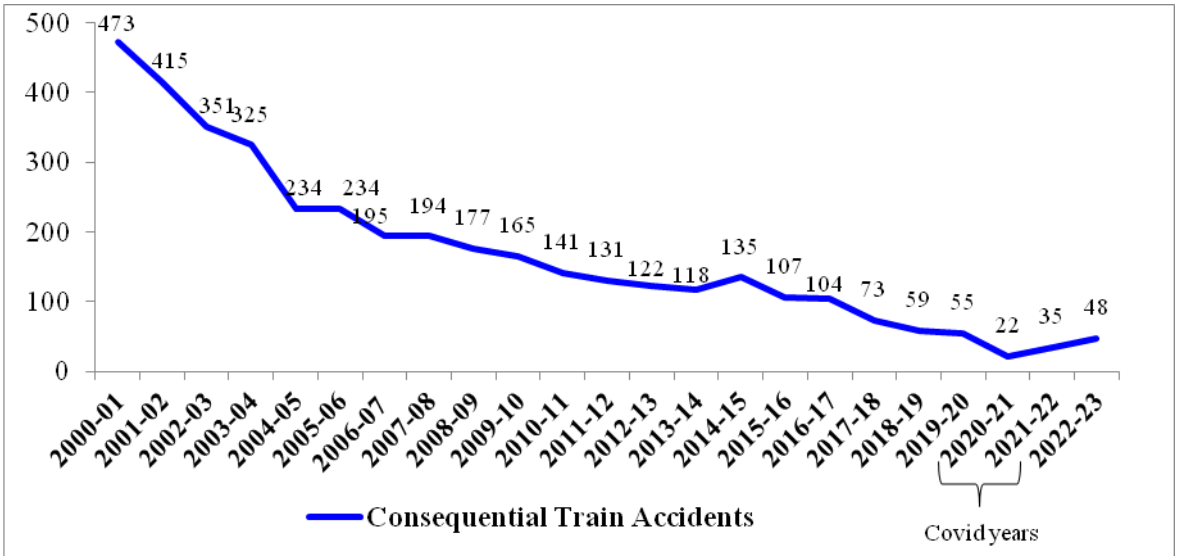
Safety on Indian Railways

Indian Railways accords highest priority to safety in train operations. Indian railways have taken a series of safety measures over the years which have improved safety of train operations, as evident from the trend of accidents shown below:



As is evident from the graph above, there is a steep decline in the number of consequential train accidents from 473 in 2000-01 to 48 in 2022-23.

The average number of consequential train accidents during the period, 2004-14 was 171 per annum, while the average number of consequential train accidents during the period, 2014-23 declined to 71 per annum.

During the period from 2014-15 to 2022-23, consequential train accidents have reduced from 135 in 2014-15 to 48 in 2022-23.

Measures to improve safety of train operations

Safety performance is regularly analyzed, and Indian Railways has taken the following measures over the years to improve safety of train operations:

1) Rashtriya Rail Sanraksha Kosh (RRSK) has been introduced in 2017-18 for replacement/renewal/upgradation of critical safety assets, with a corpus of 1 lakh crore for five years. From 2017-18 till 2021-22, a Gross expenditure of Rs. 1.08 lakh crore was incurred on RRSK works.

2) Electrical/Electronic Interlocking Systems with centralized operation of points and signals have been provided at 6427 stations up to 31.05.2023 to eliminate accident due to human failure.

3) Interlocking of Level Crossing (LC) Gates has been provided at 11093 level Crossing Gates up to 31.05.2023 for enhancing safety at LC gates.

4) Complete Track Circuiting of stations to enhance safety for verification of track occupancy by electrical means has been provided at 6377 stations up to 31.05.2023.

5) All locomotives are equipped with Vigilance Control Devices (VCD) to ensure alertness of Loco Pilots.

6) Retro-reflective sigma boards are provided on the mast which is located two OHE

masts prior to the signals in electrified territories to warn the crew about the signal ahead when visibility is low due to foggy weather.

7) A GPS based Fog Safety Device (FSD) is provided to loco pilots in fog affected areas which enables loco pilots to know the distance of the approaching landmarks like signals, level crossing gates etc.

8) Modern track structure consisting of 60kg, 90 Ultimate Tensile Strength (UTS) rails, Prestressed Concrete Sleeper (PSC), etc is used while carrying out primary track renewals.

9) Mechanisation of track laying activity through use of track machines to reduce human errors.

10) Maximizing supply of 130m/260m long rail panels for increasing progress of rail renewal and avoiding welding of joints, thereby ensuring safety.

