	NFR	Bihar	26
32.	Gunjaria-Aluabari & Dumdangi-NJP	NFR	West Bengal	41
33.	Rewari-Mahendragarh-Sadulpur	NWR	Haryana	139
34.	Suratgarh-Birdawal	NWR	Rajasthan	20
35.	Alwar-Bandikui-Bassi	NWR	Rajasthan	118

36.	Kanakpura-Phulera	NWR	Rajasthan	49
37.	Bhinwalia-Rani-Swaroopganj	NWR	Rajasthan	116
38.	Sawai Madhopur-Sheodaspura	NWR	Rajasthan	106
39.	Madar-Ajmer-Adarsh nagar	NWR	Rajasthan	13
40.	Part of Manglore-Penambur	SR	Karnataka	13
41.	Thanjavur-Thiruvarur	SR	Tamil Nadu	54
42.	Cuddalore Port-Thiruvarur	SR	Tamil Nadu	113
43.	Obulavaripalle-Krishnapatanam	SCR	Andhra Pradesh	7
44.	Nadikudi-Macherla	SCR	Andhra Pradesh	34
45.	Kukkadam-Vishnupuram	SCR	Telangana	28
46.	Gangdhara-Lingampet-Jagtiyal	SCR	Telangana	26
47.	Lakholi-Raipur	SECR	Chhattisgarh	29
48.	Kharsia-Korichhapar	SECR	Chhattisgarh	43
49.	Kelod- Bhimalgondi	SECR	Madhya Pradesh	45
50.	Oblapuram-Raydurga	SWR	Andhra Pradesh	38
51.	Hospet-Toranagaalu-Ranjitpura	SWR	Karnataka	57
52.	Ballary-Obalapuram	SWR	Karnataka	15
53.	Baiyyappanahalli-Anekal	SWR	Karnataka	35
54.	Jakhvada-Viramgam-Sanand	WR	Gujarat	41
55.	Rajkot-Hapa	WR	Gujarat	72
56.	Mahesana-Viramgam	WR	Gujarat	67
57.	Mahesana-Vadnagar	WR	Gujarat	35
58.	Viramgam-Surendranagar-Dhola	WR	Gujarat	187
59.	Dhrangdhra-Surendranagar	WR	Gujarat	31
60.	Dosawas-Nimach-Nimbahera	WR	Madhya Pradesh	157
61.	Fatehabad-Laxmibainagar	WR	Madhya Pradesh	33
62.	Nimbahera - Chhitorhgarh	WR	Rajasthan	41
63.	Chachaura Binaganj-Pachora	WCR	Madhya Pradesh	61
64.	Sagma-Satna-Rewa	WCR	Madhya Pradesh	56
65.	Khana Banjari-Joba-Majhauli	WCR	Madhya Pradesh	181
66.	Badarwas-Shivpuri	WCR	Madhya Pradesh	53
67.	Ohan-Bansapahar	WCR	Uttar Pradesh	6
68.	Thokur-Bijoor	KRCL	Karnataka	109
	Total			**4,378**

IV Important Electrification Projects Completed during 2019-20:

Vizianagaram-Rayagada-Titlagarh-Raipur rail line.

In the year 2019-20, Railway Electrification of Vizianagaram-Rayagada-Titlagarh-Raipur rail line of East Coast & South East Central Railway covering 465 route kilometers and passing through the states of Andhra



Pradesh, Chhattisgarh & Odisha has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Mankapur-Katra-Ayodhya rail line

In the year 2019-20, Railway Electrification of Mankapur-Katra-Ayodhya rail line of North Eastern Railway, covering 38 route kilometers and passing through the State of Uttar Pradesh has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Samastipur-Khagaria rail line

In the year 2019-20, Railway Electrification of Samastipur-Khagaria rail line of East Central Railway, covering 85 route kilometers and passing through the State of Bihar has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Chunar-Chopan rail line

In the year 2019-20, Railway Electrification of Chunar-Chopan rail line of North Central Railway, covering 100 route kilometers and passing through the State of Uttar Pradesh has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Guntakal-Bellary-Hospet incl. Tornagallu-Ranjitpura rail line

In the year 2019-20, Railway Electrification of Guntakal-Bellary-Hospet incl. Tornagallu-Ranjitpura Branch Line rail line of South Central & South Western Railway, covering 138 route kilometers and passing through the State of Andhra Pradesh & Karnataka has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Mathura-Kasganj-Kalyanpur rail line

In the year 2019-20, Railway Electrification of Mathura-Kasganj-Kalyanpur rail line of North Eastern Railway, covering 338 route kilometers and passing through the State of Uttar Pradesh has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Beas-Gownidwal Sahib-Taran Taran-Amritsar rail line

In the year 2019-20, Railway Electrification of Beas-Gownidwal Sahib-Taran Taran-Amritsar rail line of Northern Railway, covering 72 route kilometers and passing through the State of Punjab has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Unnao-Unchahar rail line

In the year 2019-20, Railway Electrification of Unnao-Unchahar rail line of Northern Railway, covering 113 route kilometers and passing through the State of Uttar Pradesh has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Ratlam-Fatehabad-Laxmibainagar rail line

In the year 2019-20, Railway Electrification of Ratlam-Fatehabad-Laxmibainagar rail line of Western Railway, covering 115 route kilometers and passing through the State of Madhya Pradesh has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Peddapalli-Lingampet-Jagtiyal rail line

In the year 2019-20, Railway Electrification of Peddapalli-Lingampet-Jagtiyal rail line of South Central Railway, covering 83 route kilometers and passing through the State of Telengana has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Darbhanga-Jaynagar rail line

In the year 2019-20, Railway Electrification of Darbhanga-Jaynagar rail line of East Central Railway, covering 69 route kilometers and passing through the State of Bihar has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Wani-Pimpalkhutti rail line

In the year 2019-20, Railway Electrification of Wani-Pimpalkhutti rail line of Central Railway, covering 66 route kilometers and passing through the State of Maharashtra has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Katwa-Ahmadpur rail line

In the year 2019-20, Railway Electrification of Katwa-Ahmadpur rail line of Eastern Railway, covering 52 route kilometers and passing through the State of West Bengal has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Kaptanganj-Thawe-Khairah-Chhapra Kacheri rail line

In the year 2019-20, Railway Electrification of Kaptanganj-Thawe-Khairah-Chhapra Kacheri rail line of North Eastern Railway, covering 206 route kilometers and passing through the State of Bihar & Uttar Pradesh has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Naupada-Gunupur rail line

In the year 2019-20, Railway Electrification of Naupada-Gunupur rail line of East Coast Railway, covering 90 route kilometers and passing through the State of Andhra Pradesh & Odisha has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Utretia-Rae Bareli-Amethi-Janghai rail line

In the year 2019-20, Railway Electrification of Utretia-Rae Bareli-Amethi-Janghai rail line of Northern Railway, covering 214 route kilometers and passing through the State of Uttar Pradesh has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Bandikui-Bharatpur rail line

In the year 2019-20, Railway Electrification of Bandikui-Bharatpur rail line of North Central Railway, covering 97 route kilometers and passing through the State of Rajasthan has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Jhansi-Manikpur incl. Khairar-Bhimsen rail line

In the year 2019-20, Railway Electrification of Jhansi Manikpur including Khairar-Bhimsen rail line of North Central Railway, covering 409 route kilometers and passing through the State of Uttar Pradesh has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Pagidipalli-Nallapadu rail line

In the year 2019-20, Railway Electrification of Pagidipalli-Nallapadu rail line of South Central Railway, covering 285 route kilometers and passing through the State of Andhra Pradesh & Telengana has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

Amritsar-Batala-Bharoli rail line

In the year 2019-20, Railway Electrification of Amritsar-Batala-Bharoli rail line of Northern Railway, covering 104 route kilometers and passing through the State of Punjab has been completed. This has resulted in smooth and seamless flow of electric trains in the section.

New Railway line with Electrification between Telapur-Ramachandrapuram facilitation suburban services in twin cities of Hyderabad, SCR

Signal and Telecom

Signalling

To increase efficiency and to enhance safety in train operations, Modern Signalling Systems comprising of Panel Interlocking/Route Relay interlocking/ Electronic Interlocking (PI/RRI/EI) with Multi Aspect Colour Light Signals are being progressively provided. So for 6018 stations (covering about 96% of interlocked Broad Gauge stations) on Indian Railways have been provided with such systems, replacing the obsolete Multi Cabin Mechanical Signalling System, thus optimising operational cost involved in its operation as well as enhancing safety by reducing human intervention. During 2019-20, 12 Major Stations namely, Tilak Bridge, Faridabad, Ballabgarh, Madurai, Bhilai Marshaling, Jabalpur, Chakradharpur, Jaipur, Abu Road, Tundla, Danapur and Patratu have been provided with Route Relay Interlocking (RRI)/ Electronic Interlocking (EI). Panel Interlocking has been provided at 55 stations and Electronic Interlocking at 350 stations, have been provided during the financial year 2019-20.

Complete Track Circuiting: To ensure track occupation verification, Track Circuiting has been completed at about 34,597 locations up to 31.03.2020 covering 'A', 'B', 'C', 'D Special' and 'E Special' route. Total 6,147 stations have been provided with complete track circuiting.

Block Proving by Axle Counter (BPAC): To enhance safety and improved mobility automatic verification of complete arrival of train at a station, Block Proving by Axle Counter (BPAC) is being provided at stations having centralized operation of points and signals. As on 31.03.2020, Block Proving by Axle Counters (BPAC) has been provided on 5,663 block sections.

Intermediate Block Signalling: Provision of Intermediate Block Signalling (IBS) has proved very useful in enhancing line capacity without extra recurring revenue expenditure in form of operating manpower and amenities required while developing and operating a block station. As on 31.03.2020, Intermediate Block Signalling has been provided in 602 block sections on Indian Railways.

Automatic Block Signalling: For augmenting Line Capacity and reducing headway on existing High Density Routes on Indian Railways,

Signalling provides a low cost solution by provision of Automatic Block Signalling. As on 31.03.2020, Automatic Block Signalling has been provided on 3,309 Route Km.

Train Collsion Avoidance System (TCAS): has been developed by RDSO and three Indian manufacturers. Successful trials have been completed on 250 Route Km. Works are in progress on 1,200 Route km of section on South Central Railway. It has now been decided to adopt TCAS as National ATP for implementation on Indian Railways. It shall be provided on High Density Network (HDN) & freight dense Highly Utilised Network (HUN) routes on priority in next 4-5 years. TCAS has been approved for speed upto 160 kmph. TCAS is also being upgraded to work with Automatic Signalling and Central Traffic Control (CTC) System, thus objectives of line capacity enhancement can also be met.

Centralized Traffic Control (CTC)

It is a computer based system which facilitates control and management of multiple Signalling installations covering a number of stations from a single location. It also provides a real time simulation of railway traffic centrally helping in real time traffic planning for punctual train operations. Controllers can manage train movements directly from CTC centre on real time basis.

Centralized Traffic Control (CTC) covering 250 Route km of Double line section with 29 stations on Aligarh - Kanpur Route has been operationalised.

Further works of CTCs on about 7000 Route Km covering all Zonal Railways are sanctioned and entire HDN Routes covering GQ & GD shall be provided with CTC.

Train Management System (TMS): provides real-time status of train positions, all train movements and a complete view of the section covered on a giant screen provided in the divisional control centre. Punctuality reports, rake and crew links, train graphs, and unusual occurrence reports are generated in the control office.

The overall display panel, known as the 'Mimic Indication Panel', is designed to present detailed status of the system at a glance. It is expected that with commissioning of TMS/CTC projects, our controllers shall be able to efficiently manage train operations. Besides providing real time train running information in the control offices, passengers shall also be provided with accurate arrival/departure information at stations through automatic working of the Passenger information System at Stations. This system has been provided on Suburban sections of Mumbai on Western

& Central Railways and Howrah of Eastern Railway. Similar System shall also be provided at Khurda Road in East Cost Railway, Delhi in Northern Railway, Sealdah in Eastern Railway, Kharagpur in South Eastern Railway and Chennai in Southern Railway.

Interlocking of Level Crossing Gates:

Indian Railways have provided interlocking with Signals at 11,639 Level Crossing Gates as on 31.03.2020, to enhance the safety at Level Crossings.

Sliding Boom at LC Gate:

Provision of Interlocked Sliding Boom has become very effective in minimizing disruption to train services when Level Crossing Gates get damaged by road vehicles especially in suburban areas. With provision of Sliding Boom Interlocking, Signalling System continues to function normally with minimum effect on train operation. 5,092 Nos. of busy interlocked gates have been provided with Sliding Booms as on 31.03.2020 in addition to lifting barriers and further busy gates are also being progressively covered.

Growth of deployment of Signalling on Indian Railways:

					As on 31.03.2020
Item	March,16	March,17	March,18	March,19	**March,20**
Panel Interlocking (Stations)	4,107	4,155	4,130	4,052	**3,863**
Route Relay Interlocking (Stations)	281	281	282	228	**228**
Electronic Interlocking (Stations)	1,005	1,148	1,358	1,606	**1,927**
PI/RRI/EI (Stations)	5,393	5,584	5,770	5,886	**6,018**
Block Proving Axle Counter (Block sections)	4,640	4,976	5,058	5,363	**5,663**
Automatic Signalling (Route Kms)	2,752	2,866	2,901	3,039	**3,309**
Intermediate Block Signalling (Block sections)	489	501	532	574	**602**
Interlocked level Crossing Gates (Nos.)	10,776	10,826	11,006	11,375	**11,639**

Self-Sufficiency

Signalling Workshop: Railway Signalling installations use a number of specialized equipment for smooth & 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 at Podanur on Southern Railway, Mettuguda on South Central Railway, Gorakhpur on North Eastern Railway, Howrah on Eastern Railway, Byculla on Central

Railway, Sabarmati on Western Railway, Ajmer on North Western Railway, Kharagpur on South Eastern Railway and Ghaziabad on Northern Railway have been manufacturing items like Electric Point Machines, Token less Block Instrument, Double Line Block Instruments, Axle Counters, various types of Relays, etc. The out-turn achieved by these S&T workshops during 2015-16 to 2019-20 are as under:

Year Wise out Turn Signal and Telecommunication Workshop:

Year	Out Turn in Lakhs
2015-16	22,098.30
2016-17	22,513.21
2017-18	25,749.21
2018-19	29,669.70
2019-20	**32,385.90**

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 Railway Central Public Sector Enterprise formed in September, 2000 is successfully exploiting surplus capacity of IR Telecom network commercially.

As on March 2020, Indian Railways has about 59,105 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. This OFC network is also contributing significantly in building National Knowledge Network through RailTel. It is also planning to provide Broadband connectivity to Panchayats through this OFC network.

Railways have planned Wi-Fi facility to be provided at all stations excluding Halt Stations for internet facility to passengers which will aid in "Digital India" initiatives of Govt. of India. Wi-Fi internet facility at 5,819 stations has been provided till 31.10.2020. Work is in progress at remaining stations by M/s Tata Trust without incurring any expenditure by Ministry of Railways. Wi-Fi system has also been provided at Railway Offices & 80 Divisional & Zonal Hospitals over IR.

To enhance the security of passengers & premises and to work as a strong deterrent to crime in station premises particularly those against

women and children. Railway has planned to provide Video Surveillance System at 6,124 (A1, A, B, C, D & E category) stations on Indian Railways. Video Surveillance (CCTV) System has been provided at 627 stations till 31.08.2020. In addition, CCTV also provided at Railway Offices & 80 Divisional & Zonal Hospitals over Indian Railways.

Indian Railways have also rolled out Global System of Mobile Communication–Railways (GSM-R) based Mobile Train Radio Communication (MTRC). MTRC has already been provided on 3,445 Route Kms. Now Railways have decided to go for Long Term Evolution (LTE) System based MTRC to fulfill the data and voice needs.

Indian Railways has its own satellite hub that is being utilized for connecting remote locations for Freight Operation Information System (FOIS), Unreserved Ticketing System (UTS) and Disaster Management System as well as for other critical communication needs. Besides IR network uses 16,880 data circuits that power its various data and voice networks across the country.

Railways have also established their Multi-Protocol Level Switching (MPLS) based Next Generation Network (NGN) for voice traffic. This Next Generation Network (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 1.54 lakh VHF walkie-talkies sets to ensure safety and enhance reliability.

Telecom also plays a major role in ensuring passenger comfort. For the convenience of passengers, Train Information Boards have been provided at 1,137 stations, Public Address (PA) Systems at 4,508 stations and Coach Guidance System at 648.

Implementation of e-Office application over Indian Railways as a part of digital initiative & to go paperless in the office working which would ultimately improve transparency and efficiency in the system, is also under implementation over Indian Railways. Till 30.09.2020, 106 locations including all zonal & divisional headquarters have been connected through e-Office over Indian Railways.

Important Telecom assets are tabulated below:

S.No.	Installation	Units	As on 31.03.2019	As on 31.03.2020
1.	Optical Fibre Cable	Rkms	55,835	**59,105**
2.	Quad Cable	Rkms	62,571	**62,732**
3.	Railway Telephone Subscribers Lines	Nos.	3,95,816	**3,56,910**
4.	No. of Control Sections provided with Dual Tone Multiple Frequency (DTMF) control equipment	Nos.	322	**323**
5.	Mobile Train Radio communication System (Route kms.):			
	a. GSM (R) based	Rkms	2,461	**3,445**
	b. TETRA based	Rkms	53	**53**
6.	Digital Microwave (7 GHz)	Rkms	1,178	**498**
7.	Public Address System	Nos. of STNs	5,206	**4,508**
8.	Train Display Boards	Nos. of STNs	1,113	**1,137**
9.	Coach Guidance System	Nos. of STNs	583	**649**
10.	VHF Sets			
	a. 5 Watt sets (Hand held)	Nos.	1,44,040	**1,53,999**
	b. 25 Watt sets (At Stations)	Nos.	7,795	**9,767**
11.	V SAT	Nos.	635	**635**
12.	Railnet Connections	Nos.	1,31,502	**1,53,999**
13.	UTS/PRS Circuits	Nos.	11,044	**11,044**
14.	FOIS Circuits	Nos.	2,454	**3,030**
15.	NGN & Exchange Circuits	Nos.	2,536	**2,536**
16.	Wi-Fi at Stations	Nos. of STNs	1,372	**5,661**
17.	CCTV at Stations	Nos. of STNs	453	**598**

Rolling Stock

Locomotives:

The size of IR's fleet of locomotive stock as on 31st March, 2020 consisted of 39 steam, 5,898 diesel and 6,792 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
2017-18	39	6,086	5,639	11,764	38,166	16,879
2018-19	39	6,049	6,059	12,147	*38,537	16,226
2019-20	**39**	**5,898**	**6,792**	**12,729**	**39,037**	**16,454**

* revised

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

Year	Broad Gauge		Metre Gauge	
	Diesel	Electric	Diesel	Electric
2016-17	37,633	37,995	18,948	-
2017-18	38,244	38,086	18,960	-
2018-19	*38,621	38,455	18,967	-
2019-20	**38,777**	**39,257**	**18,963**	**-**

* revised

Coach upkeep:

1,184 old coaches were given mid-life rehabilitation 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	1,280,797	-	-	7,415
1970-71	1,750	340,541	24,676	1,505,047	-	-	8,719
1980-81	2,625	500,607	27,478	1,695,127	-	-	8,230
1990-91	3,142	609,042	28,701	1,864,136	-	-	6,668
2000-01	4,526	859,701	33,258	2,372,729	142	13,884	4,731
2010-11	7,292	13,64,948	45,082	32,54,555	761	74,097	6,500
2017-18	9,556	17,48,490	54,081	39,57,328	1,690	1,67,185	6,537
2018-19	10,439	18,85,610	55,258	*40,41,235	*1,883	*1,65,524	6,406
2019-20	**11,360**	**20,72,843**	**57,083**	**42,05,915**	**1,793**	**1,57,012**	**6,372**

$ Includes standing accommodation.

@ Includes Rail Cars.

+ Includes luggage vans, mail vans, parcel vans etc.

* revised

Wagons:

As on 31st March, 2020, the size of IR's wagon fleet consisted of 2,93,077 units 67,011 covered, 1,69,871 open high-sided, 17,473 open low-sided, 23,664 other types and 15,058 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	205,596	58.9	25.5	3.4	7.2	5.0	100
1960-61	307,907	57.3	25.5	2.5	10.6	4.1	100
1970-71	383,990	53.4	25.6	1.8	13.0	4.2	100
1980-81	400,946	53.3	28.3	3.2	11.8	3.4	100
1990-91	346,102	49.1	29.6	3.6	14.4	3.3	100
2000-01	222,193	34.1	41.0	3.6	17.5	3.8	100
2010-11	229,987	26.6	52.8	3.1	12.0	5.6	100
2017-18	2,79,311	23.7	56.8	5.7	8.4	5.4	100
2018-19	2,89,175	23.4	57.1	5.9	8.5	5.1	100
2019-20	**2,93,077**	**22.8**	**58.0**	**6.0**	**8.1**	**5.1**	**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
2017-18	264	16.28	263	61.7	1.1	31.7
2018-19	275	16.95	274	61.9	1.0	31.6
2019-20	**278**	**17.44**	**277**	**62.8**	**1.0**	**32.2**

$ Excludes departmental service wagons and brake vans

Some of the major types of wagons plying on IR as on 31.03.2020 are shown below:

Types of Wagons fleet (BG)			
Types of Wagon	Units available	Tare weight (t)	Brief description
BOXNHS	19341	23.2	Bogie open wagon, air brake, high speed.
BOXNS	4304	19.85	Bogie open wagon, air brake, high speed.
BOXNLW	2298	20.41	Bogie open wagon, air brake, light weight.
BOXNCR	365	23.1	Bogie open wagon, air brake, made of corrosion resistant IRS M : 44 steel.
BOXNHA	755	23.17	Bogie open, air brake wagon of 22 t axle load with high side walls (higher than BOXN), designed for transportation of coal.
BOXNHL	66727	20.6	Bogie open air brake, stainless steel wagon
BOX 'N'	35297	23.2	High - sided bogie open wagon 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.
BOY	1174	20.71	Standard Gondola wagon, air brake, to carry minerals/ iron ore with an axle load of 22.9 t.
BCN/BCNA	41896	27.20/ 24.55	Bogie covered wagon, air brake fully riveted / welded construction for transportation of bagged cement, food grains, fertilizers, etc.

