

**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS**

**LOK SABHA
UNSTARRED QUESTION NO. 3854
TO BE ANSWERED ON 18.12.2024**

REASONS FOR TRAIN DERAILMENT

**†3854. SMT. SANJNA JATAV:
SHRI BENNY BEHANAN:**

Will the Minister of RAILWAYS be pleased to state:

- (a) whether the Government is tackling the issue of poor track maintenance a major cause of recent train derailments;**
- (b) if so, the details of initiatives taken/proposed to be taken by the Government to improve safety measures and infrastructure maintenance; and**
- (c) whether the Government has failed to install the Kavach anti-collision on system given that only 1465 route kms have been covered so far?**

ANSWER

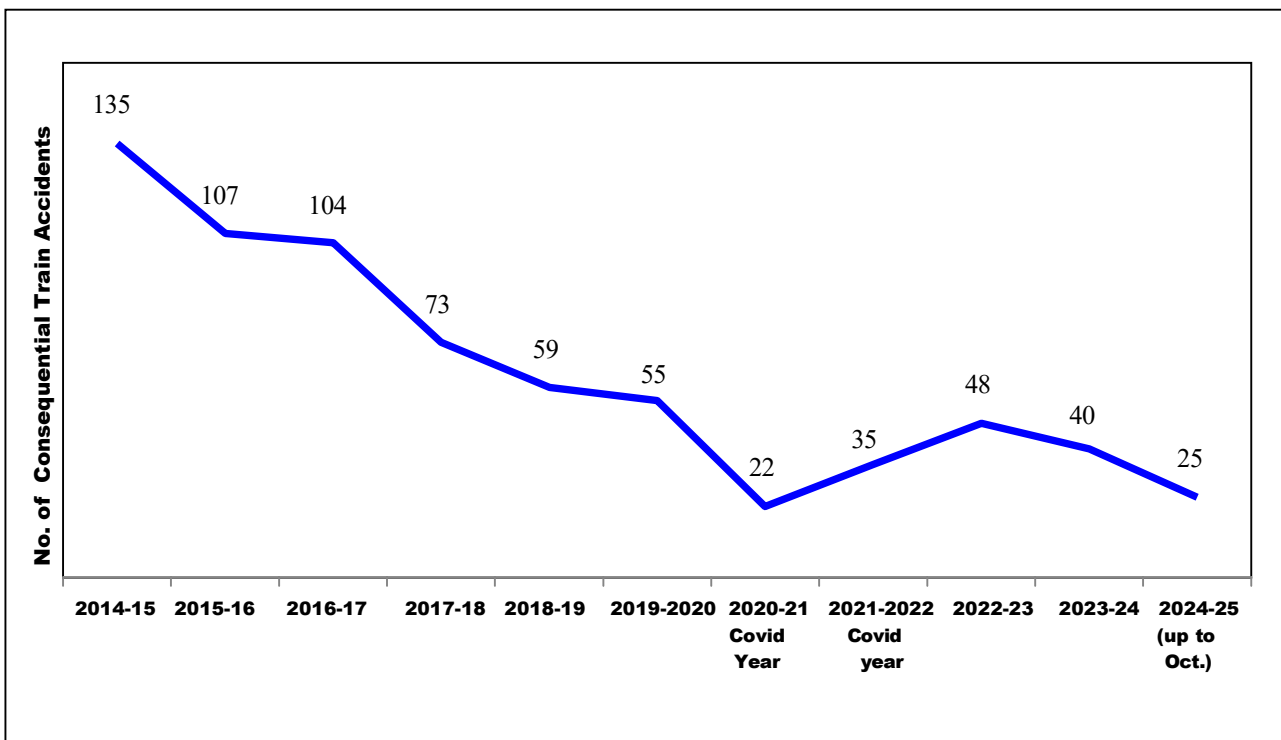
**MINISTER OF RAILWAYS, INFORMATION & BROADCASTING AND
ELECTRONICS & INFORMATION TECHNOLOGY**

(SHRI ASHWINI VAISHNAW)

(a) to (c) As a consequence of various safety measures taken over the years, there has been a steep decline in the number of accidents. Consequential Train Accidents have reduced from 135 in 2014-15 to 40 in 2023-24 as shown in the graph below. The causes of these accidents broadly include track defects, loco/coach defects, equipment failures, human errors etc.

It may be noted that the consequential train accidents during the period 2004-14 was 1711 (average 171 per annum), which has declined to 678 during the period 2014-24 (average 68 per annum), i.e. reduction of 60%.

Another important index showing improved safety in train operations is Accidents Per Million Train Kilometer (APMTKM) which has reduced from 0.11 in 2014-15 to 0.03 in 2023-24, indicating an improvement of approx. 73% during the said period.



Safety is accorded the highest priority on Indian Railways. Various measures taken for upgradation/ improvement of infrastructure, and maintenance practices to enhance safety are as under:

- Use of modern track structure consisting of 60kg, 90 Ultimate Tensile Strength (UTS) rails, Thick Web Switches and Weldable CMS Crossing in turnout renewal works, Pre-stressed Concrete Sleeper (PSC) Normal/Wide base sleepers with elastic fastening, fan-shaped layout turnout on PSC sleepers, Steel Channel/H-beam Sleepers on girder bridges while carrying out primary track renewals.