11) Laying of longer rails and adoption of better welding technology for rails.

12) Monitoring of track geometry by OMS (Oscillation Monitoring System) and TRC (Track Recording Cars).

13) Patrolling railway tracks to look out for weld/rail fractures.

14) Inspections at regular intervals are carried out to monitor and educate staff for observance of safe practices.

15) Web based online monitoring system of track assets has been adopted to decide rationalized maintenance requirement and optimize inputs.

16) Detailed instructions on issues related to the safety of Track e.g., integrated block, corridor block, worksite safety, monsoon precautions etc. have been issued.

17) Preventive maintenance of railway assets (Coaches & Wagons) is undertaken to ensure safe train operations and to keep a check on Rail Accidents across the country.

18) The replacement of conventional ICF design coaches with LHB design coaches is being done.

19) All unmanned level crossings (UMLCs) on Broad Gauge (BG) route have been eliminated by January 2019.

20) The safety of Railway Bridges is ensured through regular inspection of Bridges. The requirement of repair/rehabilitation of Bridges is taken up based upon the conditions assessed during these inspections.

21) Indian Railways has displayed Statutory “Fire Notices” for widespread passenger information in all coaches. Fire posters are provided in every coach so as to inform and alert passengers regarding various Do’s and Don’ts to prevent fire. These include messages regarding not carrying any inflammable material, explosives, prohibition of smoking inside the coaches, penalties etc.

22) Production Units provide Fire detection and suppression system in newly manufactured Power Cars and Pantry Cars, Fire and Smoke detection system in newly manufactured coaches. Progressive fitment of the same in existing coaches is also underway by Zonal Railways in a phased manner.

23) Concept of Rolling Block has been introduced wherein work of maintenance/repair/replacement is planned for 2 weeks in advance on rolling basis and

executed as per plan.

In recent times, there has been an increasing focus on works related to safety, as summarized below:

SN	Item	Unit	During FY 2004-05 to 2013-14		During FY 2014-15 to 2022-23		Comparison of the period 2014-23 with the period 2004-14
			Cumulative for 10 years	Average Per Year	Cumulative for 9 years	Average Per Year	
A.	**Track Maintenance**						
1.	Expenditure on Track Renewal	Rs. In Cr.	47,018	4,702	91,809	10,201	2.2 Times
2.	Rail Renewal Primary	TKM	32,260	3,226	37,284	4,143	1.3 Times
3.	Use of high-quality rails (60 Kg)	KM	57,450	5,745	1,23,717	13,746	2.4 Times
4.	Longer Rail Panels (260m)	KM	9,917	992	68,233	7,581	7.7 Times
5.	USFD (Ultra Sonic Flaw detection) Testing of Rails	TKM	20,19,630	2,01,963	26,52,291	2,94,699	1.5 Times
6.	USFD (Ultra Sonic Flaw detection) Testing of Welds	Nos.	79,43,940	7,94,394	1,73,06,046	19,22,894	2.4 Times
7.	Track KM added	TKM	14,985	1,499	25,871	2,875	1.9 Times
8.	Weld failures	Nos.	In 2013-14: 3699		In 2022-23: 724		80% Reduction
9.	Rail fractures	Nos.	In 2013-14: 2548		In 2022-23: 531		79% Reduction
10	Thick Web Switches	Nos.	Nil	Nil	15,146	1,683	
11	Track Machines	Nos.	As on 31.03.14 = 748		As on 31.03.23 = 1548		2.1 Times
B.	**LC Gate Elimination**						
1.	Elimination of Unmanned Level Crossing Gates	Nos.	As on 31.03.2014: 8948		As on 31.03.2023: Nil (All eliminated by 31.01.19)		100% Reduction
2.	Elimination of Manned Level Crossing Gates	Nos.	1,137	114	6,291	699	6.2 Times
3.	Construction of Road over Bridges (i.e., Flyovers)/ Road under Bridges (i.e. Under-passes)	Nos.	4,148	415	10,867	1,207	2.9 Times
4.	Expenditure on LC Elimination	Rs. In Cr.	5,726	573	30,602	3,400	5.9 Times
C.	**Bridge Rehabilitation**						
1.	Expenditure on Bridge Rehabilitation	Rs. In Cr.	3,919	392	6,380	709	1.8 Times
D.	**Signalling Works**						
1.	Electronic Interlocking	Stations	837	84	2,521	280	3.3 Times
2.	Automatic Block Signaling	Km	1,486	148.6	1,915	212.8	1.4 Times
3.	Fog Pass Safety Devices	Nos.	As on 31.03.14: 90		As on 31.03.23: 19,742		219 Times
E	**Rolling Stock**						
1.	Manufacture of LHB Coaches	No.	2,337	234	31,956	3,551	15.2 Times