BCNAHS	8980	24.6	Bogie covered air brake, all welded & riveted construction with High Speed bogie CASNUB – 22 HS BOGIE.
BCNHL	18823	20.8	Bogie covered, air brake, micro – alloy (stainless steel wagon)
BRN	1357	24.39	Bogie Rail wagon Heavy, air brake.
BRNA /HS	5751	23.54	Bogie Rail wagon Heavy, air brake, High Speed bogie, riveted cum welded construction.
BRHNEHS	1560	26.15	Bogie Rail wagon, air brake, high speed CASNUB BOGIE for engineering department.
BFNS	1195	26.71	Bogie Flat, air brake wagon, high speed for transportation of H.R. coils, plates, sheets & billets loading.
BOST/HS	9812	25.50	Longer BOXNHS, air brake, wagon for finished steel products.
BOBR/N/HS	15337	26.40/ 25.60/ 25.61	Bogie open rapid discharge air brake wagon for coal.
BOBYN	5941	27.78	Bogie Hopper, air brake, bottom discharge wagon.
BOBSN	2041	30.00	Bogie open air brake, side discharge wagon for iron ore.
BTPN	11651	27.00	Bogie Tank wagon, air brake, for liquid consignments like petrol, naptha, ATF and other petroleum products.
BTPFLN	804	23.58	Bogie Tank wagon, air brake, with frameless body.
BTPGLN	338	41.60	Bogie Tank wagon, air brake, for carrying Liquified Petroleum Gas.
BLCA/BLCB/ BLCAM	19047	19.10/ 18.00/ 18.00	Low Platform Container Flat wagon, 840 mm wheel diameter, AAR'E' type entre buffer coupler and slack less draw bar system (privately owned)
BLLA/BLLB (Group)	1634	19.10/ 19.00	Container Flat wagon, same as BLCA / BLCB, but with a Longer Platform of 45ft.(privately owned).

Repairs and Maintenance:

44 Loco sheds and 236 Carriage and Wagons sick lines and central repair depots provide repair and maintenance facilities for the entire fleet of rolling stock. 46 workshops undertake maintenance of Rolling Stocks.

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	
	2018-19	**2019-20**
Diesel Locos	440	**423**
Electric Locos	465	**490**
Coaches	30,649	**30,533**
Wagons	53,903	**55,433**

COFMOW

Central Organisation for Modernisation of Workshops(COFMOW) was established under Ministry of Railways by Government of India for modernizing Indian Railways Workshops. Since its establishment in 1979, COFMOW has been assisting in modernizing Indian Railways Production Units and maintenance Workshops. So far, COFMOW has been involved in purchasing over 23,644 machines valued at ₹7,018.39 crore. COFMOW continues its endeavor to provide crucial technical support to the various manufacturing and maintenance units of Indian Railways. COFMOW is now taking up composite turnkey projects of setting up workshops/expansion of capacity in PUs/workshops as well as specialised technical projects allotted by Ministry of Railways.

COFMOW is in a position to offer its services to those needing modernization or up gradation of their manufacturing/maintenance activities. COFMOW provides professional advice and a single window service in planning and procurement of machine tools and allied equipment.

Further, COFMOW provides professional advice and assists Zonal Railways & PUs in preparing and upgrading technical specifications for procurement of M&P, machine tools and allied equipment.

Salient features:

- Bringing in state of the art technologies available worldwide in the field of M&P.
- Preparing, Upgrading and Compiling specifications of machines used in workshops, maintenance sheds and production units.
- Its continued efforts for indigenisation have led to a vibrant machine tool industry in India.
- Undertake turnkey works/projects associated with M&P, New Manufacturing lines and composite modernization projects.
- Professional expertise in 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 for their M&P requirements.
- E-tendering all M&P items
- Executing Specialized technical projects involving upgradation of Railways rolling stock & yards.
- Reverse Auction for economic benefits.
- Successfully implemented payment of vendor through Central Integrated Payment System (CIPS).

Key Milestones:

Year	Fund Utilization (₹in crores)	Contracts Awarded (₹in crores)
2017-18	436.53	679.67
2018-19	448.61	1,096.38
2019-20	**587.58**	**802.29**

Composite Turnkey projects involving machines:

Completed

- Composite Works contract for Augmentation of production capacity for manufacturing of advanced LHB coaches at ICF/Chennai(₹127 crore).
- Coil Spring manufacturing facility at ICF/Chennai (₹83.88 crore).
- New Wheel and Axle assembly line at RWF/Bengaluru (₹49.42 crore)
- Setting up of Wheel Shop at Sanpada (₹33.64 crore).
- Augmentation of Wheel Shop capacity at Matunga/CR (₹62.3 crore).

Under progress

- Creation of BG Coach POH facilities at Motibagh/NGP (₹81.89 crore).
- Modernisation & Augmentation of POH capacity upto 150 wagons per month, Dahod (₹92.92 crore).
- Augmentation of BG coaches POH capacity from 50 coaches to 100, Bhavnagar (₹48.71crore).
- Augmentation of Wagon POH capacity from 400 to 500 wagons per month, Raipur (₹113.20 crore).
- Setting up of Axle Forging Line, RWF/Bengaluru (₹303.52 crore).
- Supply installation and commissioning of M&Ps at WRS Badnera (₹40.51 crore).
- Setting up of wheel set maintenance facility at NKJ in WCR (₹76.77 crore).

Special Projects in new technology areas in hand:

- Procurement of Simulator in motion type for training of Loco Pilots (₹350 crore).
- Procurement of Trolley Mounted Sewage Evacuation Machines (₹30 crore).
- Fitment of RFID in Wagons (₹12.11crore).
- Fitment of Bio Vacuum Hybrid-Toilet System in 500 LHB coaches (₹55 crore)
- Smart Yard facilities at DDU/Mugalsarai (₹36 crore)
- Procurement of Hot Axle Box Hot Wheel Detector
- Automation of Bogie Assembly in JUDW, PL and MTN workshop(₹50.82)
- Online Monitoring of Rolling Stock (₹542.95 crore)
- Wheel Data Acquisition System (₹7.87 crore)

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
2017-18	-	47.2	41.3	11.5	-	38.7	61.3
2018-19	-	46.3	42.1	11.6	-	*37.2	*62.8
2019-20	**-**	**43.0**	**45.4**	**11.6**	**-**	**35.3**	**64.7**

@ includes DHMU & DEMU
$ includes Rail Cars & Rail Buses
*revised

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
2017-18	-	45.3	48.8	5.9	-	35.6	64.4
2018-19	-	43.8	50.4	5.8	-	34.6	65.4
2019-20	**-**	**40.4**	**53.6**	**6.0**	**-**	**32.7**	**67.3**

@ includes DHMU & DEMU

Electric Traction:

Highest-ever Electric loco production:

CLW has turned out 431 three-phase electric loco in year 2019-20 which is the rarest feat achieved by CLW and this performance has been unprecedented in the history of CLW. A cumulative production of 784 electric locomotives has been achieved during 2019-20 utilizing the capacity of CLW, DLW & DMW.

Operation of trains with WAP-5/WAP-7 locomotive in push-pull mode:

In order to increase average speed of passenger trains, IR has successfully introduced Push-pull operation (one locomotive in front of rake and one rake in rear of rake with all controls from front locomotive) in train no. 22221/22 between Mumbai – Delhi (CSMT – NZM) over Central Railway Route. With the Push-Pull arrangement in this train, attaching/detaching of banker locomotive at ghat section between Kasara – Igatpuri is no more required. Average speed of train has also been enhanced and journey time has been curtailed by about 90 minutes. New Delhi-Mumbai and New Delhi-Kolkata Rajdhani trains are planned to be converted in Push Pull scheme. This will result in saving of 60-90 minutes in travel time.

Manufacturing of High Horse Power (9000 hp) Freight locomotives:

Enhancement of average speed of freight trains is one of the Mission of Indian Railways. At present Horse Power to Trailing Load ratio of freight trains is less than one which is just adequate. Thus average speed of freight trains on IR is only 23.2 kmph (ASS 2018-19) even after deployment of multi locomotives in heavy freighters. To the solution, IR has taken initiative and developed High Horse Power Freight electric locomotives (9000 HP) in-house successfully. The upgradation is 'Make in India' initiative and only with the incremental increase in initial cost of locomotive. Two such locomotives have been turned out from CLW and are under extensive field trials.

New Era of Green Technology- HOG power supply:

Around 700 locomotives have been provided with Hotel Load Converter and around 500 pair of trains are being converted for HOG scheme up to Feb 2020. All Passenger (WAP7) locos turned out by CLW are fitted with Hotel Load Converters. The main benefits of this system are supply of pollution free and cheaper power from OHE as compared to End on Generation (EOG) system besides other advantages like reduction of carbon emission, noise level and consumption of fossil fuels helping in

protecting the environment. There is a saving of around ₹1.5 lakhs per day per pair of rake by using HOG supply.

Crew Voice/Video recording system (CVVRS):

Provision of Crew Voice & Video Recording system (CVVR), similar to provision of black box in aeroplanes is being tried on electric locomotives for recording of cab voice & video and track side through microphones & cameras. Recording of crew communications & crew interactions that occurred immediately prior to the accident will provide assistance to identify & address the operational and human factors issues within a proactive safety management system. Procurement of 5000 & 500 CVVRs are being procured through CLW & DMW respectively. Subsequently it will be provided in all locomotives as a regular measure.

Up-gradation of WAP-5 locomotive from 5400 hp to 6000 hp:

The entire fleet of WAP-5 locomotives has been upgraded from 5400 HP to 6000 HP by modifying the Vehicle Control software. This has not only increased the power on-wheel but also the acceleration reserve. Above up-gradation has been carried out indigenously. All WAP5 locomotives turned out from CLW are of 6000 HP.

Real Time Train Information System (RTIS)

For availability of actual train information in public domain, a GPS based 'Real Time Train Information System' (RTIS) has been developed and is being installed on electric locomotives. Total 2700 locomotives have been provided with RTIS so far.

Diesel Traction:

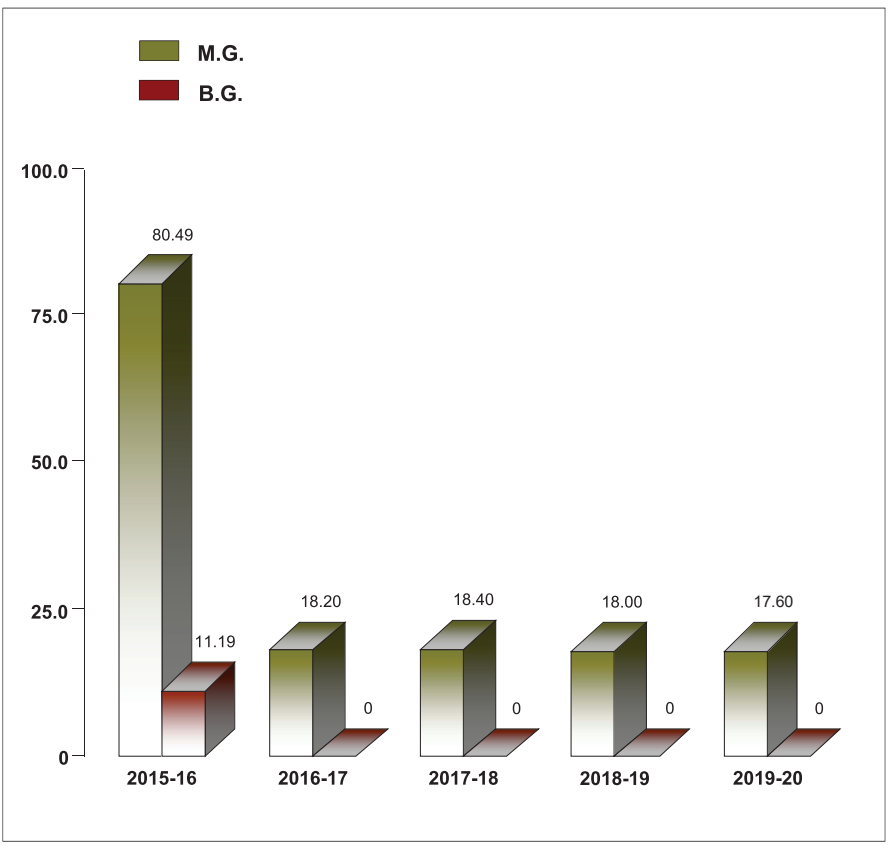
Indian Railways has a fleet of about 5589 (including 183 locomotives manufactured at Marhowra plant under PPP) mainline BG diesel locos based in 43 Sheds. There are 237 Diesel Electric Multiple Units (DEMU) based at 25 maintenance depots. Following initiatives have been taken by Mech. Engineering (Traction) Directorate for improving availability & reliability and enhancing the safety concerning to diesel locomotives, DEMUs and train operation.

- **Dual-mode Locomotive:** There are large numbers of stations/ yards, where traction change takes place over IR due to mix of diesel and electric tractions. Even after complete change-over to electric traction diesel locomotives would be needed for emergencies, disaster management, natural calamities and strategic operations. With modern electronics, it is much easier to build an electro-diesel locomotive (Dual mode), which is equally capable of running at designated speed using electric as well as diesel tractions.

These dual mode locomotives are very useful and economical for operation needing traction change, shunting and also in case of faults in electric traction. There will be huge cost savings due to reduction in the detention time of locomotive and rakes and also working with one dual mode locomotive rather than maintaining separate electric and diesel locomotives. This will also improved flexibility of operation in the goods yards / sidings, increased throughput of the sections. In the event of major accident in natural calamities like cyclone and disturbed areas where OHE gets affected, dual mode loco will provide excellent operational flexibility to work on diesel until the normalcy is established.

The prototype Dual mode locomotive has been manufactured by DLW based on indigenous design and is being taken up for operational and safety trials and testing by RDSO.

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



- **Export of Diesel Locomotives:** In view of the policy for complete electrification of Broad Gauge routes, Indian Railway has stopped manufacturing new diesel locomotives for its own use at DLW and DLMW plants. However manufacture for non-railway customers continues including exports. Indian Railways has exported 7 nos. Diesel locomotives to Shri Lanka having 12 cylinders 3000 HP engines.
- **Air Conditioning (AC) of locomotive cabs:** Loco Pilots are working in extreme weather conditions of heat, humidity and dust prevalent across the country. The need for making locomotive cab crew friendly to ensure long hours of fatigue free driving has been recognized world over. Improvement in the working conditions of loco crew is a priority area for IR also. Provision of AC in loco cab has been a step in this direction. This will reduce fatigue level, improve their efficiency and alertness. ACs have been fitted in 1099 Diesel Locomotives and all the new diesel locomotives being manufactured at Marhowra plant have cab ACs.
- **Remote Monitoring and Management of Locomotives and Trains (REMMLOT):** REMMLOT enables remote monitoring of Diesel Locomotives. It specifically enables analysis of lapses on part of the loco pilot. 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 working in 3,823 Diesel Locomotives.
- **Auxiliary Power Unit (APU):** APU is a self-contained unit with a small diesel engine coupled with compressor and alternator for battery charging. It has its own set of controls, accessories and is integrated to the existing control system of locomotive. In APU System, Main Engine shuts down and small 25 HP Engine starts and charges batteries and air brake pipes, when locomotive idles for more than 10 minutes. The diesel engine of APU consumes only 3 liters of diesel per hour in comparison to 25 liters by the main engine of the locomotive. Expected savings per loco fitted with APU is ₹20 lakhs/year on account of savings in fuel oil only. So far, APUs units have been fitted in 1167 Diesel Locomotives. Further all the new diesel locomotives being manufactured at Marhowra plant have this system.
- **Multi-genset locomotive:** Multi-genset has been developed by RDSO and DMW in collaboration with NREC of USA. In a multi- genset locomotive, 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. Two such locomotives have been turned out by DMW/PTA. Trials at Itarsi Diesel shed have shown saving up to 17% fuel in shunting and passenger operations. Besides fuel saving, there is a reduction of 85%-90% in NOx and particulate emissions compared to uncontrolled locomotive emissions. Another one multi-genset locomotive has been manufactured in 2019-20 and one more multi-genset locomotive is planned for manufacture in year 2020-21.

- **Bio-Diesel:** Indian Railways had 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/WCR and Sanathnagar/SCR. Subsequently, 76 locations on all Zonal Railways have started using the blended oil. Use of bio-diesel results in reduction of Greenhouse Gases emissions, earning of carbon credits & saving of foreign exchange.

- **Toilet onboard 4500 HP WDG4D Diesel Electric Locomotive:** Keeping in view the inherent need for improving crew comfort, 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 No. WDG4D-70486 fitted with vacuum based toilet and bio-digester system has been flagged off by Hon'ble Minister of Railways on 06th May, 2016. DLW has fitted Water Closets in five Diesel Locomotives.

- **Compressed Natural Gas (CNG)/ Liquid Natural Gas (LNG) Diesel Electric Multiple Unit (DEMU):** Indian Railways has already embarked on its journey to use alternate source of energy like CNG in its fleet of DEMUs. Presently, CNG DEMU rake are running in four sections viz., Rewari- Rohatak, Delhi-kurukshatra, Delhi- Samli and Farukhnagar- Garhi Harsaru- Delhi Sarai-Rohilla section of Northern Railway. A total of 100 DPCs (Diesel Power Cars) have been sanctioned for conversion to dual fuel with CNG/LNG under RSP. Work has been completed on 26 DPCs for CNG and work of conversion on two more DPCs is under progress. Further, Tender for conversion of 20 nos. DPC dual fuel with CNG/LNG has been awarded. Out of these, 02 nos. kits have been received at Shakurbasti/DLI.

CNG is not only cheaper fuel than diesel but is also more environment-friendly. In comparison to diesel engine, a saving in fuel cost of 6% has been realized with use of CNG engines in dual fuel mode.

- **Solar Panels**

a) DEMU with Solar Power Panel: Hon'ble Minister of Railways dedicated First 1600 HP DEMU rake with solar powered Panel hotel load system on 14th July, 2017 at Safdurjung railway station, New Delhi. Total 20 such trailer coaches are fitted by IROAF at ICF, Chennai.

Further sanction is available for provision of Solar Panels on 530 Nos. trailing Cars of DEMUs.

b) Solar Panels on trains:

(i) Solar Panels have been installed on 10 Nos Exhibition Coaches of Swachhata Express.

(ii) In addition to above, flexible solar panels have also been retrofitted on 13 coaches of Sitapur- Rewari passenger.

(iii) 50 nos. of Guard Vans have been retrofitted with solar panel.

(iv) Further, RSP sanctions are available for provision of Solar Panels on 750 Nos. Guard Brake vans.

(v) 10 nos. solar panels fitted on non AC Passenger coaches of Lucknow under trial at Raebareli.

Steam Locomotive

Steam Locomotives are the icons of Indian Railways century old rich industrial heritage. The sound and smells of the gallant stalwarts of bygone era are major tourist attraction. For offering mesmerizing experiences of old ages, the following routes have currently been earmarked for running of steam locomotive hauled tourist trains:

(i) Broad Gauge Steam service on demand between Delhi Cantt & Rewari and Garhi Hasru & Farcuhnagar (Delhi Division)

(ii) Broad Gauge Steam Tourist specials over selected routes of Southern Railway.

(iii) Narrow Gauge steam services over Darjeeling Himalayan Railway (DHR), now in its 141st year and a UNESCO World Heritage Site.

(iv) Meter Gauge Steam services over Nilgiri Mountain Railway (NMR), now in its 113rd year and a UNESCO World Heritage Site.

(v) Narrow Gauge steam services over Kalka-Simla Railway (KSR) now in its 118th year and UNESCO World Heritage Site.

(vi) Narrow Gauge steam services over Neral-Matheran on Matheran Light Railway (MLR), now in its l14th year.

(vii) Narrow Gauge steam services over Kangra Valley Railway (KVR), now in its 92nd year.

Indian Railways have also preserved about 223 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.

Besides working steam locomotives, Indian Railways are also preserving 18 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 a working Steam Shed, a feat un-paralleled in the World.

The Rewari Steam Centre now maintains six Broad Gauge and four Meter Gauge working steam locomotives, including the iconic "Fairy Queen" (1855), placed in the Guinness Book of Records as being the oldest working locomotive in the World.

WAG 9 with IGBT based propulsion system

Personnel

The number of regular employees on Indian Railways as on 31.3.2020 stood at 12,53,592.

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

Number@ of staff as on 31st March (in thousands)					Expenditure@ on staff
Year	**Groups A&B**	**Group C**	**Group D**	**Total**	**(₹ in crore)**
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
2017-18	16.6	1,133.5	120.3	1,270.4	1,28,714.74
2018-19	*16.8	1,075.8	*135.1	*1,227.7	*1,35,171.13
2019-20	**18.5**	**1,235.1**	**#**	**1,253.6**	**1,54,214.71**

*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.

erstwhile Group D merged in Group C for 2019-20.

Number of personnel (Groups A&B) constitute 1.48% of the total strength, while Group C(including Group D merged in Group C) account for 98.52% . Of the employees in Group C 1.56 lakhs (12.63%) are workshop employees and artisans and 10.79 lakhs (87.37%) from other categories including running staff. Railway Protection Force/RPSF personnel totalled 76,177.

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 2019-20 as compared to the previous year is given below:

	Number of SC Employees		Number of ST Employees	
	As on 31.03.2019	As on 31.03.2020	As on 31.03.2019	As on 31-3-2020
Group A	1,462 (14.58%)	**1,413 (12.50%)**	748 (7.46%)	**736 (6.51%)**
Group B	1,262 (18.75%)	**1,236 (17.18%)**	543 (8.07%)	**558 (7.76%)**
Group C #	2,04,939 (16.92%)	**2,03,931 (16.51%)**	95,918 (7.92%)	**96,621 (7.82%)**
Grand Total	2,07,663 (16.91%)	**2,06,580 (16.84%)**	97,209 (7.92%)	**97,915 (7.81%)**

Including erstwhile Group 'D'

Note: Figures mentioned in brackets indicate the percentage of SCs/STs to total number of employees.

A fully dedicated reservation cell exists each at the level of Ministry/ Railway/Zones/ Divisions/Workshops/Production Units, for dealing with the reservation matters.

Wage Bill:

Wage bill including pension etc. during 2019-20 was ₹1,54,214.71 crore registering an increase of ₹19,043.58 crore over the previous year. The average wage per employee was up by 11.58% from ₹11,02,934 per annum in 2018-19 to ₹12,30,641 per annum in 2019-20. 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 55%.

