



Kavach 4.0 Successfully Commissioned on 1,452 Route Km Covering High-Density Delhi–Mumbai and Delhi–Howrah Routes

8,570 Km Optical Fiber Cable Laid, 1,100 Towers & 6,776 Rkm Trackside Equipment Installed, and 767 Station Data Centers Set Up to Strengthen Railway Infrastructure: Shri Ashwini Vaishnaw

Trackside Kavach Implementation Taken Up on 24,427 Rkm Covering All Golden Quadrilateral, Golden Diagonal, High Density Network and Identified Sections of Indian Railways

Expenditure on Safety Related Activities on Indian Railways Increased Over 3 Times, From Rs. 39,200 Crore In 2013–14 to Rs. 1,20,389 Crore in 2026–27

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Kavach:

1. Kavach is an indigenously developed Automatic Train Protection (ATP) system. Kavach is a highly technology intensive system, which requires safety certification of highest order (SIL-4).
2. Kavach aids the Loco Pilot in running of trains within specified speed limits by automatic application of brakes in case Loco Pilot fails to do so and also helps the trains to run safely during inclement weather.
3. 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 Independent Safety Assessor (ISA), three firms were approved in 2018-19, for supply of Kavach Ver 3.2.
4. Kavach was adopted as National ATP system in July, 2020.
5. Implementation of Kavach System involves following Key Activities:
 - a. Installation of Station Kavach at each and every station, block section.
 - b. Installation of RFID Tags throughout the track length.
 - c. Installation of telecom Towers throughout the section.

- d. Laying of Optical Fibre Cable along the track.
- e. Provision of Loco Kavach on each and every Locomotive running on Indian Railways.

वाइल्ड लाइफ सुरक्षा के लिए रेलवे ने बहुत से स्टेप लिए हैं। :माननीय रेल मंत्री @AshwiniVaishnaw जी pic.twitter.com/imDan2vK3M

— Ministry of Railways (@RailMinIndia) March 11, 2026

6. Based on deployment of Kavach version 3.2 on 1465 RKm on South Central Railway and experience gained, further improvements were made. Finally, Kavach specification version 4.0 was approved by RDSO on 16.07.2024.
7. Kavach version 4.0 covers all the major features required for the diverse railway network. This is a significant milestone in safety for Indian Railways. Within a short period, IR has developed, tested and started deploying Automatic Train Protection System.
8. Major improvement in Version 4.0 includes increased Location Accuracy, Improved Information of Signal Aspects in bigger yards, Station to Station Kavach interface on OFC and Direct Interface to existing Electronic Interlocking System. With these improvements, Kavach Ver.4.0. is planned for large scale deployment over Indian Railways.
9. After extensive and elaborate trials, Kavach Version 4.0 has been successfully commissioned on 1452 Route Kilometres, covering the high density Delhi- Mumbai and Delhi-Howrah routes as below:

S.No.	Section	Progress (Route Km)
1	Delhi-Mumbai route:	
i)	Junction cabin – Palwal – Mathura –Nagda section	667
ii)	Vadodara - Ahmedabad section	96
iii)	Vadodara - Virar section	336
2	Delhi – Howrah route:	
i)	Gaya Sarmatanr section	93
ii)	Chota Ambana - Bardhaman – Howrah section	260

10. Further, track side Kavach implementation work has been taken up on 24,427 RKM covering all GQ,GD,HDN and identified sections of Indian Railways.
11. Progress of key items of Kavach on High density routes including Delhi– Mumbai & Delhi– Howrah corridors as on 28.02.26 are as under:

SN	Item	Progress
i	Laying of Optical Fibre Cable	8570 Km
ii	Installation of Telecom Towers	1100 nos
iii	Station Data Centre	767 station
iv	Installation of Track side equipment	6776 RKm
v	Provision of Kavach in Loco	4154 nos

12. The sections mentioned above also includes sections which pass through states of Andhra Pradesh, Maharashtra & Madhya Pradesh.

13. In addition, work for installation of Kavach in 8979 Locomotives and 1200 EMU/MEMU has been taken up.

14. Specialized training programmes on Kavach are being conducted at centralized training institutes of Indian Railways to impart training to all concerned officials. By now more than 55,000 technicians, operators and engineers have been trained on Kavach technology. This includes about 47,500 Loco Pilots & Assistant Loco Pilots. Courses have been designed in collaboration with IRISSET.

15. The cost for provision of Track Side including Station equipment of Kavach is approximately Rs. 50 Lakhs/Km and cost for provision of Kavach equipment on locomotives is approximately Rs. 80 Lakh/Loco.

16. The funds utilized on Kavach works so far up to Feb'26 is Rs. 2,763.90 Crores. The allocation of funds during the year 2025-26 is Rs. 1673.19 Crores. Requisite funds are made available as per the progress of works.