2.	Provision of Fire and Smoke Detection System in coaches	Nos. of Coaches	0	0	12,711	1,412	
3.	Provision of Fire Detection and Suppression System in Pantry and Power Cars	Nos. of Coaches	0	0	2,635	293	
4.	Provision of Fire Extinguishers in Non –AC coaches	Nos. of Coaches	0	0	39,819	4,424	
F.	**Gross Budgetary Support for Railway Investment (GBS FY 23-24: Rs 2.4 Lakhs Cr.)**	**Rs. In Cr.**	**1,56,739**	**15,674**	**8,25,967 (Incl. of BE 23-24)**	**82,597**	**5.3 Times**
G.	**Expenditure on safety related works**	**Rs. In Cr.**	**70,273**	**7,027**	**1,78,012 (Incl. of BE 23-24)**	**17,801**	**2.5 Times**

Rashtriya Rail Sanraksha Kosh (RRSK)

Rashtriya Rail Sanraksha Kosh (RRSK) was created in 2017-18 for execution of assessed safety works with a corpus of Rs. 1 Lakh Crore over a period of 5 years. The projects taken up under this fund relate to track renewal, bridges, signalling, rolling stock, training, and amenities for safety critical staff. RRSK works are to be funded from Gross Budgetary Support (GBS) and Railways revenues/resources, including mobilization of resources through Extra Budgetary Resources (EBR), as per Ministry of Finance guidelines on RRSK. From 2017-18 till 2021-22 an expenditure of Rs. 1.08 Lakh crore was incurred on RRSK works. Details of expenditure incurred are tabulated as below:

Gross Expenditure on RRSK Works (*Rs in cr.)*						
Year	2017-18	2018-19	2019-20	2020-21	2021-22	Total (2017-18 to 2021-22)
Expenditure	17259.53	19595.63	16799.61	27713.31	27374.49	108742.57

Kavach

i. Kavach is an indigenously developed Automatic Train Protection (ATP) system. Kavach is a highly technology intensive system, which requires safety certification of highest order.

ii. Kavach aids the loco pilot in train running within specified speed limits by automatic application of brakes in case Loco Pilot fails to do so and help the train safely run during inclement weather.

iii. The first field trials on the passenger trains were started in February 2016. Based on the experience gained and Independent Safety Assessment of the system by a 3rd party

(Independent Safety Assessor: ISA) three firms were approved in 2018-19, for supply of Kavach.

iv. Subsequently Kavach was adopted as a National ATP system in July 2020.

v. Kavach has so far been deployed on 1465 Route km and 121 locomotives (including Electric Multiple Unit rakes) on South Central Railway.

vi. Kavach tenders have been awarded for Delhi – Mumbai & Delhi – Howrah corridors (approximately 3000 Route km) and work is in progress on these routes.

vii. Indian Railways is preparing Detailed Project Report (DPR) and detailed estimate for another approximately 6000 RKm.

Filling up vacancies in Railways

- Indian Railways is a large organization. Occurrence and filling up of vacancies are continuous process on Indian Railway considering its size, spatial distribution, and criticality of operation. The vacancies are filled up primarily by placement of indents by Railways with Recruitment agencies as per operational requirement.

- Recruitment during April 2004- March 2014 (10 years): 411,624 @ average recruitment 41,162 per year.

- Recruitment during April 2014- June 2023 (9 years): 488,724@ average recruitment 54,302 per year.

- CBT for Centralized Employment Notification (CEN) 01/2019 for Non-Technical Popular Categories (NTPC) was conducted for 1.26 Crore candidates in 133 shifts in 68 days across 211 cities and 726 centers in 15 languages.

- Similarly, CBT for CEN-RRC 01/2019 (Level -1) was conducted for 1.11 Crore candidates in 99 shifts in 33 days across 191 cities and 551 centers in 15 languages.

- Recruitment for 1.52 lakhs Group C employees initiated since 2022 –of which 1.20 lakhs are in safety category.

- 1,38,948 candidates offered appointment in the 6 Rozgar Melas held so far- of which 1,10,000 are in safety category.

- 12,600 more to be empanelled in next few months – will take overall recruitment to over 5 lakhs: almost 22% more than recruitment during 2004-14.