The average annual wage (excluding fringe benefits) per employee paid under various categories in 2019-20 is given below:

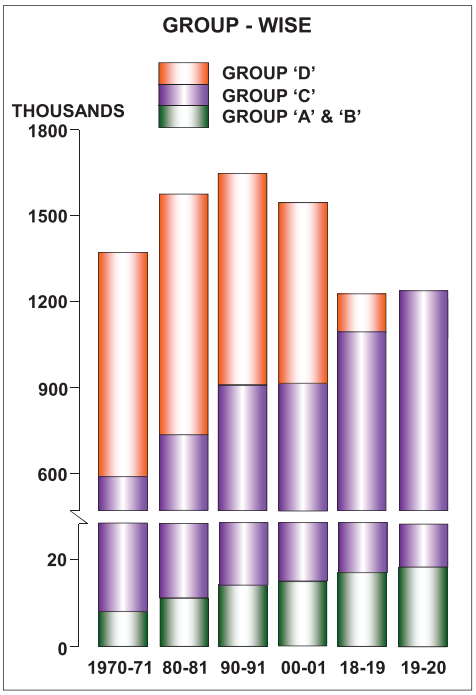
Category	Groups A & B (₹)	Group C (₹)	Total (₹)
Workshop and artisan	-	14,29,594	14,29,594
Running*	-	16,93,671	16,93,671
Others	-	10,81,976	10,81,976
Total	**34,15,481**	**11,99,500**	**12,30,641**

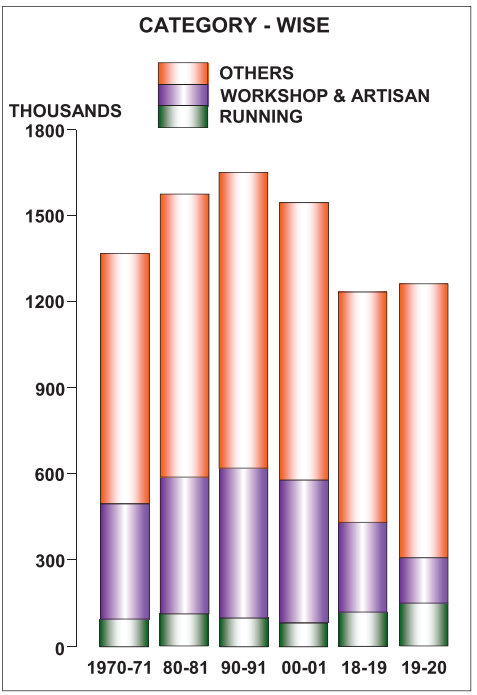
*Emoluments include running allowance.

Productivity Linked Bonus:

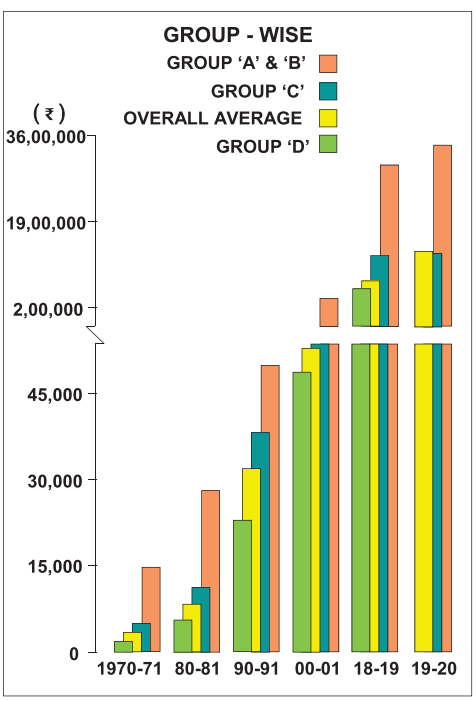
In 2019-20, all non-gazetted Railway employees (excluding RPF/RPSF personnel were sanctioned Productivity Linked Bonus (PLB) for 78 days. This benefitted an estimated 11,58,205 Railway employees. Further, Group 'C' and 'D' RPF/RPSF personnel have been sanctioned ad-hoc bonus equivalent to 30 (thirty) day's emoluments for the year 2019-20. The PLB and ad-hoc bonus both have been paid on an enhanced calculation ceiling of ₹7,000/-p.m. Financial implication for PLB and ad-hoc bonus was approximately ₹2,081.68 crore and ₹43.58 crore respectively.

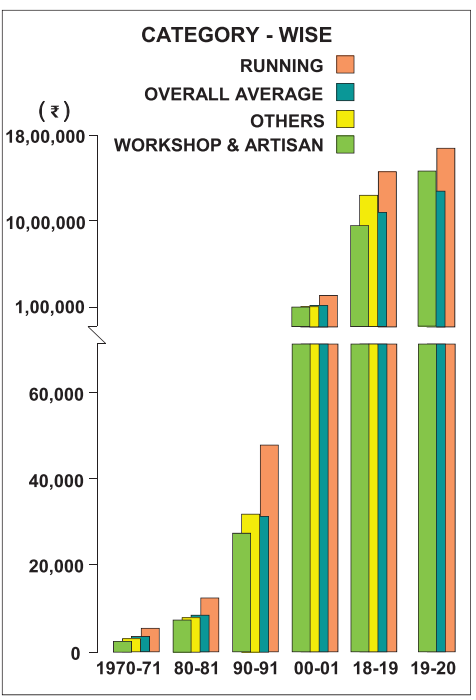
NUMBER OF PERSONNEL





AVERAGE ANNUAL WAGE PER EMPLOYEE





Human Resource Development (HRD) and Manpower Planning:

Training

Indian Railways have Training Centers for Gazetted and Non-Gazetted Staff. These Training Centres located all over Indian Railways imparts various type of trainings i.e Probationary/Initial training (i.e. before taking up a working post), Promotional training (i.e. on promotion), Refresher training (i.e. mid-career/on introduction new developments in technology) and Specialized training (for Specialized courses). During 2019-20, around 4,24,000 non-gazetted employees have been provided different types of training i.e. initial, promotional, refresher, specialized.

To meet the challenges posed by changes/advancement in technology, quality of services and safety of operations, significant initiatives have been taken to train the human resources.

All safety category railway employees are given structured training at various stages of their career. Detailed training modules as per prescribed periodicity are available for each category at initial/promotional stages along with refresher courses and specialized training courses laying emphasis on more practical aspects which helps them in assimilating technology transferred and skill upgradation. These modules are updated keeping in view the technological changes in working practice. Safety Category staff like loco staff also undergo simulation training. Online training materials have also being made available to the trainees.

All frontline staff involved in train operations are imparted a special one day capsule training on Threat Perception & Emergency Response. Training module has also been formulated for running staff to include training Course on Fire Fighting & use of fire extinguishers, in initial and periodic refresher courses for Assistant Loco Pilots, AC Attendants and other running staff. Safety staff are given exclusive training on First Aid and on Disaster Management with the emphasis on Relief, Rescue and Rehabilitation (three 'R's). Yoga and Meditation lessons have been introduced in training centres with an aim to help railway men in coping with the stresses involved with their jobs. Some of the other Specialized Courses run by the Training Centres include Management Development Programme for Supervisors, Safety Oriented Course for Permanent Way supervisors, Air brake Operations Training for Guards and Drivers, Inspection and Rehabilitation of Bridges for Junior Engineers/Senior Section Engineers (Permanent Way)/ Bridge/Works.

Apart from in-house training, railway employees are also sent for foreign trainings under transfer of technology and are also provided inputs through leading training institutes within India.

In view of the success and positive outcome of "Project Saksham, 2018", "Project Saksham-II, 2019" was launched w.e.f. 01.04.2019. "Project Saksham-II, 2019" like "Project Saksham, 2018" was a five day on the job training at workplace or as classroom training in Railway Training Center depending on the nature of training. Around 11,68,000 employees have been trained under Project Saksham-II.

Apprenticeship Training

Apprenticeship training is one of the most effective ways to develop skilled manpower for industry by using training facilities available in the establishments without putting any extra burden on exchequer to set up training infrastructure. Persons after undergoing apprenticeship training can easily adapt to industrial environment at the time of regular employment. The other advantages of apprenticeship training are as follows:

- Improved quality of training, experiential learning and enhanced employability.
- Providing apprentices a real chance to put skills into practice and helps them to gain confidence in working environment.

Indian Railways have also been awarded "CERTIFICATE OF APPRECIATION" for outstanding contribution towards engagement of apprentices.

Training Modules

In view of technological upgradation and changed job requirements, there was a need to review the existing training modules of all the departments. Therefore, the existing training modules of all the departments viz. Traffic, Commercial, Electrical, Civil, Mechanical, Personnel, Signal & Tele. and Finance were reviewed, updated & uploaded on Railway's website. These Training modules have been converted into online mode and the same have been uploaded.

Online Training

The training material for different categories of staff have also been converted in online mode in the form of powerpoint presentations, pdf documents and videos of lectures etc. These training materials can now be accessed by Railway employees even from his remotest place of posting. Most of the trainings are now being conducted in online/blended mode.

Railway Recruitment Boards:

During 2019-20, panels of 76,581 candidates have been supplied

to the Indenting Railway(s)/Production Unit(s) by 21 RRBs across India. Further, the Computer Based Tests against CENs No. 31/2018 (for Junior Engineers/CMA/DMS) having 13,538 vacancies & 02/2019 (for Para medical categories) having 1,663 vacancies have been completed during 2019-20.

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 45.12% staff have been provided with railway quarters, 2,150 staff quarters were electrified during 2019-20.

Canteens served subsidized meals and refreshments to employees during the year at their work-places.

Co-operative societies of various types are functioning on Indian Railways. These Cooperative Societies are registered under the Multi-State Cooperative Societies Act, 2002 and are under overall supervision of the Central Registrar of Cooperative Societies, Deptt. of Agriculture & Coop. Krishi Bhawan, New Delhi. Railway Administration has no jurisdiction over the administrative, financial, managerial, appointment & service matter of the employees of the society. Railways only provide certain facilities & concessions to these Cooperative Societies as per the provisions of Chapter XXIII of IREM Vol.II. There are 46 Thrift and Credit Societies, 136 Railway men's Consumer Co-operative Societies, 25 Labour Co-operative Societies and 4 Railway men's Housing Societies functioning on Indian Railways during 2019-20.

Indian Railway Medical Service:

From a humble beginning in 1853, Indian Railway Medical Service has taken great strides to become a modern well organized three tier Comprehensive Health Care System.

Indian Railway Medical Service was primarily constituted to look after the health of Railway employees. It provides medical faculties to the family members of the employee, retired employee & their family members as per pass rules.

Besides, curative services Indian Railway Medical Service provides: - Preventive, Promotive, Occupational & Industrial health, Public health

services also. It also plays a significant role in monitoring the quality of water & food within Railway premises.

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, 128 hospitals & 586 health units spread throughout the length & breadth of country. Indian Railway Medical Service also employees 41,000 paramedical staff for the 13639 indoor beds. It attends to roughly 67 lakhs beneficiaries.

A number of zonal Railway hospitals are recognized centers of excellence in the field of medical care where post graduate medical students are also trained. Railway Medical Officers are regular contributors to international journals & conferences in the field of Medical Science.

Ayushman Bharat Pradhan Mantri-Jan Arogya Yojana has been implemented the Railway Hospitals. As on date, 91 hospitals have been opened for AB PM-JAY for non-railway patients.

COVID-19 patients are also being treated in the Railway identified hospitals including the CGHS beneficiaries.

Nine of our zonal hospitals are functioning as institutions for training for the very prestigious DNB program in most of the specialties and some super specialties. Many of our senior doctors are examiners for Diplomate of National Board (DNB). Every year our institutes are producing post graduate specialist and super specialist doctors who ultimately are the assets for the nation.

Services Provided By Health Directorate

Before independence, there were forty two Railway systems, each following a separate health policy. Post-independence it was integrated into one dedicated Indian Railway Health Service erstwhile (IRMS), providing modern allopathic treatment. Today IRHS is providing comprehensive health care to nearly 1 crore beneficiaries, using the latest technology, treatment protocol, implants, surgical techniques, medicine etc., which is at par with any world class health service provider.

Healthy workforce is the most important asset of any organization. Keeping the same in view apart from periodic medical examination (PME), annual health check-up of all Railway employees is being ensured by IRHS. There are a host of other activities carried out by IRHS, in addition to preventive, promotive and curative care; like first aid to travelling passengers, attending accidents, colony sanitation, implementation of Food Safety Standards Act (FSSA), various National Health programmes and providing post- graduation training & study program. Our health services

inspire great confidence amongst the beneficiaries.

(A) Beneficiaries	
No. of RELHS Card Holders	6,91,552
No. of Beneficiaries	15,31,855
(B) Performance Statistics (2019 to 2020)	
Total OPD Cases attended	2,03,99,566
Total Indoor cases admitted	5,26,273
Total no. of Surgeries performed	1,79,235
Percentage of man days lost due to sickness (RMC)	1.29
No. of New Candidates examined for fitness	1,70,599
No. of employee who under went PME	1,20,211
No. of food samples collected/ Samples found faulty/action taken	3,670/137/19
Water sample for residual chlorine tested/fit	12,00,389/ 10,67,531
Water sample for bacteriological tested/fit	82,691/77,436
No. of Sick Passengers attended by Railway Doctors	67,231
No. of Children immunized	12,881
No. of multipurpose health drives conducted	26,030
Total no. of persons examined in the multipurpose health drives above	14,39,285

Pension Adalats:

In accordance with the directives of Department of Pension and Pensioner's welfare (DOP&PW), instructions have been issued to Zonal Railways & Production Units to conduct Pension Adalats on 23.08.1019 to examine and settle the grievances of pensioners. Every efforts are made to settle these cases on the spot. A no. of 4418 cases were taken up in the All India Pension Adalat held on 23.08.20.

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.

Railway Schools:

IR runs and manages one Degree College and 99 Railway Schools. These schools are being operated purely as a measure of staff welfare and they provide quality education at subsidized cost to children of Railway employees as well as non-Railway wards. In addition to this, 87 Kendriya

Vidyalayas are also functional on Railway land, to cater to the needs of the students residing in the vicinity of these schools.

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 continuing endeavour on Indian Railways. Till the end of 31st March, 2020 the total number of notified Railway offices is 3,588. In these Railway offices, employees proficient in Hindi have already been given directions to transact cent-percent work in Hindi in the subjects specified under Official Language Rules. Besides this, Official Language officers of Railway Board office and Zonal Railways regularly inspect the Railway offices to monitor the implementation of Hindi there. In the year 2019-20, a total number of 1,054 inspections have been carried out by these officers and the second Sub-Committee of Parliamentary Committee on Official Language has inspected 07 Railway offices and has appreciated the use of Hindi in these offices. In addition to this, Grih-Patrika 'Rail Rajbhasha' in Hindi is also published by Railway Board office. Till now, 124 editions of the patrika have been published and circulated to all the Railway offices. 'E-Rajbhasha' web magazine is also being brought out regularly in every quarter. Till now, 28 editions of this patrika have been brought out. About 89 Hindi Grih-Patrika are also being published by Zonal Railways/Divisions etc. at their level.

Training in Hindi Typewriting, Hindi Stenography and Hindi Language

In addition to the Training Centres set up by the Ministry of Home Affairs, arrangements are also made by Indian Railways to provide in-service training in Hindi language, Hindi typing and Hindi stenography. The number of employees trained at the end of 2019-20 as compared to 2018-19 as follows:

Activity	As on March 31, 2019	As on March 31, 2020
Working knowledge/ Proficient in Hindi	8,87,806	**8,62,446**
Hindi Typewriting	7,414	**7,942**
Hindi Stenography	3,065	**3,112**

Other activities

The existing policy of purchasing bilingual electronic equipments, like computers etc. is being followed. During 2019-20, 42,994 bilingual personal computers are available in various offices of Indian Railways. Websites of the Zonal Railways including Railway Board are also available in bilingual

form. In order to promote usage of Hindi in Railway offices, 935 Codes/ Manual and 6,592 Station-Working Rules have been published bilingually. Besides this, 26,461 Local, Statutory and Standard Forms have been made available in bilingual form in Zonal Railways and Production Units including Railway Board. Presently, about 17 lakhs books in Hindi are available in 967 Hindi Libraries on Indian Railways and most of the libraries have been named after the names of famous litterateurs of Hindi.

Official Language Implementation Committees

To review the progress of the use of Hindi, total 968 Official Language Implementation Committees are functioning on the Zonal Railways, in Production Units etc. and meetings of these committees are being organized regularly. Besides this, Railway Board Official Language Implementation Committee has been constituted at Railway Board level also and its meetings were conducted regularly in the year 2019.

Railway Hindi Salahakar Samiti

In order to propagate the use of Hindi in Ministry of Railways and Zonal Railways, Railway Hindi Salahakar Samiti was constituted under the Chairmanship of Hon'ble Minister of Railways, whose main objective is to give 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 Cash Awards Scheme, Railway Minister Rajbhasha Shield/Trophy Scheme, Lal Bahadur Shastri Takniki Molik Lekhen Scheme, Premchand and Maithili Sharan Gupt Award Scheme, Rail Yatra Vritant Scheme, Hindi Essay competition and other schemes for Elocution, Noting and Drafting in Hindi. In the year 2019, Director General National Academy of Indian Railways, Vadodara was awarded 'Kamlapati Tripathi Rajbhasha Swarn Padak' and 30 Silver Medals under 'Rail Mantri Rajbhasha Rajat Padak' were given to officers working in Zonal Railways including Railway Board for the outstanding work in Hindi on the occasion of Railway Board Official Language Implementation Committee's Meeting held on 16.09.2019 under the chairmanship of Member Staff, Railway Board.

On the occasion of Munshi Prem Chand and Acharya Shiv Pujan Sahay's birth anniversary "Hindi Prashanmmanch" was organinised in Rail Bhawan on 01.08.2019. Besides this, Rajbhasha Exhibition of literary work of Munshi Prem Chand and Acharya Shiv Pujan Sahay was also organised.

Hindi Essay, Elocution, Noting and Drafting competitions were organised on 8th and 9th August, 2019 at the all Indian level in N.F. Railway, Maligaon, Guwahati.

In order to promote usage of Hindi 'Rajbhasha Pakhwara' was organised from 09th to 20th September, 2019 in the Ministry of Railways. During this period, Hindi Essay Writing, Elocution, Noting and Drafting competitions, Antakshari, Hindi Workshop and Kavi Sammelan were organised. On the occasion of Hindi Diwas on 14th September, 2019, a massage from Hon'ble Minister of Railways was circulated to all the offices of Indian Railway to work in Hindi.

On the occasion of the meeting of Railway Board Official Language Implementation committee held on 19.12.2019, the certificates were given to winners by the Chairman, Railway Board under individual Cash Award Scheme, Lal Bahadur Shastri Takniki Molik Lekhen Scheme and Rail Yatra Vritant Scheme.

During the year 2019-20, total 707 Workshops on different subjects were also organised on all Zonal Railways including Railway Board, in which 15,205 officers/employees were participated.

'Akhil Rail Hindi Natyotsava' was successfully organinised at East Coast Railway, Bhubaneshwar from 08th to 10th January, 2019, in which 19 teams participated and won many prizes.

Hindi translation of commonly used sentences in Railway Board's office were uploaded on the website of the Ministry of Railways and the link (URL) was made available to the Department of Official Language, Ministry of Home Affairs.

Outstanding Achievements in Sports:

1. At International Level:

i. Ms. Jhilli Dalabehera (ECoR/Weightlifter) won Silver Medal in the AWF Senior Asian Weightlifting Championship held at Ningbo, China from 17th to 29th April, 2019.

ii. Ms. Chitra P.U. (SR) (1500 M) Won Gold Medal, Ms. Anu Rani (DMW) (Javelin Throw) won Silver Medal, Shri Ajay Kumar Saroj (NER) (1500 Meter) won Silver Medal and Ms. Parul Chaudhary (WR) (5000 Meter) won Bronze medal in the 23rd Asian Athletics Championship held at Doha (Qatar) from 21.04.2019 to 24.04.2019.

iii. Greco Roman player - Shri Sunil Kumar (NWR) Wrestling player won

Silver Medal and Free Style (M & W) players - Shri Bajrang Punia (NR) won Gold Medal, Shri Parvin Rana (NR) won Silver Medal, Shri Rahul Aware (CR) won Bronze Medal, Shri Satyavrat Kadyan (NR) won Bronze Medal, Shri Sumit (NR) Bronze Medal, Ms. Vindesh Phogat (NR) won Bronze Medal and Ms. Sakshi Malik (NR) won Bronze Medal in the Asian Wrestling Championship held at Xian (China) from 23.04.2019 to 28.04.2019.

iv. Ms. Sonia (NR) and Shri Ashish (NCR) won Bronze Medals in the Asian (M & W) Boxing Championship held at Xian China from 23.04.2019 to 28.04.2019.

v. Indian Railway Tennis team won Gold Medal in the 21st USIC (World Railway) Tennis Championship held at Albena (Bulgaria) from 28.05.2019 to 03.06.2019.

vi. Ms. Pranati Nayak (CLW) Gymnastic player won Bronze Medal in the 8th Senior Asian Gymnastic Championship held at Ulaanbaatar (Magnolia) from 19th to 22nd June, 2019.

vii. Shri Kamal Chawala (WCR) Indian Railway Cueist player represented India in the ACBS 8th Asian 6 Red Snooker Championship 2019 held at Doha (Qatar) from 22.06.2019 to 26.06.2019 and won Bronze Medal in the said Championship.

viii. Shri Swapnil Dhopade (CR) Chess player won Bronze Medal in the Commonwealth Chess Championship held at Delhi from 30.06.2019 to 07.07.2019.

ix. Indian Railway Weightlifters - Ms. Jhilli Dalabehera (ECoR) won Gold Medal, Ms. S. Mirabai Chanu (NFR) won Gold Medal, Ms. M. Santoshi (ECoR) won Silver Medal, Ms. Rakhi Halder (ER) won Gold Medal, Sh. R.V. Rahul (SCR) won Silver Medal and Sh. Pardeep Singh (NR) won Gold Medal in the Commonwealth Senior (Men & Women) Championships held at Apia (Samoa) from 06.07.2019 to 14.07.2019.

x. Indian Railway Volleyball (Men) team won Gold Medal in the 17th USIC (World Railway) Volleyball Championship held at Albena Bulgaria from 24th to 29th August, 2019.

xi. Indian Railway Athletics (Men & Women) teams won the 17th USIC Men and 14th USIC Women (World Railway) Athletics team Championships held at Trutnov, Czech Republic from 10th to 13th September, 2019.

xii. The following Indian Railway Wrestling (Men & Women) players participated in 2019 World Senior Free Style, Greco Roman and Women Wrestling Championship held at Nursultion, Kazakhstan from 12th to 22nd September, 2019 and won 04 Bronze medals.

xiii. Shri Kamal Chawla (WCR) Indian Railway Snooker player participated in IBSF World Six Red and World Team Snooker Championship held at Mandalay (Myammar) from 16th to 25th September, 2019 and Won Bronze Medal in the team Event.

xiv. Shri Shashikant Kutwal (CR), Indian Railway Chess player won Gold Medal in the 1st World Individual Rapid and Blitz Chess Championship held at Torrevieja, Spain from 21st to 25th November, 2019.

xv. Indian Railway players participated in the South Asian Games 2019 held at Kathmandu (Nepal) from 01.12.2019 to 10.12.2019 and won 65 Medals (46 Gold, 11 Silver & 08 Bronze).

xvi. Indian Railway (Men & Women) Wrestlers have won 10 Medals (04 Gold, 04 silver & 02 Bronze) the medals in the Senior Asian (Men & Women) Wrestling Championship held at I.G. Sports Complex, New Delhi from 17.02.2020 to 23.02.2020.

