

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

RAJYA SABHA
UNSTARRED QUESTION NO. 2977
ANSWERED ON 20.12.2024

OUTLIVED SIGNAL ASSETS

2977 MS. SUSHMITA DEV:

Will the Minister of RAILWAYS be pleased to state:

- (a) whether it is a fact that the signal assets along the railway lines have been used beyond their codal life, if so, the details thereof;
- (b) the details of objective and funds allocated for the Plan for Reliability Improvement and Maintenance Effectiveness (PRIME) for the maintenance of the signalling system;
- (c) whether there is any timeline for the overhauling of the outlived signalling system, if so, the details thereof; and
- (d) the number of rail accidents due to the fault in the signal system in the last five years, year-wise?

ANSWER

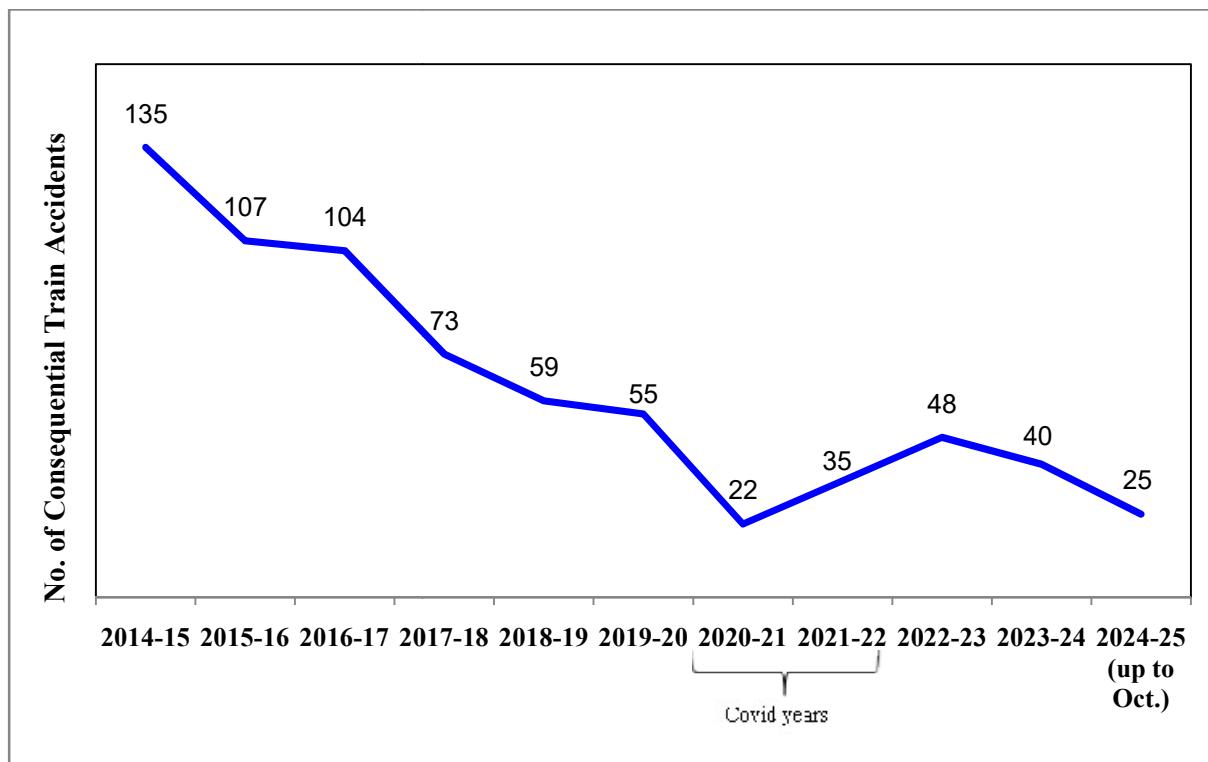
MINISTER OF RAILWAYS, INFORMATION & BROADCASTING AND
ELECTRONICS & INFORMATION TECHNOLOGY

(SHRI ASHWINI VAISHNAW)

- (a) to (d): 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, which include consequential train derailments also, 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. An accident might cause damage to the Railway property that includes track, rolling stock, OHE equipment, signaling gears 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. a reduction of about 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. The various safety measures taken to enhance safety in train operations are as under:-

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

Expenditure on Safety related activities (Rs. in Cr.)				
	2013-14 (Act)	2022-23 (Act)	2023-24 (Act)	BE 2024-25
Maintenance of Permanent Way & Works	9172	18,115	20,322	21,386
Maintenance of Motive Power and Rolling Stock	14796	27,086	30,864	31,494
Maintenance of Machines	5,406	9,828	10,772	11,864