Safety is accorded the highest priority on Indian Railways. As a consequence of various safety measures taken over the years, there has been a steep decline in the number of accidents.

Number of Consequential Train Accidents has reduced as shown in the table below:-

Year	Consequential Accidents
2014-15	135
2025-26 (upto 28.02.2026)	14 (90% lesser)

Another important index showing improvement in safety in train operations is Consequential Accident Index, the details of which are as under:-

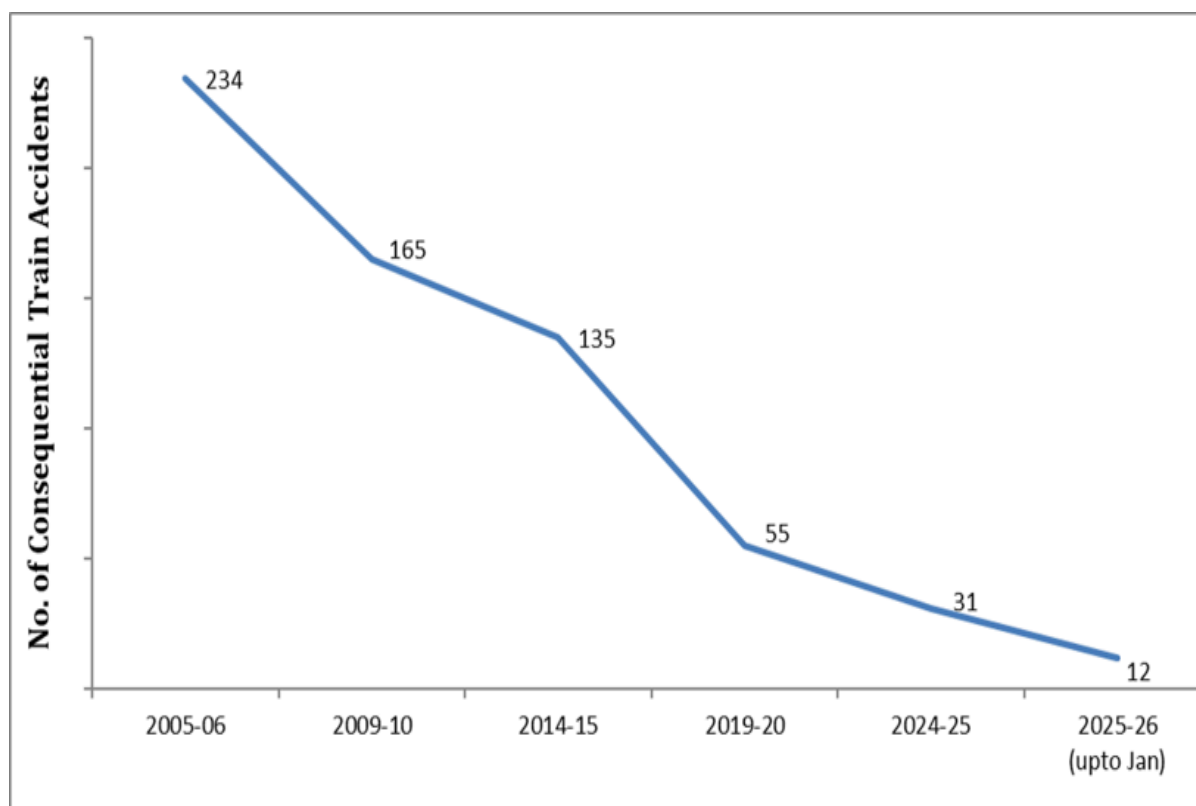
Consequential Accident Index:-

Year	Accident Index
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2014-15	0.11
2024-25	0.03 (73% lesser)

This index measures number of consequential accidents as a ratio of total running kilometers of all trains.

Accident Index = No. of consequential accidents / No. of trains X million kilometers run



The various safety measures taken to enhance safety in train operations are as under:-

- On Indian Railways, the expenditure on Safety related activities has increased over the years as under:-

Expenditure/Budget on Safety related activities (Rs. in Cr.)					
2013-14	2022-23	2023-24	2024-25	2025-26	2026-27
39,200	87,336	1,01,662	1,14,022	1,17,693	1,20,389

- Electrical/Electronic Interlocking Systems with centralized operation of points and signals have been provided at 6,665 stations up to 28.02.2026 to reduce accidents due to human failure.
- Interlocking of Level Crossing (LC) Gates has been provided at 10,153 Level Crossing Gates up to 28.02.2026 for enhancing safety at LC Gates.
- Complete Track Circuited of stations to enhance safety by verification of track occupancy by electrical means has been provided at 6,669 stations up to 28.02.2026.

This information was provided by the Union Minister for Railways, Information & Broadcasting and Electronics & Information Technology, Shri Ashwini Vaishnaw, in a reply to questions in Lok Sabha today.

Dharmendra Tewari/ Ritu Raj

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