2. At National Level:

During 1st April, 2019 to 31st March, 2020, Indian Railway Participated in total 46 National Championship. Out of which IR was semi-finalist in 03 Championships, 3rd Position in again 03 Championships, Runners-up in 11 Championships and Winners in 18 Championships.

3. Following Railway players have been honored with National Sports Awards during 2019-20:

S. No.	Name	Game	Award	Rly.
i)	Sh. S. Bhaskaran	Body Building	Arjuna Award	SR
ii)	Ms. Sonia Lather	Boxing	Arjuna Award	NWR
iii)	Sh. Chinglensena Singh	Hockey	Arjuna Award	WR
iv)	Ms. Poonam Yadav	Cricket	Arjuna Award	NCR
v)	Sh. Nitten Kirrtane	Tennis	Dhyanchand Award	CR
vi)	Sh. Bajrang	Wrestling	Rajeev Gandhi Khel Ratna	NR
vii)	Sh. Bajrang	Wrestling	Padma Shree	NR
viii)	Ms. L. Bombayla Devi	Archery	Padma Shree	ER

Finance

Indian Railways financial results for 2019-20 compared with the previous year are tabulated below:

		(₹ in crore)
	2018-19	**2019-20**
Capital-at-charge	*2,95,151.86	**3,21,471.67
Investment from Capital Fund	53,449.91	**53,449.91**
Total	3,48,601.77	**3,74,921.58**
Passenger Earnings	51,066.65	**50,669.09**
Other Coaching Earnings	4,474.46	**4,640.79**
Goods Earnings	1,27,432.72	**1,13,487.89**
Sundry Earnings	6,996.23	**5,862.75**
Gross Earnings	1,89,970.06	**1,74,660.52**
Suspense	-63.48	**-303.92**
Gross Traffic Receipts	1,89,906.58	**1,74,356.60**
Ordinary Working Expenses	1,40,200.30	**1,50,211.21**
Appropriation to Depreciation Reserve Fund	300.00	**400.00**
Appropriation to Pension Fund	44,280.00	**20,708.00**
Total Working Expenses	1,84,780.30	**1,71,319.21**
Net Traffic Receipts	5,126.28	**3,037.39**
Miscellaneous Transactions	-1,352.42	**-1,447.77**
Net Revenue Receipts	3,773.86	**1,589.62**
Dividend payable to General Revenues $	0.00	**0.00**
Excess (+)/Shortfall (-)	3,773.86	**1589.62**
Percentage of Net Revenue to Capital-at-charge including investment from Capital Fund	1.08	**0.29**
Operating Ratio (%)	97.29	**98.36**
Capital-at-charge (including investment from Capital Fund) per NTKM (in paise)	425	**479**

* Excludes ₹15,143.21 crore of MTPs, ₹1026.98 crore of Circular Railways, ₹16,026.70 crore of Udhampur-Srinagar-Baramulla Project (National Project), ₹1,1954.00 crore of appropriation to SRSF and ₹24,062.87 crore investment in DFCCIL. ₹30,000 crore investment in RRSK and ₹15,107.03 crore investment in RSF. Includes ₹16,562.26 crore of Production Units.

** Excludes ₹16,636.14 crore of MTPs, ₹1,898.79 crore of Circular Railways, ₹32,933.94 crore of Udhampur-Srinagar-Baramulla Project (National Project), ₹11,954.00 crore of appropriation to SRSF, ₹24,062.87 crore investment in DFCCIL, ₹45,000 crore investment in RRSK and ₹22,357.87 crore investment in RSF. Includes ₹16,952.12 crore of Production Units.

Revenue:

Revenue from Freight accounted for 63.82% of Gross Earnings. Passenger Earnings constituted 29.01% of the Gross Earnings, of which

5.61% was from Suburban Services, 88.36% from Express Long distance and 6.03 % 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 91.92% of the total goods earnings, while commodities other than the above accounted for 6.30%. Miscellaneous realization like demurrage, wharfage, shunting and siding charges etc. made up the remaining 1.78%.

Balance Sheet:

A brief summary of Balance Sheet as on 31st March, 2020 compared with the previous year is given below:

(₹ in crore)

	As on 31.03.2019	As on 31.03.2020	Variation
Assets			
Block Assets	5,73,641.66	**6,40,408.27**	66,766.61
Fund with Central Government			
(i) Reserve Fund	1,905.94	**-25,730.65**	-27,636.59
(ii) Banking Accounts	61,620.47	**69,164.17**	7,543.70
Sundry Debtors	4,007.03	**4,649.96**	642.93
Cash in hand	1,377.04	**604.78**	-772.27
Total	6,42,552.14	**6,89,096.52**	46,544.38
Liabilities			
Represented by:			
Capital-at-charge	*3,35,241.43	**3,78468.48	43,227.05
Investment financed from internal resources etc.	2,38,400.23	**2,61,939.79**	23,539.56
Total (i)	5,73,641.66	**6,40,408.27**	66,766.61
Reserve Fund	1,905.94	**-25,730.65**	-27,636.59
Total (ii)	1,905.94	**-25,730.65**	-27,636.59
Banking Accounts			
(i) Provident Fund	38,115.46	**39,341.70**	1,226.24
(ii) Miscellaneous Deposits etc.	23,450.36	**29,762.66**	6,312.30
(iii) Loans and Advances	54.65	**59.80**	-5.15
Total (iii)	61,620.48	**69,164.17**	7,543.69
Sundry Creditors etc. **(iv)**	5,384.07	**5,254.73**	-129.34
Total (i) to (iv)	6,42,552.15	**6,89,096.52**	46,544.38

* Excludes ₹15,143.21 crore of MTPs, ₹1,026.98 crore of Circular Railways, ₹11,954 crore appropriation to SRSF, ₹30,000 appropriation to RRSK and ₹15,107.03 crore appropriation to RSF. Includes ₹24,062.87 crore investment in DFCCIL ₹16,026.70 crore Udhampur-Srinagar-Baramulla Project (National Project).

** Excludes ₹16,636.14 crore of MTPs, ₹1,898.79 crore of Circular Railways, ₹11,954.00 crore of appropriation to SRSF, ₹45,000.00 crore appropriation to RRSK and ₹22,357.03 crore appropriation to RSF. Includes ₹16,026.70 crore of Udhampur-Srinagar-Baramulla Project (National Project) and ₹40,987.75 crore investment in DFCCIL.

Cash Flow:	2019-20	(₹ 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	78,994.83	**79,162.57**
By replacement of assets	167.74	
Payments of interest on loans, repayment of loans and increase/decrease in Reserve Funds		
Payments of interest on loan for Development Fund	0.00	**-27,636.62**
Repayment of loan for Development Fund	0.00	
Increase (+)/ Decrease (-) in Funds balances	-27,636.62	
Payment for Accident Compensation	0.00	
	Total	**51,525.95**
Finance for these requirements was provided from the following sources:		
Internal sources:		
Contribution from Revenue/Capital to fund and interest occurring on the balances of the fund.	-27,905.41	**5,934.20**
Development Fund financed from Surplus	1,388.85	
Development Fund financed from General Revenue	0.00	
Capital Fund financed from surplus	0.00	
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	0.00	
Railway Safety Fund financed from General Revenues(from Central Road Safety Fund)	17,250.00	
Spl. Railway Safety Fund financed from Surplus	0.00	
Spl. Railway Safety Fund financed from Genl. Revenues	0.00	
RRSK Finance from General Revenue (Capital)	5,000.00	
RRSK Finance from RSF	10,000.00	
RRSK Finance from Surplus	200.76	
OLWR	0.00	
Cash Surplus - Working Results		**1,589.62**
Appropriation to Development Fund		**-1,388.85**
Appropriation to Capital Fund		**0.00**
Appropriation to Debt service fund		**0.00**
Appropriation to Railway Safety Fund		**0.00**
Appropriation to RRSK		**-200.76**
Investment from capital		**45,591.75**
	Total:	**51,525.95**

Composite Input Cost Index

Base 2011-12=100

	2018-19		**2019-20****	
	Revenue Index	Cost Index	**Revenue Index**	**Cost Index**
Unit Revenue				
Average receipt per pkm	*162.22		**162.69**	
Average receipt per ntkm	170.05		**158.05**	
Cost Indices of Inputs				
Labour: Average annual wage per employee @		241.7		**291.6**
High Speed Diesel(H.S.D.)		97.1		**93.7**
Electricity (Railway traction)		109.6		**111.8**
Transport equipment and parts		112.8		**114.5**
Non-Ferrous Metals		112.2		**107.0**
Electrical machinery, equipment & battery		111.7		**111.3**
Lubricants		124.8		**131.7**
Manufactured products		117.9		**118.3**
Ferrous Metals		112.2		**106.2**
Composite weighted index of inputs		*187.8		**217.4**

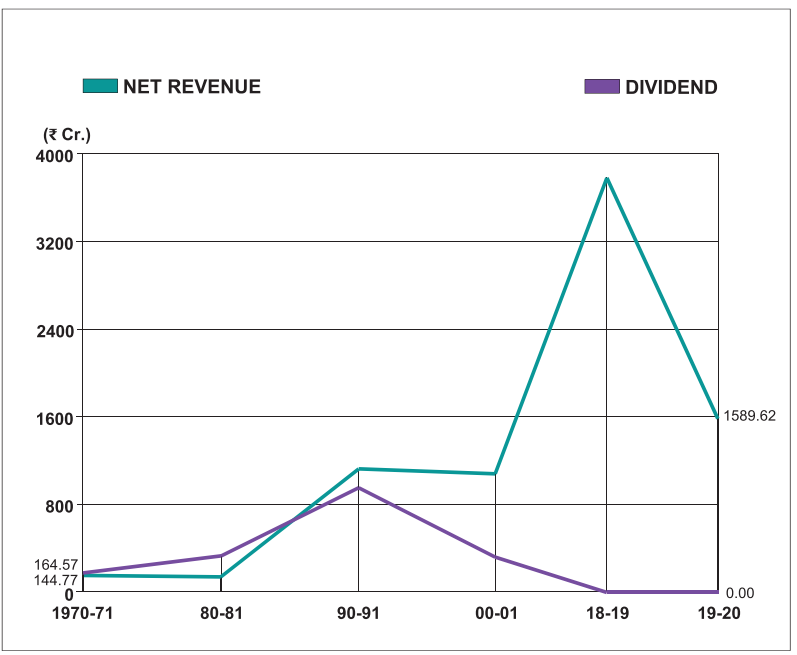
* revised

** Provisional

@ Based on information received from Directorate of Statistics and Economics.

S.No. 2-9 based on information received from Office of Economic Adviser, Department for Promotion of Industry and Internal Trade.

NET REVENUE AND DIVIDEND



Social Service Obligation

Indian n Railways (IR), in the larger social and national interest, undertakes certain uneconomic operations in transportation to provide affordable transport facilities to poorer sections of society and to facilitate the movement of essential commodities meant for mass consumption. Losses incurred on this account fall under Social Service Obligation of IR.

Net Social Service Obligation borne by IR in 2019-20 is assessed at ₹45541.92 crore excluding staff welfare cost (₹7,905.55 crore) and law and order cost (₹5,281.82 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;
- Concession in passenger fares;
- Losses on EMU Suburban Services;
- Operation of Uneconomic Branch & New Lines opened for Traffic during the last 15 years;
- Operation of Strategic Lines;
- Pricing of passenger fares below cost.

Losses on transportation of Essential Commodities carried below cost:

As part of the Railway's Social Service Obligation, certain essential commodities of mass consumption like fruits and vegetables, salt, charcoal, bamboos etc. are carried below cost of operation in order to contain their market prices. The total losses on the movement of these commodities in 2019-20 amounted to ₹301.31 crore.

Commodities	Losses(in crore of ₹)
Salt	158.38
L.P.G.	42.88
Total Edible Oil	30.23
Sugar & Khandsari	27.90

Fruits & Vegetables	21.77
Bamboos	5.41
Charcoal	4.86
Other Wood	3.53
Dry Grass Including Saboi Grass	2.39
Cotton Manufactured other than piece goods	2.38
Paper	0.68
Wool Raw and Waste	0.49
Organic Manure	0.22
Cotton Raw Pressed	0.14
Electric Goods	0.03
Total	**301.31**

These commodities constituted 2.49% of the total revenue NTKMs and 1.57% of freight earnings in the year 2019-20.

Concession in passenger fares:

As a welfare measure, Indian Railway extend concessions in passenger fares to more than 50 categories such as (i) Senior citizens (ii) Physically challenged persons (iii) Patients suffering from cancer, thalassemia, heart, kidney, tuberculosis and other serious diseases (iv) Recipients of gallantry awards (v) Shram awardees (vi) Teachers honored with National awards (vii) War widows (viii) National sports awards (ix) Participants in National and State sports tournaments (x) Students (xi) Youths (xii) Kisans (xiii) Press correspondents (xiv) Film technicians etc. Revenue foregone due to concession in passenger fares during the year 2019-20 amounted to ₹2058.61 crore.

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.

Losses on EMU Suburban Services :

Analysis of the profitability of EMU Suburban Services in Chennai, Kolkata, Mumbai and Secunderabad during the year 2019-20 has revealed an overall loss of ₹6,937.72 crore. Lag in the rise of passenger fares with respect to inflationary pressures prevalent in the economy has contributed to EMU Suburban losses.

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 90 uneconomic branch lines for the year 2019-20 shows that, on an original investment on these lines of the order of ₹3,474.53 crore, loss during the year 2019-20 amounted to ₹2,396.82 crore.

New lines opened for traffic during the last 15 years:

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, reliefs like making available land free of cost and sharing of construction cost by the concerned State Governments are the need of the hour. Periodic reviews have revealed that of the 15 lines examined in 2019-20, as part of Social Service Obligations of the Railways for development of backward areas, most lines are showing either negative or unremunerative returns.

Financial Results of New Lines for The Year 2019-20

S. No.	Name of the branch line	Date of opening	Cost (₹ in crore)	Expected return on investment	Actual return on investment		
				(%)	2017-18 (%)	2018-19 (%)	**2019-20 (%)**
1	Abohar-Fazilka (BG) 34 Kms.	16.07.2012	232.51	-7.44	-14	-15	**-16**
2	Taran Trn-Govindwal (BG) 21.416 Kms.	06.08.2011	81.44	NA	-24	-28	**-29**
3	Ludhiana-Sahnewal (BG) 15.11 Kms.	17.11.2012	289.40	-2.26	-5	-6	**-6**
4	Udhampur-SVDK (BG) 25 Kms.	04.07.2014	1231.09	NA	-2	-2	**-2**
5	Banihal-Baramula (BG) 13.7 Kms.	26.06.2013	4917.00	-1.30	-3	-3	**-3**
6	Chuararu Takrala-Amb Andaura (BG) 11.17 Kms.	2011-12	313.53	0.18	-5	-11	**-11**
7	New Morinda-Sahnewal (BG) 52.18 Kms.	2013-14	723.70	-2.26	-8	-8	**-9**
8	Chandigarh-Morinda (BG) 43.89 Kms.	2006-07	408.81	-2.26	-12	-13	**-14**
9	Una Himachal-Chuararu Takrala (BG) 16.5 Kms.	2005-06	385.59	0.18	-4	-5	**-5**
10	Rewari-Jhajjar-Rohtak (BG) 81.257 Kms.	08.01.2013	437.27	-4.78	-2	-2	**-2**
11	Jind-Sonipat (BG) 81 Kms	26.06.2016	462.36	NA	0	0	**0**
12	Madar-Pushkar (BG) 25.7 Kms.	23.01.2012	132.12	-4.06	-1.57	-1.76	**-1.91**
13	Koderma-Giridhi (BG) 86.50 Kms.	08.08.2015	699.95	NA	NA	-4.6	**-2.13**
14	DRU-CMGR (BG) 45.12 Kms.	17.11.2013	353.45	NA	-0.92	-1.04	**-0.84**
15	MYS-CMNR (BG) 60.78 Kms.	2008	233.55	NA	-0.63	-0.78	**-0.09**

Operation of Strategic Lines:

At present, following six operational lines only have been categorized as strategic railway lines on Indian Railways:-

(i) Pathankot-Mukerian (Northern Railway)

(ii) Rangapara North Lakhimpur-Murkongselek (Northeat Frontier Railway)

(iii) Siliguri-Jogighopa including BG conversion of Siliguri-Haldibari (Northeast Frontier Railway)

(iv) Jaisalmer-Pokaran (North Western Railway)

(v) Bhatinda-Suratgarh (North Western Railway)

(vi) Bhuj-Naliya (Western Railway)

Apart from the above, there are other lines which are located in the border areas and serving the strategic needs of Defence and Paramilitary forces. Some of the projects have been taken up as National Projects from strategic point of view in the northeast region. Indian Railways is maintaining these services essentially for strategic reasons despite steep operating losses. The losses accruing to IR on account of operation of Strategic lines during the year 2019-20 is ₹1,604.27 crore.

Pricing of passenger fares below cost:

IR being the major transport carrier of the country bears a Social Service Obligation owing to the nature of the services it is committed to offer affordable transportation solution to the poorest section of the society. This essential feature of IR contributes not only to promoting economic and industrial growth but also in providing certain services below their cost of operation in the interest of common men. Railways therefore have to fine tune between the need to maintain its financial viability and its commitments to society at large. This places certain curbs on the commercial freedom of IR in the matter of pricing and elimination of uneconomic operation and services. The resultant losses accruing to IR on account of fares below cost of operation during the year 2019-20 amounted to ₹45,430.56 crore.

The Net Social Service Obligation borne by IR in 2019-20 assessed at ₹45,541.92 crore, constitutes 26.07% of the total revenue earnings and 22.02% of the total working expenditure.

Research and Development

RDSO under Ministry of Railways is the sole R&D organisation of Indian Railways and functions as the technical advisor to Railway Board, Zonal Railways and Production Units. RDSO's major functions involve:

- Development, adoption, absorption of new technology for use on Indian Railways.
- Development of new and improved designs of equipment and systems.
- Setting standards for adoption on Indian Railways.
- Development of specifications for materials and products needed for Indian Railways.
- Technical investigation, statutory clearances, testing and providing consultancy services.
- Inspection of critical and safety items of Rolling Stock (including Metro Stock), Locomotives, Signalling & Telecommunication equipment and Track components.
- Vendor development for safety and critical items controlled by RDSO.

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. RDSO attracts worldwide attention in the area of Research & Development in Railway equipment and systems.

Some of the important activities during the year are given as:-

Safety and Reliability

IP Based Video Surveillance System

IP Based Video Surveillance System is complete solution for monitoring and safety of the passengers and establishment of Indian Railways. IP Based Video Surveillance System are to be provided at Main entrance/ exit, Platforms, Waiting hall, Reservation counter, Parking area, Railway yards, Foot over bridges etc. of Railway stations and others Railway establishments. The Video Surveillance System is based on non-proprietary open architecture where the Video Management Software, Video Recording

Software, Video Analytics Software and Face Recognition Software can work and integrate with any make of IT hardware like Server, Storage, Workstation, Network Video Recorder and Switches etc.

Development of EP assisted Brake System

In the present brake system the Brake Pressure (BP) is depleted in the locomotive to apply brake in the train. The brake is applied in the engine as well as in the train. To release brake, the Brake Pressure (BP) is charged in the train through engine resulting in release of brake in the complete train.

Provision of LED type Light for Exchanging Signals with Train Passing Staff

To avoid the frequent opening of windows of air conditioned cab for exchanging the signals, a LED based signal exchange lamp is required to be provided outside the cabs with control push button at the ALP/LP desk for exchange of signals. If cab doors/windows are opened frequently, this activity reduces the effectiveness of Cab AC as well as imposes undue stress on LP/ALP.

Development of Specification of 'TRI-NETRA'- Terrain Imaging for Locomotive Drivers Infrared Enhanced Optical & Rangefinder Assisted:

On advice of Railway Board, RDSO developed Specification for 'TRI-NETRA' - Terrain imaging for locomotive drivers - Infra-red, Enhanced optical & Rangefinder Assisted. A system which shall be capable to enable the Locomotive Driver to visualize and warn about infringing objects from a reasonable far away distance so as to enable him/her to apply brakes sufficiently in advance to stop the train well short of the infringement in all-weather condition including day and night.

Development of new material for SGCI inserts

Railway Board had referred the issue of poor metallurgy of SGCI insert. In this regard, RDSO has proposed 3 alternatives with varying composition of Copper, Tin & Phosphorous. SGCI inserts with new chemical composition proposed by M&C Dte. were cast in two of the willing firms premises. The SGCI insert manufactured with revised metallurgy is expected to work satisfactorily in highly curved and turnout area which in turn improve safety & riding over such areas.

Benchmarking of Rail cum Road Vehicle (RCRV) for Ultrasonic Testing of Rail & Weld

Benchmarking of Rail cum Road Vehicle (RCRV) for Ultrasonic Testing of Rail & Weld at speed of 40 Kmph has successfully done by NDT team

of RDSO. This technology will enhance the speed of Ultrasonic testing of Railway Track as compared to manual Ultrasonic testing of Railway Track at a speed of 5-6 Track Km/day/equipment.

