GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

RAJYA SABHA
UNSTARRED QUESTION NO. 1559
ANSWERED ON 01.08.2025

ENACTMENT OF LAW FOR RAILWAY SAFETY

1559. DR. AJEET MADHAVRAO GOPCHADE:

Will the Minister of RAILWAYS be pleased to state:

(a) whether Government is aware of incidents of accidents involving fire in passenger coaches due to electrical short circuits, if so, the measures taken to prevent the same;

(b) whether Government proposes enacting a fresh law specific for railway safety or contemplates modifications to the existing Act in this regard; and

(c) whether the Ministry has taken cognizance of a representation submitted to examine Railway Safety Acts of South Africa and Ireland, in order to identify the best practices therefrom, the details thereof?

ANSWER

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

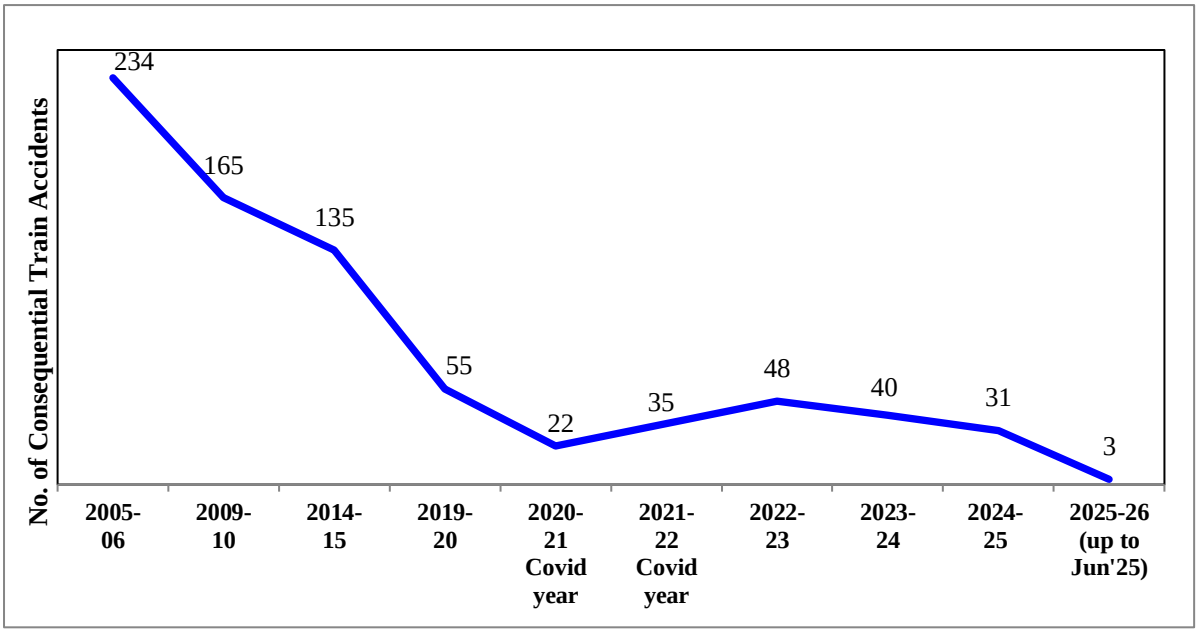
(SHRI ASHWINI VAISHNAW)

(a) to (c): 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. Consequential Train Accidents have reduced from 135 in 2014-15 to 31 in 2024-25 as shown in the graph below.

It may be noted that the Consequential Train Accidents during the period 2004-14 was 1711 (average 171 per annum), which has declined to 31 in 2024-25 and further to 3 in 2025-26 (upto June, 2025).

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 2024-25, indicating an improvement of approx. 73% during the said period.

The number of consequential train accidents during the last five years is depicted in the Graph below.



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

i. 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.)**	**RE 2024-25**	**BE 2025-26**
Maintenance of Permanent Way & Works	9,172	18,115	20,322	21,800	23,316
Maintenance of Motive Power and Rolling Stock	14,796	27,086	30,864	31,540	30,666
Maintenance of Machines	5,406	9,828	10,772	12,112	12,880
Road Safety LCs and ROBs/ RUBs	1,986	5,347	6,662	8,184	7,706
Track Renewals	4,985	16,326	17,850	22,669	22,800
Bridge Works	390	1,050	1,907	2,130	2,169
Signal & Telecom Works	905	2,456	3,751	6,006	6,800
Workshops Incl. PUs and Misc. expenditure on Safety	1,823	7,119	9,523	9,581	10,134
Total	**39,463**	**87,327**	**1,01,651**	**1,14,022**	**1,16,470**

ii. Electrical/Electronic Interlocking Systems with centralized operation of points and signals have been provided at 6,635 stations up to 30.06.2025 to reduce accident due to human failure.

iii. Interlocking of Level Crossing (LC) Gates has been provided at 11,096 level Crossing Gates up to 30.06.2025 for enhancing safety at LC gates.

iv. Complete Track Circuiting of stations to enhance safety by verification of track occupancy by electrical means has been provided at 6,640 stations up to 30.06.2025.

v. 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 RKm). Kavach has been successfully commissioned over Kota–Mathura section (Delhi – Mumbai route) covering 324 Route Kilometers on 30.07.2025.

vi. 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.

vii. System of disconnection and reconnection for S&T equipment as per protocol has been re-emphasized.