Road Safety LCs and ROBs/ RUBs	1,986	5,347	6,662	9,980
Track Renewals	4,985	16,326	17,850	17,652
Bridge Works	390	1,050	1,907	2,137
Signal & Telecom Works (Including items of PRIME)	905	2,456	3,751	4,647
Workshops Incl. PUs and Misc. expenditure on Safety	1,823	7,119	9,523	9,615
Total	39,463	87,327	1,01,651	1,08,776

2. Electrical/Electronic Interlocking Systems with centralized operation of points and signals have been provided at 6,612 stations up to 30.11.2024 to reduce accidents due to human failure.
3. Interlocking of Level Crossing (LC) Gates has been provided at 11,082 level Crossing Gates up to 30.11.2024 for enhancing safety at LC gates.
4. Complete Track Circuiting of stations to enhance safety by verification of track occupancy by electrical means has been provided at 6,620 stations up to 30.11.2024.
5. Kavach is a highly technology intensive system, which requires safety certification of highest order. Kavach was adopted as a National ATP system in July 2020. Kavach is provided progressively in phased manner. Kavach has already been deployed on 1548 RKm on South Central Railway and North Central Railway. Presently, the work is in progress on Delhi-Mumbai and Delhi-Howrah corridors (approximately 3000 Route Km). Track side works on these routes have been completed on about 1969 RKm. Regular trials are being done on these sections.
6. Detailed instructions on issues related with safety of Signalling e.g. mandatory correspondence check, alteration work protocol, preparation of completion drawing, etc. have been issued.
7. System of disconnection and reconnection for S&T equipment as per protocol has been re-emphasized.
8. All locomotives are equipped with Vigilance Control Devices (VCD) to improve alertness of Loco Pilots.
9. Retro-reflective sigma boards are provided 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.
10. 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.
11. 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.

12. Mechanisation of track laying activity through use of track machines like PQRS, TRT, T-28 etc to reduce human errors.
13. Maximizing supply of 130m/260m long rail panels for increasing progress of rail renewal and avoiding welding of joints, thereby improving safety.
14. Ultrasonic Flaw Detection (USFD) testing of rails to detect flaws and timely removal of defective rails.
15. Laying of longer rails, minimizing the use of Alumino Thermic Welding and adoption of better welding technology for rails i.e. Flash Butt Welding.
16. Monitoring of track geometry by OMS (Oscillation Monitoring System) and TRC (Track Recording Cars).
17. Patrolling of railway tracks to look out for weld/rail fractures.
18. The use of Thick Web Switches and Weldable CMS Crossing in turnout renewal works.
19. Inspections at regular intervals are carried out to monitor and educate staff for observance of safe practices.
20. Web based online monitoring system of track assets viz. Track database and decision support system has been adopted to decide rationalized maintenance requirement and optimize inputs.
21. Detailed instructions on issues related with safety of Track e.g. integrated block, corridor block, worksite safety, monsoon precautions etc. have been issued.
22. Preventive maintenance of railway assets (Coaches & Wagons) is undertaken to ensure safe train operations.
23. Replacement of conventional ICF design coaches with LHB design coaches is being done.
24. All unmanned level crossings (UMLCs) on Broad Gauge (BG) route have been eliminated by January 2019.
25. 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.
26. Indian Railways has displayed Statutory “Fire Notices” for widespread passenger information in all coaches. Fire posters are provided in every coach so as to educate 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.

27. Production Units are providing 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.

28. Regular counselling and training of staff is undertaken.

29. Concept of Rolling Block introduced in Indian Railways (Open Lines) General Rules vide Gazette notification dated 30.11.2023, wherein work of integrated maintenance/ repair/ replacement of assets is planned up to 52 weeks in advance on rolling basis and executed as per plan.

The details of the Safety related works undertaken by Railways are tabulated below:-

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)/	4,148	11,945	2.88 Times

	Road under Bridges (RUBs) (Nos.)			
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
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	
5.	Fog Pass Safety Devices (Nos.)	As on 31.03.14: 90	As on 31.03.24: 19,742	219 times

Further, the replacement of Signalling Assets is carried out on age cum condition basis as per Codal provisions.

The timelines for signalling assets requiring overhauling are prescribed in Indian Railway Signal Engineering Manual (IRSEM) and overhauled as per the periodicity norms mentioned therein.