Development of Automatic Phase Switching Section (APSS)

RDSO has developed Bi-directional logic relay for providing power to locomotives without break in Automatic Phase Switching Section (APSS) having insulated overlaps required for separating different phase supply from adjacent traction sub-stations. With this system, trains having multiple electric locomotives, EMUs etc. can easily and safely negotiate the insulated overlaps (IOLs) without interruption of power for the rolling stock. Adoption of Automatic Phase Switching Section (APSS) on IR is expected to result in doing away with the requirement of conventional neutral section where there shall be no need for loco pilots to take any action of switching ON/OFF of locomotive circuit breaker while passing through the Automatic Phase Switching section where feed from one different phase supply to another is changed. Trials have been conducted in Asaudah (ASE) TSS of Northern Railway.

Passenger Amenities

IP Based Integrated Passenger Information System

IP Based Integrated Passenger Information System has been developed by RDSO. The system consists of networked Indoor & Outdoor Video Display Boards, Train Indication Displays, Coach Guidance Displays and PC Based Announcement System. In addition to displaying train related information like arrival/departure timings, this system is also used for showing "Train number, Train name, Arrival or Departure status, Time and Platform Number" can be displayed in different colours to easily read and differentiate by passengers.

LVPH Coach

In series of developments of rolling stock on LHB platform, RDSO has designed and developed parcel van on LHB platform (LVPH), which is highest loading capacity parcel van on Indian Railways. It will cater Parcel transportation requirement (24t) of customers and help in increasing revenue for Indian Railways. The advantages of LVPH are Capacity of 24t w.r.t. 23t in existing ICF coaches, Speedier delivery (130kmph speed potential), HOG/EOG complaint.

Bio-Vacuum Toilets

Vacuum Toilets uses vacuum for transfer of fecal matter thus reducing water consumption used for flushing. It also uses pressurized water flushing

system for effective cleaning of the toilet pan / commode units. Indian Railways has already completing the fitment of IR-DRDO bio toilets for greener environment.

Development of HOG/EOG Compatible LHB SLRs with Facilities for Divyangjan Passengers

To cater the mobility requirements of Divyangjan passengers in Trains with LHB design coaches on IR Traffic system & to operate trains with HOG compliant locomotives, RDSO has designed LSLRD, LDSLRA, LWLRRMD & LWLRRMDAC coaches with providing a separate compartment for Divyangjan passengers with minimum acceptable space & necessary facilities conceptualized after detailed interaction with NGO 'SAMARTHAYA' a National Centre for promotion of barrier free environment for persons with disabilities (Divyangjan) based in Delhi.

Operational Efficiency

Air Conditioning of Driver's Cab in HHP Class of Diesel Electric Locomotive

In the recent past, HHP locomotives manufactured at DLW were equipped with Cab Mounted Compact HVAC unit. Railway Board advised RDSO to work on Air Conditioning of Driver's cab in existing fleet of HHP locomotives which have been earlier turned out by DLW without having provision of HVAC. This shall be applicable to single as well as dual cab WDG4 and WDP4B BG diesel electric HHP locomotives. This will render comfort to cabin crew during train operation.

Development of End of Train Telemetry (EoTT)

End to Train Telemetry (EoTT) is a device which could work as an alternative of freight running trains without guard. EoTT system consists of two units:

- **End of Train (EoT) Unit:** This unit is installed on the Last Vehicle of the train. It comprises of SBU, Radio transmitter & Receiver, battery, Air turbine for battery charging, GPS device etc. It transmits and receives information to/from HoT device fitted in the locomotive.
- **Head of Train (HoT) Unit:** This unit is fitted on the Cab of locomotive. Display unit is part of HoT device fitted in the locomotive. One display unit will be provided in each cab of the locomotive. Total two display units will be provided as part of HoT. Both the EoT & HoT units are fitted with radio transmitter which communicates with each other.

Development of 8-Wheeler Diesel Electric Tower Car (8W-DETC)

Based on the Prototype testing, oscillation trial and CRS sanction, RDSO has developed Self-propelled 8-Wheeler Diesel Electric Tower Car (8W-DETC) with maximum operational speed of 110kmph. 8-Wheel DETC is used for maintenance & Inspection of Over Head Equipment (OHE). This development will facilitate Zonal Railway in carrying out inspection & maintenance of OHE as well as early restoration of traffic in case of breakdowns/accidents.

Indigenous Development

Development of Digital Ultrasonic Single and Double Rail Tester with B-Scan

Developmental work for Digital Ultrasonic Single and Double Rail Tester as per revised specifications containing new technology i.e. B-Scan (continuous recording facility upto 50km), GPS location, Real time recording for future analysis etc. has been successfully completed. This new technology will enhance reliability of testing.

Adoption of modified Design of Ballastless Track with indigenous Fastening System (BLT-IFS) for speed upto 50 kmph for 25t axle load over Indian Railways

RDSO designed & developed a Ballastless Track with indigenous fastening system (BLT-IFS) for trial for 'at-formation' tracks and for platform lines as washable apron for speeds upto 110 kmph. The BLT-IFS design had been approved by Railway Board for trial in Zonal Railways & PSUs and 100m track on mainline at RVNL project. Trial length of 100m of BLT-IFS has been constructed at km 862/160-292 in new 3rd line of Bina-Bhopal section/WCR. To develop one design for washable apron with speed potential upto 50 kmph with 25t axle load and the other design for 160 kmph mainline track has been sent to all Zonal Railways for regular adoption.

Unique Identification (UID) Number of CMS Crossing

In view of digitizing of IR track's data, it was necessary to allot a Unique Identification (UID) Number of CMS crossings for their easy identification in field. This UID number may be dove-tailed with the IR Track Management System (TMS) applications so that the data regarding performance/GMT/life/wear/replacement reported from the field shall be directly available to all concerned for detailed analysis. Unique Identification (UID) Number of CMS crossings will make identification of CMS Crossing easy.

Indigenous Development of Radio Equipment for Distributed Power Wireless Control System (DPWCS)

The requirement of the interoperability feature is desirable for flexibility in operation of locomotives fitted with Distributed Power Wireless Control System (DPWCS). OEMs of DPWCS are using different sets of Radio Equipment leading to problem in Interoperability among different makes of DPWCS. This is because different Radio Equipment does not have common communication protocol for ensuring interoperability. Common RF devices in DPWCS will help in achieving objectives are Interoperability among various make of DPWCS, Common communication protocol is feasible, Simplifying the requirements for obtaining an operator's license for radios from Wireless Planning & Co-ordination (WPC) wing of Telecommunication Department, as each radio modem needs to be approved by WPC, Proliferation of different modems will increase the license processing time and Cost reduction of DPWCS provided with indigenous Radio equipment.

Up-gradation of Speed of WAP7 Locos from 140kmph to 160kmph

The WAP7 is a three phase AC electric passenger locomotive. It is capable of hauling 24 coach trains at speeds upto140 km/h. The existing speed of WAP7 loco has to be upgraded to 160kmph by changing the gear ratio from 3.6 to 3.18 & reducing the weight by 14.5t approx. Upgraded WAP7 loco (designated as WAP7HS) can haul 24 coach train at 160kmph. This will reduce the journey time will improve line capacity.

Inspection & Quality Audit

In RDSO, all the product inspection modules have been made online. Inspection calls are placed online and after inspection, Inspection Certificates are issued online.

Inspection of Engine of GE Prototype 4500 hp WDG4G Locomotives

To ensure the functionality & reliability, Inspection of Engine of GE Prototype 4500 HP locomotives has been carried out by RDSO team at Diesel Locomotive Factory, Marhowra jointly with East Central Railway and M/s GE representatives as per approved inspection plan and found to be satisfactory.

Quality Audit of DLW for inspection maintenance and assembly of Turbo Clutch drive assembly of HHP diesel locomotives

DLW is doing the maintenance and assembly of the clutch drive assembly. Hence, to find out root cause of failure, Quality audit of DLW has been carried out by RDSO for inspection, maintenance & assembly practice

of clutch drive assembly and a quality audit report prepared by RDSO.

Quality Audit of Railway Units

A system of Quality Audit at Railway Units is followed to have interaction with Railway units & to ensure conformance to the requirement of laid down work instructions & maintenance practices. During the year areas like corrosion repair the coaches, CTRB overhauling, interior furnishing coaches, ICF bogie overhauling has been considered for Quality Audit. The audit reports are uploaded on railnet (10.100.2.19) for perusal by all Railway Units.

Quality Audits of Vendor Manufacturing Facility

A system of Quality Audit at vendors' premises has also been streamlined. Emphasis is now being given on process audit/inspection in addition to product inspection. Quality audits are found highly effective to review the compliance of requirement as per approved QAP.

Test & Trials

Trial of USP for Ballast Reduction Purpose Over Indian Railways

Indian Railway is the first Railway system in world trying use of Under Sleeper Pad for ballast thickness reduction upto 100 mm looking after non-availability of ballast in future due to environment reasons. On the basis of sample test results, four firms have been shortlisted for field trials and sent to Railway Board for approval. Railway Board has approved trial of USP for ballast thickness reduction in NCR, SER & CR. Trial scheme, have been sent by RDSO to trial Zonal Railways.

Oscillation Trials

RDSO conducts various trials to assess the riding behaviour of rolling stock for safe running. Such trials are conducted on all new designs of all rolling stock as well as all major design modifications affecting safety of running. Different types of trials conducted to ensure safety of rolling stocks both new and existing trials viz. 3 LHB trials, 11 various type axle load trials, 2 Broad Gauge Bogie Open wagon, Locomotive trials etc. conducted during the year 2019.

Construction of Test Track between Gudha – Thathana Mithari Stations, Jodhpur Division, NWR

The proposed Dedicated Test Track in Jodhpur Division, NWR is being constructed on worn out line of MG track constructed hundred years back and was washed out during 1979 floods which resulted the closure of MG

line. Based on the analysis of test results of sub-soil, fill material & blanket material, submitted by North Western Railway for 5 to 15 km stretch of Proposed Test Track Embankment, Design of Embankment including side slopes for 32.5 t axle load & for speed up to 200 kmph has been submitted to the Railways.

Metro Rail Systems

RDSO is giving technical approval to various technical documents of Metro Rail Systems as Design Basis Report, Schedule of Dimension, Track Structure, Signalling and Control, Technology of Traction and Power Supply & Rolling Stock and its Maintenance Manual.

Track Recording

To ensure safety of traffic periodic track monitoring of Indian Railway track, RDSO has conducted track recording of 72738 Km up to January'2020.

Consultancy

Other than this, other Rolling Stocks like Catenary Maintenance Vehicle of Maha Metro (Nagpur Project) and Diesel Shunting Loco of Mumbai Metro-1 have been given technical clearance. Through these consultancies by December 2019, during the Financial Year 2019-20, RDSO has earned ₹17.84 crores as consultancy charges, which is about ₹4.5 crores higher than the previous year.

Technical solution for frequent rain cuts in New Coochbehar-Golokganj section, Alipurduar Division, Northeast Frontier Railway: RDSO team inspected the problematic locations between New Coochbehar-Golokganj section, Alipurduar Division, Northeast Frontier Railway. Based on site observations & soil test results, Consultancy Report (No. RDSO/2019/GE:CR-200) suggesting remedial measures for referred problematic locations issued to Zonal Railway.

Export

Design and Development of AC- AC 3000 HP Cape Gauge Diesel Electric locomotive for Export

M/s RITES has requested RDSO for development of 3000 HP AC - AC traction Cape gauge diesel electric locomotive for export to Mozambique. In this regard, RDSO has prepared a specification no. MP-0.0800.115 (Rev.00) May' 2019 for this locomotive.

Undertakings and other Organizations

As many as 14 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	1999	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	2006	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	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 Ltd, a Miniratna (Category-I) and Schedule 'A' Central Public Sector Enterprise under the Ministry of Railways, incorporated on April 26, 1974, is a leading player in the transport consultancy and engineering sector in India and uniquely placed in terms of diversification of services and geographical reach in various sectors such as railways, highways, airports, ports, ropeways, urban transport, inland waterways, and renewable energy. The company is the only export arm of Indian Railways for providing rolling stock, other than Thailand, Malaysia, and Indonesia.

RITES has consistently displayed excellent financial performance over the years and has duly built a strong fiscal base. It became a listed company in July, 2018. Within one year of listing, the company has made it to the top-500 companies on the basis of the market capitalization as well as revenue.

Domestic Business

During the year 2019-20, RITES executed many prestigious projects, which include consultancy for capacity enhancement through Semi–High speed and High Speed Railway Line, detailed design of alignment for Delhi – Ghaziabad – Meerut Line for RRTS Corridor. It also worked on the DPRs for 9 railway tunnels, rail-based Mass Transit Systems for Gorakhpur, Prayagraj, Chennai, Vijayawada, Jammu, Srinagar, Thane, Nagpur, Mumbai, Kanpur and Agra, rail infrastructure for DVC, NTPC, CIL and others at various locations, railway station development project for Ayodhya and Varanasi. It provided services for various projects on turnkey construction basis to Indian Railways viz construction of doubling of track between Gooty and

Dharmavaram section, Annupur-Pendra Road third line, and electrification of Sawaimadhopur-Jaipur-Ringas. Also, it completed Vijaypur-Pachore Road-Maksi section railway electrification project (188 km) in Madhya Pradesh and 83 km of track work.

Further projects such as General Consultancy for Metro Rail System Ahmedabad, Nagpur & Pune, Detailed Design Consultancy for Power Supply & Distribution system for Ahmedabad Metro & Bengaluru Metro phase-II and Independent Quality Monitoring for Noida Metro Rail Corporation Ltd also progressed well during the financial year.

Overseas Business

RITES has completed supply of six DEMUs trainsets (Diesel Electric Multiple Units) and 10 locomotives to Sri Lanka and based on the quality of the product supplied, the Company secured a repeat order of two DEMUs from Sri Lanka.

The Company is also executing PMC for 4-Lane National Highway project in Bangladesh, Trident Port for Government of Mauritius and Construction Supervision Services for Metro Express project, phase-1 of this was operationalized during the year. It has also completed the work of Integrated Check Post (ICP) at Biratnagar and secured work of ICP at Nepalgunj in Nepal. It has also completed the detailed project report for Georgetown road project in Guyana (South America).

Further, RITES has emerged as successful bidder for supply of 6 locomotives and 90 coaches, including 5 DEMUs trainsets, to CFM Mozambique for which an agreement was signed in June, 2020.

During the year, RITES was also engaged in various international assignments such as Detailed Design Consultancy Services for a standard gauge railway line between Tema and Akosombo in Ghana; PMC for East Bank-East Coast road linkage project in Guyana (South America); Construction Supervision of Tshesebe-Masunqa Road in Botswana; warranty services for YDM 4 meter gauge locomotives supplied to

Myanmar Railways, warranty maintenance and support services for state-of-the-art LHB BG passenger coaches supplied to Bangladesh and expert services for maintenance of locomotives supplied to CFM/ Mozambique.

Financial progress

During 2019-20, RITES achieved its highest-ever total standalone revenue of ₹2,665 crore, up by 23.1% over 2018-19. Key business segments

continued to register growth over 2018-19, with exports income going up by 161.6%, leasing up by 16.5% and turnkey revenue up by 18.7%. Consultancy revenue during the year 2019-20 remained ₹1,066 crore.

(₹ in crore)

Particulars	Standalone		Consolidated	
	2018-19	**2019-20**	2018-19	**2019-20**
Total Revenue	2,164	**2,665**	2,240	**2,734**
Operating Turnover	1,969	**2,401**	2,047	**2,474**
Profit Before Tax	677	**823**	730	**874**
Profit After Tax	445	**596**	490	**633**

Ircon International Limited (IRCON)

Ircon International Limited (IRCON), a Schedule "A" & Mini Ratna – Category I Central Public Sector Undertaking (CPSU), incorporated by the Ministry of Railways, Central government, under the Companies Act, 1956 on 28th April 1976 originally under the name "Indian Railway Construction Company Limited". It was created for the development of railway's networks in India and abroad utilizing the expertise of Indian Railways. The Company has executed projects operated in the areas of Railway construction including New Lines, Doubling works, Rehabilitation & Gauge Conversion projects, Ballast less track, Electrification, Bridges/Flyover, Tunneling, Sub-Stations, Signal & Telecommunication as well as Leasing of Locos, Station building etc., Over the years, while keeping railway projects as its focus area, it diversified into a wider spectrum of infrastructure such as Highways & Expressways, Tunneling, Bridges, Metro, Power substation, transmission & distribution, Buildings (Industrial, Commercial & Residential), Townships, and Airport Runways & hangars and Mass rapid transit system.

Foreign Projects

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

IRCON's expertise coupled with its experience has helped in successful completion and commissioning of a mega project valuing over USD 1 billion in Malaysia, the largest ever Transportation project completed by any Indian company abroad.

In Bangladesh, IRCON has completed projects of "Design, Supply, Installation, Testing and Commissioning of Computer-based Interlocking Colour Light Signalling System on turnkey basis at 11 stations between Ishurdi-Darsana section."

IRCON has successfully completed project for Procurement of Plant Design, Supply and Installation of Overhead Track Equipments, Traction Sub-Stations, Auxiliary Power Supplies Sub stations, Bulk Power Supplies Switching Stations and Signalling Systems for Majuba Rail Project, South Africa, at a value of ₹345 crore.

IRCON through its 100% owned subsidiary named IRCON Infrastructure & Services Limited is providing PMC services for Construction of Two Lane Road from Paletwa to India-Myanmar Border (Zorinpui) from km 0.000 to km 109.200 in Chin State of Myanmar.

International Rail Connectivity Projects

As close neighbors, India shares a unique relationship of friendship and cooperation with Nepal, Sri Lanka and Bangladesh. Taking the bilateral relationship to new heights, IRCON is executing Rail connectivity projects to Nepal and Bangladesh.

Strategic Projects in India

IRCON has undertaken various prestigious projects, which are emblematic to the country's rise on global infrastructural map. The Company is involved in the biggest strategic Railway construction project in Jammu & Kashmir. IRCON is also constructing a new Broad-Gauge railway line from Sivok in North Bengal to Rangpo in Sikkim to provide rail connectivity to Sikkim.

During the Year 2019-20, major projects completed include:

- Setting up of Rail Coach Factory at Rae Bareli with a production capacity of 1000 coaches per annum.
- Construction of ROBs in the state of Rajasthan
- Survey, Geo-Technical investigation, designing & execution which includes Piling, Sub-Structure, Super Structure Approaches and other Miscellaneous works for construction of Road Over Bridges over the Railway Track in the state of Bihar, India.

Among the ongoing projects, some of the key projects are:

- Civil and Track Works of DFCCIL in three packages between JNPT - Vaitarana, Vaitarana - Sachin and Sachin - Vadodara sections.
- Construction of Railway lines of approx. 300 km length at an estimated cost of ₹5,000 Crores in Chhattisgarh.
- Six- Laning of Davanagere- Haveri from (Km. 260+000) to Km. 338+923) of NH-48 in the state of Karnataka to be executed on Hybrid

Annuity Project on DBOT Annuity Under NHDP - Phase-V.

- Eight-lane Vadodara-Kim Expressway from 323.000 to 355.000 in Gujarat.
- Survey, Feasibility study, detail design and construction of various identified rail connectivity projects of MCRL(Mahanadi Coal Railway Limited).
- Kiul-Gaya Doubling Project (East Central Railway).
- Katni-Singrauli Doubling Poject (West Central Railway).
- Katni Grade Separator By pass Line Project.
- Hajipur Bachwara Doubling Project.
- Rampur Dumra - Tal - Rajendrapul Doubling including Ganga Bridge (ECR)

Financial Performance

IRCON has achieved highest ever Operating Revenue of ₹5,202 crore in the year 2019-20 as compared to ₹4,415 crore in 2018-19. Similarly, total Revenue has also increased to ₹5,442 crore in 2019-20 as compared to ₹4,680 crore in 2018-19, a growth of 16.29%.

PAT(Profit After Tax) of the company have gone up by 10% to ₹490 crore in 2019-20, as compared to ₹445 crore in 2018-19. Net Worth of the company increased to ₹4,165 crore as on 31.03.2020 from ₹3,950 crore at the end of the previous year.

Centre for Railway Information Systems (CRIS)

The Centre for Railway Information Systems (CRIS) is an Autonomous Organization of the Ministry of Railways, with its headquarters in New Delhi and Regional Offices in Delhi, Kolkata, Mumbai, Secunderabad and Chennai. It develops and manages the IT systems of the Indian Railways, with terminals and counters spread across the country from Kargil to Kanniyakumari, and from Tawang to Port Blair. Together with a team of IT professionals with rich practical experience, CRIS has successfully positioned itself at the vanguard of Indian Railways' digital transformation.

Achievements and Developments

CRIS is developing and managing IT applications in all areas of Railway working, and has been focusing on interfacing these applications to provide a unified IT platform for Indian Railways. The applications being managed by CRIS (at the development or operational stage) are given below:

Ticketing and Passenger Services

PRS (Passenger Reservation System); Modernization of PRS; NGeT (Next-Gen e-Ticketing System); UTS (Unreserved Ticketing System), Paperless UTS, ATVMs (Automatic Ticket Vending Machines), UTS on Mobile; NTES (National Train Enquiry System); RBS (Rates Branch System); IR Web Portal and Complaint Management System; Kolkata Metro Ticketing System including Automatic Fare Collection; Hand-held terminals for TTEs (HHT); PRS Modernization; Webclaims (Claims and Refunds); PMIS (Parcel Management Information System); TTE lobbies system.

Freight and Operations

FOIS (Freight Operations Information System), e-Registration of demand, and e-payment Gateway; Pipeline Management System for FOIS; ICMS (Integrated Coaching Management System); COA (Control Office Application); TSR (Train Signal Registers); CMS (Crew Management System); SATSaNG (Software aided Train Scheduling System); SIMS (Safety Information Management System); RTIS (Real-time Train Information System); Route Optimization modelling using OR tools; Auto-generation of optimized Loco Links.

Resource Management- Finance

AIMS/I-PAS (Accounting Information Management System); IR Budget management System; GST implementation on all production systems; TAMS (Traffic Accounts Management System); WAMS (Workshop Management Information System); ARMS (Accounting Reforms Management System).

Resource Management - Materials and others

EPS (e-Procurement System);IMMS (Integrated Material Management System); VIMS (Vendors Interface Management System); e-Drishti and other Railway Board Applications; RSMS (Railway Security Management System).