- **Mechanisation of track laying activity through use of track machines like PQRS, TRT, T-28 etc to reduce human errors and Monitoring of track geometry by OMS (Oscillation Monitoring System) and TRC (Track Recording Cars).**
- **Maximizing supply of 130m/260m long rail panels, minimizing the use of Alumino Thermic Welding and adoption of better welding technology for rails i.e. Flash Butt Welding.**
- **Ultrasonic Flaw Detection (USFD) testing of rails to detect flaws and timely removal of defective rails.**
- **Adoption of Integrated Rolling Block System and Web based online monitoring system of track assets viz. Track database and decision support system to decide rationalized maintenance requirement and optimize inputs.**
- **Eliminated all unmanned level crossings (UMLCs) on Broad Gauge (BG) routes and Interlocking of Manned Level Crossing (MLCs) Gates for enhancing safety.**
- **Regular inspection of Bridges to take up repair/rehabilitation based upon the conditions assessed during these inspections.**
- **Electrical/Electronic Interlocking Systems with centralized operation of points and signals provided to eliminate human failure.**
- **Complete Track Circuiting of stations to enhance safety by verification of track occupancy by electrical means.**
- **Issuance of detailed instructions on issues related with safety of Signalling e.g. mandatory correspondence check, alteration work protocol, preparation of completion drawing, etc.**
- **Providing retro-reflective sigma boards on the mast which is located two OHE masts prior to the signals in electrified territories to alert the crew about the signal ahead when visibility is low due to foggy weather.**

- **Providing GPS based Fog Safety Device (FSD) 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.**

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

SN	Item	2004-05 to 2013-14	2014-15 to 2023-24	2014-24 Vs. 2004-14
	Track Maintenance			
1.	Expenditure on Track Renewal (Rs. in Cr.)	47,038	1,09,577	2.33 times
2.	Rail Renewal Primary (Track Km)	32,260	43,335	1.34 times
3.	Use of high-quality rails (60 Kg)(Km)	57,450	1,23,717	2.15 times
4.	Longer Rail Panels (260m) (Km)	9,917	68,233	6.88 times
5.	USFD (Ultra Sonic Flaw detection) Testing of Rails (Track km)	20,19,630	26,52,291	1.31 times
6.	USFD (Ultra Sonic Flaw detection) Testing of Welds (Nos.)	79,43,940	1,73,06,046	2.17 times
7.	New Track KM added (Track km)	14,985	31,180	2.08 times
8.	Weld failures(Nos.)	In 2013-14: 3699	In 2023-24: 481	87% reduction
9.	Rail fractures (Nos.)	In 2013-14: 2548	In 2023-24: 383	85% reduction
10	Thick Web Switches (Nos.)	Nil	21,127	

11	Track Machines(Nos.)	As on 31.03.14= 748	As on 31.03.24= 1,661	122% increase
Level Crossing Gate Elimination				
1.	Elimination of Unmanned Level Crossing Gates (Nos.)	As on 31.03.14: 8948	As on 31.03.24: Nil (All eliminated by 31.01.19)	100% reduction
2.	Elimination of Manned Level Crossing Gates (Nos.)	1,137	7,075	6.21 times
3.	Road over Bridges (RoBs)/ Road under Bridges(RUBs) (Nos.)	4,148	11,945	2.88 times
4.	Expenditure on LC Elimination (LC+ROB+RUB)	8,825	41,957	4.75 times
Bridge Rehabilitation				
1.	Expenditure on Bridge Rehabilitation (Rs.in Cr.)	3,924	8,255	2.10 times
Signalling Works				
1.	Electronic Interlocking (Stations)	837	2,964	3.52 times
2.	Automatic Block Signaling (Km)	1,486	2,497	1.67 times
3.	Fog Pass Safety Devices (Nos.)	As on 31.03.14: 90	As on 31.03.24: 19,742	219 times
SN	Item	2004-05 to 2013-14	2014-15 to 2023-24	2014-24 Vs. 2004-14
Rolling Stock				
1.	Manufacture of LHB Coaches (Nos.)	2,337	36,933	15.80 times

2.	Provision of Fire and Smoke Detection System in AC coaches (Nos. of Coaches)	0	19,271	
3.	Provision of Fire Detection and Suppression System in Pantry and Power Cars (Nos. of Coaches)	0	2,991	
4.	Provision of Fire Extinguishers in Non-AC coaches (Nos. of Coaches)	0	66,840	

- **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).**
- **Kavach aids the Loco Pilot in running of train 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.**
- **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 KavachVer 3.2.**
- **Kavach was adopted as National ATP system in July 2020.**
- **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.**

- **Based on deployment of Kavach version 3.2 on 1465 Rkm on south central Railway, lot of experience was gained. Using that further improvements were made. Finally, Kavach specification version 4.0 was approved by RDSO on 16.07.2024.**
- **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.**
- **Major improvement in Version 4.0 includes increased Location Accuracy, Improved Information of Signal Aspects in bigger yard, 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.**
- **Progress of Key items comprising Kavach system on Indian Railways upto Nov' 2024 is as under :-**

SN.	Items	Progress
i	Laying of Optical Fibre Cable	5133 Km
ii	Installation of Telecom Towers	540 Nos.
iii	Provision of Kavach at Stations	523 Nos.
iv	Provision of Kavach in Loco	707 Locos
v	Installation of Track side equipment	3434 Rkm

- **Next phase of Kavach implementation is planned as under:-**
 - a. Project for equipping 10,000 Locomotives has been finalized. 69 number of loco sheds have been prepared for equipping with Kavach.**
 - b. Bids for track side Works of Kavach for approximately 15000 Rkm have been invited. It covers all GQ, GD, HDN and Identified sections of Indian Railways.**

- **Currently, 3 OEMs are approved for supply of Kavach System. To increase capacity and scale of implementation, trials and approval of more OEMs are at different stages. Specialized training programme on Kavach are being conducted at centralized training institutes of Indian Railways to impart training to all concerned officials. By now more than 9000 technicians, operators and engineers have been trained on Kavach technology. Courses have been designed in collaboration with IRISSET.**