Resource Management –Human Resources

HRMS (Human Resource Management System)

Fixed Asset Management

TMS (Track Management System); RORACS (ROB/RUB General Arrgt. Drawing System); Land Management System; IR GIS System including IR GEO-PORTAL; BMS (Bridge Management System); TMMMS (Track Machines Maintenance Management System); CRS Sanctions Management System; IRPSM (Projects and Sanctions Management System); BSIS

(Building & Structures Information System; TDMS (Traction Distribution Management System); EEMS (Electrical Energy Management System).

Rolling Asset Management

LAMS / SLAM / LMS (Locomotive Asset Management System); CMM (Coaching Maintenance Management System); WISE (Workshop Management System); FMM (Freight-Wagon Maintenance Management System); Fuel Management System; Automatic Identification of Rolling Stock using RFID; COFMOW system; PU Information Systems (BLW, MCF/ RBL, RWP/Bela).

Integration & Infrastructure

CRIS private Cloud Computing Technology; Communication Network Projects; IR Information Security Management project; Data Analytics and Artificial intelligence (AI); ESB (Enterprise Service Bus); IR-MDMS (IR Master Data Management System); IREA (Indian Railways Enterprise Architecture).

Major new Applications taken up in the year:

- Tunnel Maintenance and Management System
- Commercial Earning Tenders Management System
- Modernization of FOIS System and DBA facilities

During the year, CRIS datacenter was awarded ISO 27001 IT Security certification.

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 development needs, IRFC has been successfully meeting the borrowing targets set for it year after year. Funds are raised though issue of bonds, 54EC Capital Gain Bonds, Term loans from banks/financial institutions and through external commercial borrowings/export credit etc. The Department of Public Enterprises has consistently rated the Company as "Excellent" for its performance vis-a-vis the parameters set out in the MOU.

The Company has leased rolling stock assets worth ₹2,27,588 crore to the Railways upto 31st March, 2020. Rolling Stock assets worth about `33,544 crore were financed during 2019-20. 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. IRFC has also funded Railway projects through Institutional Finance to the extent of ₹93,655 crore till 31st March,2020. Besides, IRFC has funded National Projects worth ₹7,578.70 crore upto 31st March ,2020.

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 10.978% p.a. in 2019-20 which compares favorably 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 ₹5,735.39 crore to Rail Vikas Nigam Ltd. (RVNL) till the end of fiscal year 2019-20 for development of Railway Projects.

IRFC has consistent profit earning track record. It has so far paid ₹3,557.66 crore as dividend to the Government. Based on its strong financial strength and credit standing, it has got the highest possible rating from three prominent domestic Credit Rating Agencies and investment grade at far with 'Sovereign' from four major International Credit Ratings Agencies.

Konkan Railway Corporation Limited (KRCL)

The Corporation was established in the year 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.

Financial Performance

There has been substantial financial impact in the year 2019-20 and it is going to be very severe in the Financial year 2020-21 due to the Covid-19 Pandemic.

Key Financial Highlights

		(₹ In crore)
Particulars	2018-19	**2019-20**
Total Income	2,898.97	**2,734.77**
Operating Margin	291.23	**199.79**
Profit After Tax	99.73	**5.96**
Net Worth	2,053.63	**1,892.31**

TRAIN OPERATING PERFORMANCE:

On an average, 46 pairs of Mail/Express train and 9 pairs of passenger Trains were run per day over Konkan Railway single line system during the year 2019-20. In addition to this, 524 nos. of Holidays special trains

were run during summer, winter holidays and during Ganpati festival to clear extra rush of passengers in the year 2019-20. The passenger earnings during the year was ₹687.68 crore registering a decrease of 1.06% over the corresponding earning of `695.10 crore, last year.

On the freight front, on an average, 12 freight trains were run per day including Roll on- Roll off (RORO) services, during the 2019-20. The freight apportioned earnings during the year was ₹436.10 crore, as compared to last year's freight earning of ₹560.94 crore.

Project Performance

a. **Udhampur-Srinagar-Baramulla Rail Line (USBRL Project, J&K):** So far the Corporation has completed 37.80km tunnel excavation, out of total of 46.1km of the construction of Katra-Dharam section of USBRL Project, J&K. 8.363 km of tunnel excavation and 6.747 km of Tunnel Lining have been completed during the year. A turnover of ₹1,434 crore (including GST) in USBRL Project alone was achieved in the year which is the highest ever and 10.05% higher than ₹1303 crore (including GST) of 2018-19.

b. **Track Doubling Roha-Veer Section (47km):** Track doubling of this section is expected to increase the line capacity of the Corporation. During the year, the project has achieved cumulative financial progress of `350 crore and physical progress of 94%.

c. **Route Electrification of Konkan Railway Route:** With complete electrification, the Corporation is excpted to save approx ₹200 crore per annum on fuel cost and net saving of ₹60 crore per annum after paying principal and interest on loan. For expeditious execution of the railway electrification on KR route, work has been initiated from both the ends simultaneously. Field works of casting foundation for OHE masts and other civil works are in progress. During the year, the project has achieved cumulative financial progress of ₹615.34 crore and physical progress of 58%.

RailTel Corporation of India Limited (RailTel)

RailTel Corporation of India ltd. (Miniratna Category-1 CPSU), was formed on 26th September, 2000 for modernizing the Telecommunication system of Indian Railways through an internal entity. Formed with an authorized capital of ₹1000 crore and an exclusive Right of way (ROW) of the 67,415 RKM of Indian railway network, the PSU started functioning with a hand full of talented, experienced and motivated Signalling & Telecommunication engineers of Indian Railways.

Over the years RailTel has grown from a small entity to one of the largest secured Neutral Telecom Services Provider in the country. It is at the forefront of providing nationwide Broadband Telecom & Multimedia Network in addition to Modernization of Train operations and administrative network systems for Indian Railways. The biggest USP of RailTel is its ownership of a Pan-India 55000+ RKM of Optic fibrenetwork which covers all important towns & cities of the country and several rural areas covering 70% of India's population. In high bandwidth backbone segment, RailTel occupies a proud place with its unparallel network. The network has the ability to provide the mission critical customized connectivity platform for enhanced efficiency and growth. Presently this network is available at more than 600 cities in multiple rings of STM-64/16.

RailTel has PAN India Telecom Network with capability of Service delivery from 2mbps to 100Gbps links. RailTel Network comprises of various technologies viz. Next Generation Network (NGN), Synchronous Digital Hierarchy (SDH), Packet Transport Network (PTN), Dense Wavelength Division Multiplexing (DWDM), Internet Protocol- Multi Protocol Label Switching (IP-MPLS) which are maintained by round the clock Network Operation Centres and trained field manpower. All the equipments provided on the network are of State-of-the-Art Technology and are as per International Telecom Standards.

Though RailTel started off as an entity to support Telecommunication system of Indian Railways, soon it diversified into many fields. The company started offering a bundle of services like Internet Bandwidth, Leased lines, Tower Co-location, HD Video Conferencing service (Telepresence as a Service),MPLS-VPN services, UPTIME, USA certified Tier III Data Center/ Data recovery services, Colocation and Managed services, e-office implementation, and IT & IT enabled services etc. to private and Government clients.

Performance during last three years.

a. In the last 3 years, the Company has consistently earned every year more than ₹190 crore profit before tax.

b. The Company pays revenue share to Railways and license fee to DoT from its income. During the last two years, such revenue share and license fee paid are as under:

			(₹ in crore)
	2017-18	**2018-19**	**2019-20**
Revenue share to Railways	27.64	28.43	31.81
Revenue share to DoT	45.01	45.21	47.93

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

Financial Performance

(₹ in crore)

	Particulars	2017-18	2018-19	2019-20
1	Share Capital	321	321	**321**
2	Gross Income	1,025	1,017	**1112**
3	Gross Operating Margin	313	327	**361**
4	Net Profit after Tax	156	110	**138**
5	Net Worth	1,249	1,284	**1361**
6	Dividend paid to Ministry of Railways	62.47	64.20	**68.06**

Focus Areas:

Station Wi-Fi

As on 31st March-2020, 5,655 stations were live with RailTel's RailWire Wi-Fi. This is one of the largest and fastest public Wi-Fi networks of the world. The response to the service has been phenomenal, with around 2.22 crore user logins in a month and around 9000 TB of aggregated data consumption. Out of the stations commissioned 70% are in rural areas which is bringing free high-speed Wi-Fi services in the vicinity of a major chunk of rural population. The reduction in cost of smart phones is making it easy for even economically weaker sections of society in these areas to avail internet facility through RailTel's RailWire Wi-Fi at stations. This Wi-Fi service has been helpful in bridging the urban rural divide by providing the rural masses with access to high speed free Wi-Fi which they can use for making digital payments, access to e-gov services, knowing the weather conditions and learning new vocational skills.

E-office in Indian Railways

RailTel has also started implementation of e-office over IR to bring more efficient, effective and transparent inter-government and intra-government transactions and processes. e-Office is a Cloud Enabled Software Application developed by NIC, hosted at RailTel Tier III Certified Data Center at Secunderabd with Disaster recovery at Gurugram. RailTel provides e-office solution from planning to Commissioning along with User training and all support for a smooth transition from manual to Digital workplace by creating a reliable, efficient, and effective way to handle office files & documents. A digital workplace also ensures less consumption of paper thus promoting green workplace.

The project is being executed in phases and implemented in all 60 Units (Zonal HQs, Divisions/CTIs/ PUs / RDSO etc.) of IR & in all the 46 Divisions under Phase-I & phase-II respectively with over one lakh users taking benefit of faster and transparent working. Work for balance 60 units (workshops) for 30000 users is sanctioned.

During the COVID crisis 25 new establishments were commissioned with NIC e-office. This has proven to be boon in a crisis time and part of Railway workforce was able to WORK FROM HOME, which would have been impossible in case of manual filing system. RailTel provided this service to other PSUs such as DFCCIL, IRCON, and CWC etc. RailTel has also created Virtual Private Network for 4500 users of Indian Railways. We have also upgraded Railnet speed at a number of Railway Colonies to further support working from home for Railway Officials.

Railway Display Network (RDN)

This is an initiative to provide contextually rich and relevant information to Rail users along with public awareness messages & entertainment content and use the latest digital technologies to unlock the true advertisement potential of the footfalls in stations. RDN is planned to be built and operated on a self-sustainable model.

The display screens will be provided at the station buildings, entrance, concourse, platforms, waiting rooms and foot-over-bridges. Various passenger related information from most appropriate sources like train charting server, NTES, PRS etc shall be provided. RDN will also be a platform for targeted live messaging on audio, video or social media to display information of national importance and citizen services. Project is to be implemented at 2000 stations (all A1, A, B, C & D category stations).

Telepresence as a Service (TPaaS)

RailTel's TPaaS an end-to-end, full high-definition video conferencing service that gives users a virtual, face-to-face meeting experience was launched in January-2015. Before adoption of TPaaS Indian Railways were spending huge amount of money and man hours for meetings and events. Post adoption of TPaaS the number of travels for meetings and events has dropped drastically saving man hour, travel and lodging expenses. Being swifter, faster in decision making and crisis handling, lesser travel for meetings and events has also helped in saving significant amount of carbon footprint. This is extensively used holding online meetings of Board, Zonal & divisional level. Also used for inauguration of Rly facilities (131 events in last 1 year)

The service now serves 530 elite users across 45 plus customers. The success is a result of the significant ease of use & 24X7 customer responsiveness of the RailTel team vis-a-vis the challenges faced with other service providers.

Video Surveillance System (VSS)

RailTel is also executing provision of IP camera-based Video Surveillance System at 6124 railway stations and 14,387 premium train coaches and EMU coaches. This will go a long way in enhancing the safety and security of the passengers travelling over the IR network. RailTel is also integrating the various standalone video surveillance system installed at various stations by respective zonal railways so that the video recordings can be seen and monitored at the Divisional and Zonal head quarter level centrally. Under the project, all cameras to be provided in station premises will be networked on optical fiber cable and brought to a centralized place (CCTV control room) from where they shall be viewed on multiple LCD monitors by Railways security personnel. The system shall provide high capacity storage devices at stations to store recording of CCTV footage for a defined period. During the year VSS has been provided at 215 stations by RailTel.

RailWire –Retail Broadband Service

It is a collaborative model in partnership with local entrepreneurs & local cable operators for providing access network. There are more than 1.9 lakh RailWire broadband customers in the SMEs/household segment. Due to high SLAs & last mile connectivity, this is suitable for providing rural connectivity at Gram Panchayat/village levels as well as for connecting banks and other Government institutions.

Modern Train Control System (MTCS)

RailTel Enterprises Limited (REL), a wholly owned subsidiary company of RailTel Corporation of India ltd., has been entrusted with the work of Modern Train Control System project for modernizing railway control system in 4 sections of 4 different Zones over 640 Kms. The MTCS project envisages upgradation of signaling system at par with the world standards and will work on LTE (Long Term Evolution) communication backbone.

The Modern Train control system is being implemented for 165 Route KM (RKM) between Renigunta – Yerraguntla, 145 RKM on Vizianagaram - Palasa, 155 RKM on Jhansi - Bina Section and 175 RKM on Nagpur – Badnerasection. These are some of the busiest railway routes with heavy traffic. MTCS will help enhance safety drastically, reduce congestion in rail network and increase line capacity, improving punctuality as it can eliminate

train delays due to automated signaling and real time information of train movements, eliminating the need for manual data logging. It will also help to increase average speed of trains due to automation of train

Indian Railway Catering and Tourism Corporation Limited (IRCTC)

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 ₹250 crore and paid up share capital is ₹160 crore, fully subscribed by Ministry of Railways, Government of India.

The financial highlights of the year 2019-20 as compared with the year 2018-19 are as below:

(₹in crore)

S. N0.	Particulars	2018-19	2019-20
1	Total Income	1,958.94	**2,353.54**
2	Total Expenditure	1,489.13	**1,569.37**
3	Profit Before Tax	478.56	**745.35**
4	Profit After Tax	308.56	**528.57**
5	Net worth	1,071.02	**1,327.82**

Catering & Hospitality:

During the year, IRCTC managed on-board catering services in 417 trains (24 Rajdhanis, 2 Tejas, 1 Gatiman, 2 Vande Bharat, 23 Shatabdis, 18 Durontos and 347 Mail/Express trains). During 2019-20, Ministry of Railways introduced one Vande Bharat, one Rajdhani and thirteen Mail/express trains. IRCTC also manages Train Side Vending (TSV) contracts on Mail/Express and Superfast trains having no pantry cars. As on 31st March, 2020, contracts for 26 sections over Indian Railways network have been finalized for provision of TSV services for trains without Pantry Cars.

As on 31st March, 2020, IRCTC managed 11 Base Kitchens, located at New /Delhi, Howrah, Ahmedabad, Patna, Mumbai Central, Mumbai CST, Ballarshah, Nagpur, Balasore, Sealdah and Kharagpur Jn. and also managed 169 Refreshment rooms, 56 Jan Ahaars and 24 Cell Kitchens.

The Company commissioned 16 Food Plazas and 40 Fast Food Units, thereby managing 293 operational units as on 31st March, 2020.

E-catering service is expanding and available at 358 stations. On an average 21,571 meals per day were booked through e-catering in the year 2019-20.

IRCTC has set up 06 Executive Lounges at New Delhi, Agra Cantt, Jaipur, Ahmedabad, Madurai & Sealdah.

The Company is presently operating two Rail Yatri Niwas at Ginger Rail Yatri Niwas, New Delhi and Sampath Rail Yatri Niwas, Howrah and two BNR Hotels from Puri and Ranchi.

The revenue from Catering segment in 2019-20 was registered at ₹1,059.99 crore as against ₹1,045.41 crore in 2018-19.

Travel & Tourism:

IRCTC has become one of the leading travel and tourism companies in the market. The various tourism business segments of IRCTC includes Luxury Train Tours Maharajas' Express, Buddhist Circuit Special Train, Bharat Darshan Special Tourist Trains, Rail Tour Packages, International and Domestic Air packages, Land Tour Packages, Hotel booking, Customised and LTC tours and Event Management etc.Initialisation of operation and management of Private Trains which is operated on sectores like, Lucknow-Delhi-Lucknow, Ahmedabad-Mumbai-Ahmedabad and Varanasi-Indor-Varanasi. IRCTC have its exclusive tourism portal, www.irctctourism.com for showcasing and booking of various tourism products in a single space.

The revenue from Tourism segment in 2019-20 was registered at ₹297.20 crore as against ₹251.25 crore in 2018-19.

Internet Ticketing:

E-ticketing accounts for 72.75% of reserved tickets in 2019-20 on Indian Railways booked online. On an average, more than 8.25 lakh tickets were sold daily through IRCTC's website and Mobile App during 2019-20. The site offers round the clock ticket booking services except for 35 minutes from 2,345 hrs to 0020 hrs.

Year	2018-19	**2019-20**
No. of E-Tickets Booked (in Lakhs)	2,842	**3,019**
No. of Passengers Booked E-tickets (in Lakhs)	4,950	**5,230**
E-ticketing Revenue Collection (₹ in Crores)	32,070	**34,055**

The revenue from Internet Ticketing segment in 2019-20 was registered at ₹622.34 crore as against ₹234.10 crore in 2018-19.

Packaged Drinking Water (Rail Neer) :

As on 31.03.2020, IRCTC has fourteen operational plants located at Delhi, Patna, Palur, Ambernath, Amethi, Parassala, Bilaspur, Sanand, Hapur, Mandideep, Nagpur, Jagiroad, Jabalpur and Sankrail which are under PPP mode.

The total production of Rail Neer Plants during 2019-20 was 29.50 crore litres against total production of 21.50 crore litres the in previous year. The capacity utilization of all plants was 79% as on 31st March, 2020.

The revenue from Rail Neer segment in 2019-20 was registered at ₹225.85 crore as against ₹176.26 crore in 2018-19.

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) 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 has been given the status of a non-Government Railway Administration enumerated in the Railways Act, 1989.

PRCL has permission to run container trains on rail corridors serving the Ports of Pipavav, Mundra, Chennai, Ennore, Vizag and Kochi and their hinterlands (in its capacity as a Container Train Operator - Category – III).

The comparative figures of 2018-19 and 2019-20 are as under:-

	2018-19	**2019-20**
Number of single stack Container trains	2,338	**2,109**
Number of Double Stack containers trains	2,117	**2,073**
Total container	4,455	**4,182**
Number of Bulk trains	575	**618**
Number of empty trains run	488	**536**
Total number of trains run	5,518	**5,336**
Traffic volume (in Million Tonnes)	8.24	**8.14**
TEU's loading	3,26,690	**3,26,812**
Gross Apportioned freight earnings (`in crore)	227.65	**229.65**
Net Profit (`in crore)	85.61	**82.15**
Net Worth as per audited financial statements(`in crore)	571.18	**641.52**
Number of passenger trains (in SUNR – Botad)	**18 pairs	** **19 pairs**

** includes 9 mail / express trains, which are running weekly and 9 mail / express / passenger trains run daily and 1 mail/express train run Monday-Saturday.

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 31.03.2020, RVNL has completed 10,839.48 km of project length covering 455.55 km of New Lines, 3,483.37 km of Doubling, 1,888.63 km of Gauge Conversation and 4,969.93 km of pure Railway Electrification, 2,385.29 km RE as part of NL/GC/DL, 42 km of Metropolitan Transport Project (MTP), 8 Railway Workshops, 1 Cable Stayed Bridge at Bardhhaman and 9 Other Specific Works. 92 projects assigned to RVNL have been fully completed. In comparison to completing a total of 999.94 km of project length in 2018-19, RVNL completed 1959.83 km in 2019-20 implying an increase of 95.99%. This included 551.02 km of Doubling, 95.54 km of New Lines, 105.41 km of Gauge Conversation and 1207.86 km of Railway Electrification. In addition, Railway Electrification of 355.88 km was also carried out in other than specific Railway Electrification projects as part of Doubling. For the past six years, RVNL has been contributing more than 1/3rd of total project length completed on Indian Railways under Doubling & about 20% under Railway Electrification Plan Heads.

Financial Performance (2019-20) as compared with 2018-19

(₹in crore)

	2018-19	**2019-20**
Total Turnover	10,060.07	**14,530.58**
Gross Profit	758.31	**990.84**
Profit after Tax	606.59	**789.96**
Dividend	186.94	**236.96**

The cumulative dividend paid to Ministry of Railways by RVNL is ₹1,012 crore.

In addition to borrowings from IRFC for implementation of projects, comprising of ₹4,256.65 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 ₹9,466.89 crore against which the equity contribution of RVNL is ₹983.80 crore, i.e.10%. Balance funds of ₹8,483.89 crore will be provided by the equity share of stakeholders and through debt raised from Financial Institutions.

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 Railways 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

1.1 Commercial Development of Vacant Railway Land

Sites for commercial development are entrusted to RLDA by the Ministry of Railways. During the year 2019-20, total earning of ₹933.27 crore has been realized by RLDA.

In the beginning of 2019-20, RLDA had been entrusted with 75 (1 site is under litigation) sites. During this period, RLDA had identified 13 new sites for commercial development. During 2019-20, 11 nos Letter of Acceptance (LOA) for development of commercial sites have been issued. Out of 11 selected bidders, LOA of 02 sites has been cancelled on account of non-payment of 1st installment of lease premium.

1.2 Construction of Multi Functional Complexes (MFCs)

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 the PSU for development [IRCON (24), RITES (14), RVNL (2)], out of these 40 MFCs have been completed by them and 24 MFCs have been commissioned by IRCON. However, as per the directions of the Railway Board, 14 MFC Buildings completed by RITES have been handed over back to Railways without any cost. RLDA has been entrusted 123 MFCs for development through private developers. Out of these 53 MFCs have been awarded and 33 MFC have been deferred by Railway Board, due to non feasibility or being commercially unviable or requested by Railway to drop them.

LOAs for 3 MFC sites namely Sasaram, Arsikere & Bangarpet were issued during 2019-20.

1.3 Re-development of Railway Colony

Most of the colonies of Railways are very old and quarters are in

dilapidated conditions. RLDA has been given responsibility of Re-development of Railway colonies along with earning of non-tariff revenue by leveraging land uses and FSI. Upto March 20, Railway has entrusted 84 colonies to RLDA for re-development.

1.4 Re-development of Railway Station by RLDA 2019-20:

- For redeveloping railway stations, Indian Railway Stations Development Corporation Ltd. (IRSDC) was created as a Special Purpose Vehicle (SPV), Joint Venture of IRCON & RLDA with an authorized share capital of ₹100 crore and initial paid up share capital is ₹40 crore, which has been now enhanced to ₹80 crore. IRSDC has been entrusted about 50 stations for redevelopment till the end of the year 2019-20. Redevelopment of Habibganj and Gandhinagar stations is under progress by IRSDC.

In all RLDA has been working on the re-development of 62 Railway Stations during the year 2019-20.

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 of the most ambitious rail infrastructure projects undertaken by the Government of India. In the first phase, two corridors - the Eastern DFC (1,337 route km) and Western DFC (1,504 route km) spanning a total length of 2,843 route km (except Sonnagar – Dankuni section) are being constructed. The Eastern Dedicated Freight Corridor starts from Ludhiana and terminates at Sonnagar, traversing the states of Punjab, Haryana, Uttar Pradesh, and Bihar. The Sonnagar – Dankuni section will be built on a PPP mode. It will largely serve coal and steel traffic to northern parts of India. The Western Dedicated Freight Corridor originates from Dadri (Uttar Pradesh) and terminates at Jawaharlal Nehru Port Trust (Mumbai) passing through Uttar Pradesh, Haryana, Rajasthan, Gujarat and Maharashtra. This corridor will mainly meet requirements of container traffic.

Project in Brief:

The total length of the Eastern & Western DFC is targeted for completion

in the period 2018-2022 (in phases). Total Expenditure upto 31.03.2020 (approx.) is ₹5,877 crore (including the cost of land). The overall financial progress is 69% (including land) and the overall Physical progress is 71%.

DFCCIL achieved the following milestones during the year 2019-20:

A) Achievements during the year 2019-20

1. Nationwide lockdown was imposed due to COVID 19. Consequently, work across DFCCIL at all worksites was badly affected. However, DFCCIL took a number of measures to ensure timely payment to the contractors / employees and availability of raw PPEs, sanitising material to all field staff.
2. Trial runs in Western & Eastern DFC: The project has witnessed successful trial runs of Freight trains in both Eastern and Western Corridor after completion of Civil, Electrical and S&T works.
    - Rewari-Madar section (306 km) in WDFC has already been completed in December, 2019 and more than 176 trains have been run in this section upto 31.03.2020.
    - Bhadan-Khurja (194 km) section in EDFC-I has already been completed and more than 1200 trains have been run in this section since November 2019.
3. Track linking with Mechanized track laying machine of 682 km has been done in the year taking the cumulative linking to 2,582 km.
4. OHE wiring by Mechanized wiring train has been started for the first time in India in both EDFC & WDFC. Total 1,508 km laying of catenary and contact wire has been completed upto 31.03.2020.
5. CAPEX: DFCCIL achieved CAPEX of ₹3,476 crore during March 2020. With this the cumulative CAPEX for 2019-20 is ₹11,740 crore.
6. Successful Oscillation run in WDFC: Oscillation Trials of 25T axle load BOXNS & BLC (Container) wagon at maximum speed of 110 kmph was successfully conducted by RDSO in Phulera-Ateli section (193 km) of Western DFC. With this, now full DFC is fit to run 25 T axle load trains @100 kmph, as against IR's current regime of 22.9 T axle load @ 65-70 kmph.

B) Overall progress of major items: There has been considerable progress of major items. 228 major bridges out of 494 have been completed while 127 are in progress. 298 out of 562 RUBs have been commissioned while 232 are in progress. 68 out of 296 ROBs have been completed while 138 are in progress.

C) **Procurement:** The MOU for implementing the e-tendering application IREPS developed by CRIS was signed with CRIS and has been implemented in DFCCIL. As per the guidelines of Railway Board, procurement of the products and services available on GeM are done mandatorily through GeM portal. Products worth ₹1.29 crores (156 nos of orders) have been purchased through GeM during 2019-20. The BDD (business discovery document) for material management module has been finalized with SAP for implementation of Material Management Module which will facilitate inventory and material management for the organisation.

D) **Land Acquisition:** There has been a tremendous improvement in the cooperation by State Governments. Numerous hurdles/impediments have been removed and considerable progress in the land acquisition has been achieved.

E) **Environmental Issues:** During the year various Environmental and Safety awards have been obtained in various sections of DFCCIL like RoSPA Golden and Silver Award, International Safety Award. During the year mass plantation drive at construction site has been undertaken and till the year 2020, approx. 45000 trees have been planted.

Mumbai Railway Vikas Corporation Ltd. (MRVC)

1.1 Mumbai Railway Vikas Corporation Ltd (MRVC Ltd), a PSU of Government of India under Ministry of Railways (MOR) executing of the Rail Component of the MUTP.

1.2 Mumbai Urban Transport Project – I

MUTP-I was sanctioned in Rail Budget 2003-04. The completion cost of MUTP-I was ₹4,452 crore MUTP- I was successfully completed in 2012.

Major Infrastructural Inputs in MUTP Phase - I (Rail Component)

- Addition of 93 track Kms. (5th & 6th line Kurla-Thane, 3rd& 4th line Borivali-Virar)
- Induction of 101 new 9-car rakes (909 coaches)
- Resettlement & Rehabilitation of 15,857 Project affected households.
- Running of 12-car rakes on all lines (excluding Harbour Line) by extending the length of all platforms
- 1500 V DC to 25k V AC conversion on Central & Western Railway – Traction conversion work on entire Western Railway.

1.3 Mumbai Urban Transport Project- II

MUTP -II was sanctioned in Railway Budget 2008-09 and the present cost of project is ₹8087 crore MUTP-II was bifurcated as MUTP 2A & 2B.

1.3.1 MUTP 2A – Completed : Cost of MUTP 2A is ₹4,803 crore (Loan ₹1,727 crore from WB)

S. No.	Name of Work	Agency of Execution	Status
1	EMU Procurement/Manufacture (ICF)	MRVC/RDSO/ICF	Completed
2	1500v DC to 25kV AC Conversion	CR, MRVC	Completed
3	EMU Maintenance Facilities & Stabling Lines	CR, WR, MRVC	Completed
4	Trespass Control measures	MRVC	Completed

1.3.2 MUTP 2B – In progress : (funded by GoM & MoR on 50:50 basis)

S. No.	Name of Work	Agency of Execution	Completion Target
1	5th & 6th line between CSTM-Kurla	CR	March 2024
2	5th & 6th line between Thane-Diva	MRVC	June 2021
3	Extension of Harbour Line between Andheri-Goregaon	MRVC	Completed in December 2017
4	6th Line between BCT-Borivali	WR	March 2023
6	Resettlement and Rehabilitation	MMRDA	Along with project

1.4 Overall Amenities at various Stations by MRVC under MUTP II works

Under various MUTP II works, number of amenities were provided in Mumbai suburban stations –

30	New FoBs	12	New platforms
27	Booking offices,	02	New home platforms
6	Elevated Decks,	44	Escalators
31	Platform extensions	25	Elevators.
01	New Station (Ram Mandir Rd)	06	Skywalk/Highwalk

1.5 MUTP 2C – Running of 12 car on Harbour line - Completed : Cost of ₹714 crore

All infrastructure works were completed in March ,2016 and this increased the capacity by 33% on harbour line. The 13 EMU rakes were also received by Feb., 2018

1.6 MUTP 3 – Sanction in Dec. 2016 – Cost of ₹10947 crore

S. No.	Name of the work	Cost (₹in Crore)
1	New Suburban Railway Corridor Panvel-Karjat (double line) (28 Kms)	2,782
2	New Suburban corridor link between Airoli-Kalwa (elevated) on Central Railway (4 Kms)	476
3	Quadrupling of the Virar-Dahanu Road on Western Railway (31.5 Kms)	3,578
4	Procurement of Rolling Stock (565 coaches)	3,491
5	Trespass Control on mid-section	551

1.6.1 Land Acquisition for all the corridors is in progress & tenders awarded for MUTP III works. A Loan Agreement has been signed by Govt. of India & AIIB on 24.08.2020 of ₹3,500 crore (USD 500 million) for MUTP III.

1.7 MUTP 3A - has been approved by Union Cabinet in March 2019 at the cost of ₹33,690 crore which is as under: -

S. No.	MUTP 3A corridors	Route km	Completion Cost in crore	Executing Agency
1	Extension of Harbour Line between Goregaon-Borivali	7	826	WR
2	5th & 6th line between Borivali-Virar	26	2,184	MRVC
3	4th line between Kalyan-Asangaon	32	1,759	CR
4	3rd & 4th line between Kalyan-Badlapur	14	1,510	MRVC
5	Kalyan Yard - Segregation of Long distance and Suburban Traffic		866	CR
6	a) CBTC on CSMT-Panvel on Harbour Line	49	1,391	MRVC
	b) CBTC on CSMT-Kalyan on Central Railway	53	2,166	MRVC
	c) CBTC on CCG-VR on Western Railway	60	2,371	MRVC
7	Station Improvement		947	MRVC
8	Procurement of Rolling Stock – 191/12 car AC EMU rakes		15,802	MRVC/ICF/ MCF
9	Maintenance facilities for Rolling Stock		2,353	MRVC

10	Stabling Lines	557	CR & WR
11	Augmentation of Power Supply Arrangement	708	CR & WR
12	Technical Assistance	250	MRVC

Preliminary works are in progress.

1.8 Construction of FoBs on Central & Western Railway

Railway Board has entrusted MRVC the work of execution of FoBs on Central Railway (13) and Western Railway (16) stations of Mumbai Suburban Section in November 2017. 7 FoB completed on CR & 12 FoB completed on WR.

Braithwaite & Co. Limited

Braithwaite & Co. Limited (BCL) is a leading Heavy Engineering Company in India under Ministry of Railways, having two manufacturing units located in West Bengal. BCL has been a dominant player in Wagon Manufacturing Industry since decades. Its major products include manufacturing of newly built wagons, repairing of wagons, structural steelwork, Bridges, manufacture and maintenance service for cranes and steel castings (Bogie, Coupler etc) and wagon sub assemblies.

Although BCL's core competency is developing & manufacturing of various types of wagon, however in recent times, BCL has gradually forayed into Service Sector and also entered into various other business verticals viz. manufacture of SS benches for various Zonal Railways, renovation and rebuilding of Rail and Foot Over bridge (ROB / FOB) etc. The Company is accredited with ISO 9001:2015, ISO 14001:2015, OHSAS 18001:2007 and EN ISO 3834-2:2005.

Highlights of its performance in the year 2019-20, vis-a-vis 2018-19 are tabulated below:

Particulars	2018-19	**2019-20**
Newly Built Wagon (Nos.)	869	**1,263**
Repair Wagon (Nos.)	4,590	**7,852**
Bogie (Nos.)	1,371	**1,883**
Revenue from Operations (₹ in crore)	317.03	**579.16**
Profit (PBT) (₹in crore)	9.41	**23.97**
Net Worth (₹in crore)	63.68	**83.45**

Self – Sufficiency

Stores imported by IR constitute 1.24% of the total stores purchased. The cost of stores imported in the last three years are as under:

			(₹ in crore)
Item	2017-18	2018-19	**2019-20**
Diesel loco parts and fittings	508.72	426.93	**225.18**
Electric loco parts and fittings	120.57	180.47	**207.61**
Carriage, Wagon and EMU parts and fittings	228.36	286.05	**141.81**
Electrical stores	17.48	2.31	**25.45**
Engineering stores	14.26	17.72	**54.40**
Ball and Roller Bearings	0.54	0.24	**0.37**
General stores covering acids, chemicals, drugs, etc.	43.92	30.71	**41.41**
Other items including metal ferrous, complete units of rolling stock i.e. bogies, wheel -sets, couplers, etc.	56.26	111.45	**93.90**
Grand Total	990.11	1,055.88	**790.13**

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 Performa charges) for different types of rolling stock manufactured in Indian Railway Production Units for the year 2019-20 is furnished below:

	LOCOMOTIVES/COACHES	2018-19	**2019-20**
DLW	WDP-4D	7.65	**9.36**
	WAP-7	0.91	**1.08**
	WAG-9	1.36	**1.63**
	WDG-3A	2.96	**9.12**

	WDS-6	2.94	**4.5**
	Sri Lanka Loco	0.45	**0.74**
	WDG-4D	8.84	**-**
	WDG-5	40.75	**-**
	WAG-11	5.25	**-**
RCF	LGS	2.17	**1.41**
	LSLRD(LC)	-	**1.33**
	EOG/LHB/FAC	-	**1.14**
	SCZAC/EOG/LHB	-	**1.18**
	VPHX	-	**1.91**
	LWSCZ	2.23	**1.43**
	LWSCN	2.22	**1.46**
	LFCWAC	-	**1.13**
	ACCB/EOG/LHB	-	**1.13**
	WLRRM/EOG/LHB	-	**0.86**
	ACCW/EOG/LHB	-	**1.09**
	RA AC	-	**1.45**
	EOG/LHB/ACCN (Humsafar)	-	**1.01**
	LGS (Antyodya)	-	**1.44**
	DD UDAY	-	**0.81**
	LACCNX	-	**1.11**
	LWACCN	1.70	**-**
	LWACCW	1.74	**-**
	LWCBAC	1.67	**-**
	LWFAC	1.73	**-**
	LWFCWAC	1.75	**-**
	LWFCZAC	1.75	**-**
	LWFCZAC	1.40	**-**
	LWFCZACHS	1.40	**-**
	LWLCBRRM	1.22	**-**
	LWLRRMHS	1.24	**-**
	LWS	2.34	**-**

	LWSCZAC	1.73	**-**
	LWSCZACHS	1.73	**-**
CLW	WAG-9	2.65	**2.84**
	WAP-7	2.35	**2.37**
	WAP-5	3.92	**8.25**
MCF	LWACCW	3.62	**1.72**
	LWACCN	3.62	**1.73**
	LWSCN	4.71	**2.34**
	HUMSAFAR	5.77	**-**
	TURNKEY	3.37	1.54
	DEEN DAYALU	3.61	**2.07**
	TRC	3.68	**-**
	TRSC	3.58	**-**
	LWSCN(G)	4.68	**2.00**
	LWLRRM	2.95	**1.24**
	LDSLR	2.24	**1.28**
	LWSCZ	5.06	**2.43**
	LWSZAC	-	**1.81**
	LWFAC	-	**2.27**
	LWLBAC	4.04	**1.65**
ICF	LACCN	2.87	**0.65**
	LACCW	2.65	**0.69**
	LFCWAC	-	**0.25**
	LS	-	**0.28**
	LSCN	2.39	**0.61**
	LSCZ	2.08	**0.28**
	LSCZ AC	2.58	**0.69**
	LWCB AC	-	**1.28**
	LWFAC	-	**1.65**
	LWLRRM	1.81	**0.46**
	LWLRRM TEJAS	1.85	**-**
	AC EMU B	0.39	**-**

LFCZAC	2.37	-
LGS	2.00	-
LOMS	1.16	-
MEMU DMC US	0.29	-
MEMU TC US	1.06	-
TRAIN 18 DTC	0.55	**0.52**
TRAIN 18 MC	0.26	**0.25**
TRAIN 18 MC EC	0.56	**0.54**
TRAIN 18 TC	0.52	**0.53**
TRAIN 18 NDTC	0.53	**0.54**
TRAIN 18 NDTC EC	0.53	**0.53**
AC EMU NDMC US	0.50	-
AC EMU TC US	0.86	-

Locomotives:

Locomotives are manufactured by Chittaranjan Locomotive Works (CLW), Chittaranjan, Diesel Locomotive Works (DLW), Varanasi and Diesel Loco Modernisation Works, Patiala. During 2019-20, CLW manufactured 431 state-of-the-art 3 phase HP BG electric locomotives. DLW manufactured 306 BG locomotives including 27 Diesel Locomotives for NRC/Export. DLW also converted four WDG4 old diesel locomotives to WAG11 electric locomotive. DMW manufactures 81 nos 3-phase (WAP-7) HHP BG Electric locomotives.

Diesel Loco Modernisation Works:

DMW, Patiala rebuilt & upgraded 6 diesel electric locomotives from 2600 HP to 3100/3300 HP along with fitment of Microprocessor Based AC-DC Power Transmission system resulting improved fuel efficiency and enhanced reliability. DMW also manufactured 48 nos DETC tower cars including 01 for NRC.

Passenger Service Vehicles:

During the year, Integral Coach Factory (ICF), Chennai manufactured 4,204 coaches (312 EMUs, 54 DEMUs (42 for Haldia), 24 high speed Self Propelled Accident Relief Trains (SPART), 40 coaches for Kolkata Metro, 3419 LHB coaches, 224 three phase MEMU, 16 Train set coaches, 49 nos (DETC) inspection coaches and 49 coaches for Sri Lankan Railways. Rail Coach Factory (RCF), Kapurthala manufactured 1342 coaches including

928 LHB coaches, 414 MEMU coaches. Modern Coach Factory (MCF), Raebareli manufactured 1930 LHB coaches during 2019-20.

Wheels and Axles:

RWF, Bangalore assembled 58,868 wheel-sets during 2019-20. It also manufactured 1,76,387 wheels and 80,849 axles. Rail Wheel Plant Bela produced 29,563 wheels during 2019-20.

Wagons:

Indian Railways bulk requirement of wagons is met by wagon manufacturing units both in public and private sectors as well as PSUs under the administrative control of Ministry of Railways.

During the year 2019-20, 15,443 wagons were inducted in Indian Railway System. Out of these, 1,243 wagons (including 255 BLC wagons) were manufactured by Railway Workshops and the remaining 14,200 wagons (including 1,141 BLC wagons) were manufactured by wagon industry.

Signalling:

Railway Signalling installations use a number of specialized equipment for smooth & 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 at Podanur on Southern Railway, Mettuguda on South Central Railway, Gorakhpur on North Eastern Railway, Howrah on Eastern Railway, Byculla on Central Railway, Sabarmati on Western Railway, Ajmer on North Western Railway, Kharagpur on South Eastern Railway and Ghaziabad on Northern Railway have been manufacturing items like Electric Point Machines, Token less Block Instrument, Double Line Block Instruments, Axle Counters, various types of Relays, etc. The out-turn achieved by these S&T workshops during last three years are as under:

Year wise Out-Turn of Signal and Telecommunication Workshop:-

Year	Out Turn in Lakhs
2017-18	25,749.21
2018-19	29,669.70
2019-20	32,385.90

Traction Motor Shops:

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

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

Item No.	No. of jobs undertaken	
	2018-19	**2019-20**
Rewinding		
TAO 659 TM armature	137	***118**
HS15250A TM armature	531	**622**
EMU TM armature	607	**619**
3-Phase TM stator	63	**76**
3-Phase TM rotor	213	**301**
Re-shafting		
TAO 659/HS15250A TM armature	218	**429**
3-Phase TM rotor repairs	14	**194**
EMU TM armature	237	**126**

*Due to reduction in arisings.

Materials Management

Materials Management Department deals with planning, organising, communicating, directing and controlling of all the activities concerned with the flow of materials into an organization and its further movement to various users. Indian Railways is one of the largest organizations in the country dealing with public procurement.

Expenditure on Purchases

Expenditure by Indian Railways on procurement of goods to meet the requirements of operation, maintenance and production of assets (excluding track related items and goods supplied as part of works) during 2019-20 was ₹63,843.58 crore.

A broad classification of procurement of such goods is given below:-

		(₹ in crore)
	2018-19	**2019-20**
Stores for operation, repairs and maintenance	13,424.45	**18,497.38**
Stores for construction	2,955.54	**2,210.58**
Fuel	16,564.64	**14,049.91**
Stores for manufacture of Rolling Stock and purchase of Complete units	29,189.11	**29,085.71**
Total	62,133.74	**63,843.58**

Procurement of Iron and Steel Material

During the year 2019-20, Indian Railway's requirement of Iron and Steel material was met with indigenously. Procurement during 2019-20 was 55,842 MT valued at ₹312 crore.

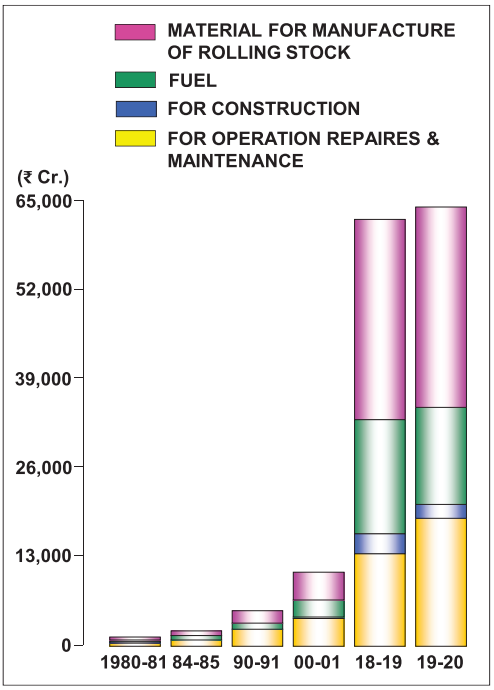
Stocking Depots

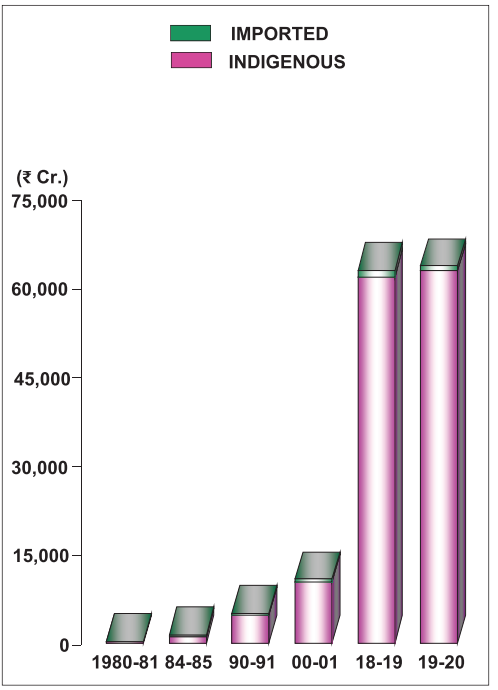
Warehouse management is an important aspect of materials management. Indian Railways has extensive warehouse network dedicated to provide the required material as close to the point of consumption as efficiently possible. To meet this requirement Zonal Railways and Production Units have 262 stocking depots spread all over the Railway Network. These depots stock over 1.3 lakh items consisting of raw materials, components, spares, consumables etc.

Disposal of unserviceable Items

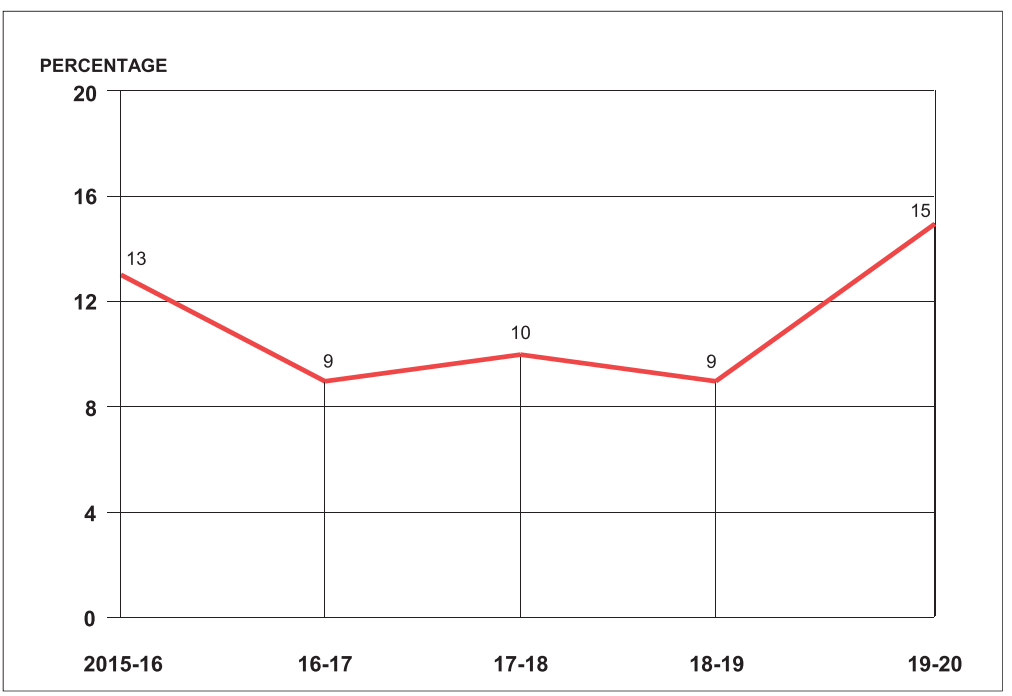
Efficient Materials Management also involves timely and efficient

VALUE OF STORES PURCHASED





INVENTORY TURNOVER RATIO (EXCLUDING FUEL)



disposal of scarp generated during maintenance and production activities. Safe disposal of industrial waste and hazardous scrap is a legal obligation which is meticulously ensured by Indian Railways. Disposal of obsolete items is essential to free the locked up capital in such assets. Disposal of scrap is an important source of revenue for Railways. Total revenue generated through disposal of scrap, during 2019-20, was ₹4,332.69 crore, as against ₹4,192.07 crore during 2018-19.

Digitisation

Transparency and efficiency in public procurement and enhancing the Ease of Doing Business is an endeavour which is directly in line with 'Digital India' initiative of the Government. Digital journey of Materials Management on Indian Railways that started with roll out of e-procurement system in the year 2011-12 with limited scope of e-tendering has now extended to encompass the complete Materials.

Management cycle which includes demand generation, tendering, purchase decision, contracting, inspection, material receipt and payment. All types of tenders for Goods, Services, Works, Earning/Leasing and sale of scrap are issued on a single web-portal i.e. www.ireps.gov.in. An Android app "IREPS –आपूर्ति" has been launched which enables access to useful information related to Railways procurement and disposal, "on the go."

System of online processing of non-stock demand generation, online indenting and processing of imprest stores, online generation of requisition cum issue note has been rolled out by IR during 2019-20.

Agency of Procurement

Zonal Railways and Production Units mostly procure the materials required by them in a decentralised system, but for purchase of a few items which are centralised for procurement at Railway Board's level. Common use Goods and Services available on GeM are reserved for procurement through GeM portal. Out of ₹63,843.58 crore worth of stores procured in 2019-20, 78% was done by Zonal Railways and Production Units, 22% by Railway Board.

Stores worth ₹6,503.54 crore were bought from Small Scale Sector and Khadi and Village Industries in 2019-20.

Public Sector Undertakings contributed 20% and other industries contributed 80% towards supplies.

Indigenous Vendor Development

Indian Railways has fully implemented Public Procurement (Preference to Make in India) Order. The value of Indigenous stores at ₹63,052.32 crore during 2019-20 constituted almost 99% of the total purchases by Indian Railways. Indian Railway has to depend on imports for high technology components

for its locomotives, coaches, signal & telecom equipments etc. which are not available in adequate quantity with required quality within the country.

Inventories

Maintaining inventories at an optimum level is the key to successful materials management. Turn Over Ratio for the year 2019-20 was 14% (without fuel) and10% (with fuel), as against 9% (without fuel) and 6% (with fuel) during 2018-19.

Wagons Procurement

During the year 2019-20, 15,443 wagons were inducted in Indian Railway System, out of these, 1,243 wagons (including 255 BLC wagons) were manufactured by Railway Workshops.

Passenger Amenities

Contracts for supply and installation of 1,00,000 steel benches across 2,000 stations throughout Indian Railways were placed for all five regions viz Northern, Central, Western, Eastern and South. Out of intial ordered 50,000 Benches, 45,890 Benches have been installed during the 2019-20.

Swatch Bharat

To achieve this objective, Indian Railways placed purchase orders for 1,11,975 Bio-toilets upto March 2020, out of which 1,08,339 Bio-toilets i.e. more than 96% have been supplied by March, 2020.

Printing and Stationery:

Five General Printing Presses and attached 'Book and Forms Depots' on Indian Railways, meet the entire requirements of passengers for Card Tickets, Blank Computer Stationery, money Value Books/Forms and PRS, UTS Ticket Rolls for Passenger train including Shatabdi and Rajdhani trains.

General Printing Presses produced an out-turn of 35.95 crore A-2 standard size impressions in 2019-20. Considerable progress was made in implementing Government's directives 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 Receipt, 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 3.78 crore Card Tickets in 2019-20 by maintaining "outstanding load" on printing presses well below one month's level. The Book and Forms Depots stocked 1974 different items. Transactions of receipts and issues at these depots were worth of ₹74.87 and ₹66.37 crore respectively, in 2019-20.

Security

The Railway Protection Force (RPF) has been constituted under the RPF Act, 1957 (as amended in the year 1985 and 2003) for better protection and security of railway property, passenger area, passengers and matters connected therewith. RPF is headed by an officer of the rank of Director General, who functions under the Ministry of Railways.

RPF is empowered under the 'Railway Property (Unlawful Possession) Act, 1966' to deal with cases of theft, dishonest misappropriation and unlawful possession of railway property. RPF is also empowered under the Railways Act, 1989 to deal with offences related to roof travelling, touting, unauthorized entry into coaches earmarked for ladies, unauthorized vending, trespassing etc.

The administrative set-up of the Railway Protection Force is in sync with the administrative set-up of the Indian Railways. In addition, a special formation called Railway Protection Special Force (RPSF), which is organized on Battalion pattern, provides specialized service to assist the RPF in zonal railways. At present, there are 15 battalions of RPSF located in various parts of the country, including one Mahila Battalion and one Commando battalion (CORAS).

Separate specialized intelligence units viz. Special Intelligence Branch (SIB) and Crime Intelligence Branch (CIB) also function at Divisional as well as Zonal Railways for collection of special and criminal intelligence respectively. Besides above, Stores, Dog Squad and Band are other specialized units of the Force and located at Divisional, Battalion and Zonal levels, as per requirements of the Force.

On 14.08.2019, Hon'ble Minister of Railways inducted the first Commando force for railways: CORAS (Commandos for Railway Security). Comprising RPF and RPSF personnel, the CORAS is armed with special uniforms with bullet-proof jackets, helmets and sophisticated weapons. CORAS commandos have undergone training programmes including basic and advanced commando courses with specialization in handling landmines and improvised explosive devices, hostage rescue, sniping and breaching. The unit is being envisaged as a responder for any situation pertaining to damage, disturbance, disruption of train operations, attack/hostage/hijack and disaster situations in railway areas.

Round the clock security related assistance to passengers by RPF:

- **All India Security Help-Line:** A 24x7 security helpline has been made functional through Security Control Rooms of RPF to provide round the clock security related assistance to passengers. This Helpline is functioning through a three digit no. 182. Security helpline system has been upgraded to include features like automated phone call distribution system, auto generated SMS, computerized registration of complaints, voice recording, dashboard and its integration with a dedicated App.
- **Twitter:** Complaints/suggestions, relating to Security, received through MR Twitter handle @RailMinIndia, are swiftly attended and necessary follow-up action is initiated.

Details of complaints attended over Twitter and Security Helpline No. 182:

Year	No. of complaints attended on Twitter	No. of complaints attended on Help Line No. 182
2018	30,894	48,712
2019	35,092	73,795
2020 (upto Aug)	**4,418**	**86,078**

- **Rescue of children:** A Standard Operating Procedure (SOP), on care and protection of children on railways has been jointly prepared by the Ministry of Railways and the Ministry of Women and Child Development (MoWCD). Under the SOP, Railways have provided space for setting up of Child Help Desk/Kiosk (CHD) at the nominated stations. The scheme has been implemented at 88 railway stations.

Details of children rescued by RPF in the year 2018, 2019 & 2020 (upto Aug):

Year	No. of children rescued by RPF
2018	17,479
2019	16,294
2020 (Upto Aug)	**3,641**

- **Surveillance through CCTV Cameras:** Indian Railways have decided to provide CCTV cameras at all stations (excluding halt stations) as well as in trains to enhance the safety of passengers. So far, CCTV cameras have been provided at 627 railway stations. Similarly, CCTV cameras have been provided in about 2688 coaches.

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

- Escorting of major trains by RPF/ GRP personnel.
- Access control at important railway stations.
- Implementation of Station Security Plan over identified railway stations.
- Keeping vigil at station platforms, yards and circulating areas and surveillance through CCTV cameras, provided at 627 railway stations over Indian Railways.
- 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.
- 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.

Special measures for women security:

i) Special Lady Squads like 'Bhairvi', 'Virangana' and 'Shakti' have been formed by Northern, Central and North Central Railways respectively to ensure safety & security of women passengers.

ii) All ladies special trains, running in metropolitan cities, are being escorted by lady RPF personnel.

iii) The Ladies compartments in local trains are being escorted by RPF and GRP during peak/non-peak hours. Staff deployment is done during late night and early morning local trains to ensure proper security to lady passengers.

iv) Action is taken against offenders travelling in ladies coaches by conducting intensive drives under section 162 of the Railways Act.

v) Seminars on gender sensitization/public awareness programmes are being organized with the assistance of NGOs for sensitization of RPF personnel, Railway staff and passengers.

vi) "Meri Saheli" initiative aimed at focused attention on women passenger's security has been implemented on a pilot basis over Indian Railways.

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, with widening of the ambit of panel sections. Performance of the RPF under the RP (UP) Act 1966 for the years 2018, 2019 & 2020 (upto Aug) is as under:

Year	No. cases detected under the RP(UP) Act	Value of property recovered (₹in crore)	No. of persons arrested
2018	4,569	3.28	6,820
2019	3,501	3.86	6,782
2020 (upto Aug)	**1,472**	**3.51**	**3,347**

Setting-up of Cyber Cells:

Cyber cells are being commissioned over all zonal railways to enhance the cyber investigative skills of RPF. Staff are being trained to be able to tackle cyber crime effectively. Increase in cyber security can definitely prevent e-touting and attacks on Indian Railway's website. RPF has succeeded in busting a number of rackets of touts who were using various illegal softwares for cornering e-tickets.

Action against touts:

Intensive drives were launched by RPF against touting activities and use of illegal softwares used by touts to confirm bulk tickets. Technological surveillance and use of PRS data led to identification of suspects who used to confirm berths under Tatkal Quota & General Quota within a few seconds at the at online booking window.

Due to effective action by RPF, several illegal softwares like ANMS, MAC, N-GET, Cycle, Star-V2, Jaguar etc. stopped functioning.

In the nationwide action against illegal softwares by RPF, about 207 persons have been arrested so far and future journey tickets purchased through these softwares worth crores of rupees were got blocked.

Recruitment:

During the latest recruitments 1121, 8619 & 798 vacancies were notified for the post of Sub Inspector (Executive), Constable (Executive) & Constable (Ancilliary) respectively. In all, 1121 Sub Inspector, 8543 Constables (Executive) & 796 Constables (Ancilliary) have been empanelled in RPF & RPSF.

During the aforesaid recruitment drives, out of the 1121 vacancies notified for Sub-Inspector (executive), 301 vacancies i.e. (approx 27%) were notified for women. Out of 8619 vacancies notified for Constable (executive), 4216 vacancies (approx 49%) were notified for women. Total 298 & 4078 women personnel have been empanelled for the post of Sub- Inspector and Constable respectively. Similarly, out of the 798 vacancies notified for Constable (Ancillary), 10% were reserved for women. Total 46 women personnel have been empanelled for the post of Constable (Ancillary).

Training

At present 13 RPF Training Centers, including one Centralized Training Institute (CTI) are catering to the training needs of RPF personnel. Initial as well as on the job refresher courses are conducted for RPF personnel to enhance capability and skill development. Training curriculum includes Outdoor drill, PT, Parade, weapons training, field craft etc. and indoor training includes Law, Railway working, Passenger interface, Soft skill, Yoga, Gender sensitization, Human-rights, computer applications etc. 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 Forces.

Commando Training

All the directly inducted Sub Inspectors and Constables are scheduled to undergo 30 days Commando Training. A proposal for setting up of Commando training centre at 9 BN/ RPSF/ Jagadhri is under process.

Meritorious Service

During the years 2018 & 2019, 05 RPF/RPSF personnel have been awarded President's Police Medal for Distinguished Service and 60 RPF/ RPSF personnel have been awarded Police Medal for Meritorious Service by Hon'ble President of India. 03 RPF personnel have been awarded Uttam Jeevan Raksha Padak in the years 2018 & 2019 by the Hon'ble President of India for life saving acts. Late Shri Jagbir Singh Rana, Constable/Northern Railway was awarded Sarvottam Jeevan Raksha Padak (2019) and Police Medal for Gallantry on the occasion of Republic Day 2020.

Vigilance

Vigilance Organisation plays a very important role in the administration of 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 during the year 2019-20 were:

- A total of 17,541 preventive checks were conducted throughout the Railways.
- A total of 27 Vigilance bulletins, including "Chetna Ahwan" by the Railway Board, were released for circulation. These bulletins contain case studies, dos & don't etc. related to various departments.
- Print and electronic media were extensively utilized by all Zonal Railways, Production Units and Public Sector for conducting extensive public campaigns during Vigilance Awareness Week, 2019.

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 during 28th October to 02nd November in the year 2019.

- **Counselling:** As many as around 250 Workshops/Seminars/Interactive sessions were conducted on topical issues by Vigilance in 2019-20 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 85 personnel participated in two schedules from 19th-23rd August, 2019 and 26th-30th August, 2019.

Punitive Vigilance:

A statement showing number of officials against whom disciplinary action in vigilance-investigated cases was initiated/finalized during April 2019 to March 2020 is given below:

Vigilance investigated cases	2019-20
Number of officials against whom disciplinary proceedings were initiated	**4,704**
Number of officials against whom disciplinary proceedings resulted in imposition of major penalty	**1,106**
Number of officials against whom disciplinary proceedings resulted in imposition of minor penalty	**4,104**

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 2019, these measures resulted in realization of revenues to the tune of ₹263.11 crores.
- Scrutinizing of more than 2,968 Annual Property Returns filed by Officers during 2019.

Preserving Indian Railways Heritage

The Heritage Directorate in the Railway Board has a tangible remit, specifically that of policy related to the UNESCO World Heritage Sites of the Mountain Railways in Darjeeling, Shimla and the Nilgiris, and other built heritage sites dotting the track & network nationwide. The focus of heritage preservation at these locations has been on balancing tourism with heritage. Heritage rolling stock assets, skills & their transmission are incorporated in a complex, interconnected and dynamic continuity of operating heritage railways, over a more than 150 years' time span.

A digital publication "Transforming A Nation's Destiny - Indian Railways" was lunch in September, 2019. It has been published with the collaboration of retired railway services officers, enthusiasts and the railway Heritage Directorate. Appreciation has also deservedly flown to Coffee Table Books brought out this year on other railway entities like the Chittaranjan Loco Workshop, CSMT station in Mumbai and other heritage narratives in the Zones and Divisions. The proliferation of online 'virtual museum' visits and initiatives on social media such as "Object of The Day" have kept railway heritage museums connected to the fan following in India & abroad even through pandemic lockdowns & closures.

Physical museums centred around Railway Heritage have systematically detailed their archives & documentation, putting the closure times to good use. New & renovated museums have been opened in Hubli & Mysore respectively, adding to the railway heritage spaces that dot the entire network of railways in India. The National Railway Museum in Chanakyapuri, New Delhi has two new large format digital screens added to enhance the charm of its outdoor areas. Digital content added to the central website of the Heritage Directorate is available to screen on walls, screens and virtual displays with easy QR code-based downloads. Matching narratives to objects have helped railway museums tell their story better to the expert and lay person alike.

The chronicled narrative of the industrial heritage of a nation is as much a historical record of its move to modernity. The 'intangible' heritage of the Indian Railways as showcased in the National Rail Museum in Chanakyapuri, New Delhi is a constant source of delight to railway enthusiasts. The Regional Rail Museums in four major cities of Howrah, Chennai, Mysore

& Nagpur are equally popular with visitors. Several prestigious and well-acclaimed Railway Heritage galleries across the national railway network stand testimony to the value attached to over 167 years of railway heritage.

Indian Railways' mesmerizing journeys were retold through the "Google Arts & Culture" platform in 2019. Additions to the platform with Sportspersons of Indian Railways, World Engineering Day special exhibits, Railway Bridges in Panoramic views, all extend the link of railway transportation to the retelling of touching, human stories through the massive reach of this online platform.

Indian Railways have inventoried heritage rolling stock assets and also preserved about 223 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 include 17 Steam Locomotives as working heritage. The Rewari Heritage Steam Centre maintains six Broad Gauge and four Meter Gauge working steam locomotives, including the iconic "Fairy Queen" (1855), placed in the Guinness Book of Records as being the oldest working locomotive in the World. Another proud possession is "Akbar" that featured in memorable Bollywood movies like Sultan & Gadar etc.

Ramgotty BG Steam locomotive, the sole engine to work on 4'0" gauge has been given its name to commemorate Mr. Ramgotty Mookherjee the last General Manager of Nalhati-Azimganj Light Railway. It is the only locomotive existing in India with outside Gooch valve gear, and was built by Anjubault of Paris in 1862. In its centenary year Ramgotty was at standstill, but in 1974, it was rescued, returned to Jamalpur and now a part of the National Rail Museum collection. In November 2019, it was restored to working condition by Shakurbasti Diesel Shed. Southern Railway (SR) had already restored Express (1855), which is currently deployed to haul Steam Tourist Specials at various places over SR. South Eastern Railway (SER) has also revived the Broad-Gauge Garratt Locomotive (N-38811) at Kharagpur Workshop.

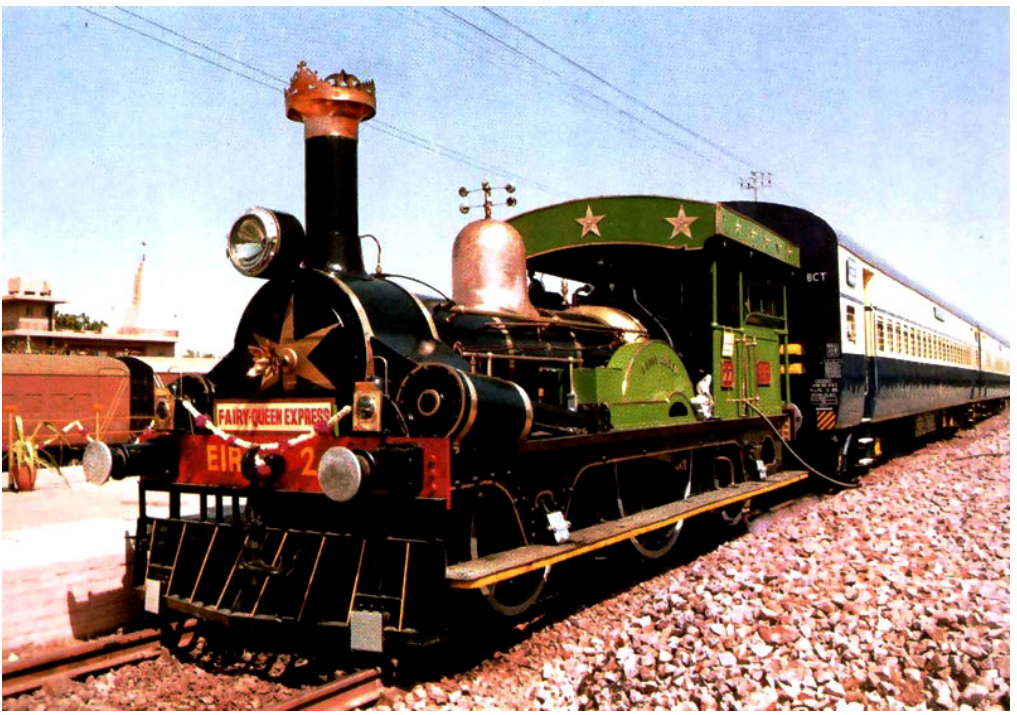
The Darjeeling Himalayan Railway (DHR), Kalka Shimla Railway(KSR) and Nilgiri Mountain Railway (NMR), all UNESCO accorded World Heritage Sites, have been studied by high level consultants for asset monetization to improve their revenues & tourist potential. With working steam locomotives that attract steam lovers from India and abroad, the sight and sound of these Locomotives recreate the romance of a bygone era.

Indian Railways maintain a large repository of built heritage like buildings, bridges via ducts etc. As of now, about 37 Bridges and 73 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 with inventories, documentation & policy initiatives.

Preservation of Railway Heritage and unlocking its potential for 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 to institutionalize rail heritage preservation include compilation of heritage inventory, collaboration with institutions and stakeholders, capacity building of railway officers and introducing modules for training courses. An academic framework for Railway Industrial Heritage study & research is in preparation with NAIR Vadodara & IRICEN, Pune.



Fairy Queen the world's oldest steam loco in operation

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