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

ix. 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.

x. 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.

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

xii. Mechanisation of track laying activity through use of track machines like PQRS, TRT, T-28 etc. to reduce human errors.

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

xiv. Ultrasonic Flaw Detection (USFD) testing of rails to detect flaws and timely removal of defective rails.

xv. Laying of longer rails, minimizing the use of Alumino Thermic Welding and adoption of better welding technology for rails i.e., Flash Butt Welding.

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

xvii. Patrolling of railway tracks to look out for weld/rail fractures.

xviii. The use of Thick Web Switches and Weldable CMS Crossing in turnout renewal works.

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

xx. 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.

xxi. Detailed instructions on issues related with safety of Track, e.g. integrated block, corridor block, worksite safety, monsoon precautions, etc. have been issued.

xxii. Preventive maintenance of railway assets (Coaches & Wagons) is undertaken to ensure safe train operations.

xxiii. Replacement of conventional ICF design coaches with LHB design coaches is being done.

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

xxv. 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.

xxvi. 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.

xxvii. 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.

xxviii. Regular counselling and training of staff is undertaken.

xxix. 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.

Safety-related Works: The details of the Safety related works related to better maintenance practices, Technological improvements, better infrastructure and rolling stock etc. undertaken by Railways are tabulated below:-

S.N.	Item	2004-05 to 2013-14	2014-15 to 2024-25 (till March 25)	2014-25 Vs. 2004-14
	Technological improvements			
1.	Use of high-quality rails (60 Kg) (Km)	57,450 Km	1.43 Lakh Km	More than 2 times
2.	Longer Rail Panels (260m) (Km)	9,917 Km	77,522 Km	Nearly 8 times
3.	Electronic Interlocking (Stations)	837 Stations	3,691 Stations	More than 4 times
4.	Fog Pass Safety Devices (Nos.)	As on 31.03.14: 90 Nos.	As on 31.03.25: 25,939	288 times
5.	Thick Web Switches (Nos.)	Nil	28,301 Nos.	
	Better maintenance practices			
1.	Primary Rail Renewal (Track Km)	32,260 Km	49,941 Km	1.5 times
2.	USFD (Ultra Sonic Flaw detection) Testing of Welds (Nos.)	79.43 Lakh	2 Crore	More than 2 times
3.	Weld failures (Nos.)	In 2013-14: 3699 Nos.	In 2024-25: 370 Nos.	90 % reduction
4.	Rail fractures (Nos.)	In 2013-14: 2548 Nos.	In 2024-25: 289 Nos.	More than 88% reduction
	Better infrastructure and Rolling stock			
1.	New Track KM added (Track km)	14,985 Nos.	34,428 Km	More than 2 times
2.	Flyovers (RoBs)/ Underpasses (RUBs) (Nos.)	4,148 Nos.	13,808 Nos.	More than 3 times
3.	Unmanned Level crossings (nos.) on BG	As on 31.03.14: 8948	As on 31.03.24: Nil (All eliminated by 31.01.19)	Removed
4.	Manufacture of LHB Coaches (Nos.)	2,337 Nos.	42,677	More than 18 times

To prevent any chance of fire in passenger coaches due to electrical short circuit, measures have been taken by Indian Railways at all stages from design and manufacturing of passenger coaches to their maintenance and use. Some of these measures are as follows:

i. The electrical power supply system for passenger coaches is designed with a number of in-built multi-level protection measures including provision of adequate fuses and circuit breakers to detect any unusual condition and isolate the affected circuit well in time to protect from electrical short circuit.

ii. The size of cables used in different circuits are based on electrical load for the particular circuit under normal operation as well as fault conditions after considering various de-rating factors for the cable like higher ambient temperature, bunching of cable, running in conduits etc.

iii. Electron beam irradiated cables manufactured using electron-beam processing are used in air-conditioned coaches. Electron-beam processing modifies the polymer material of the cable improving its mechanical, thermal and electrical properties. This in turn results in superior performance and reliability when compared to conventional cables. This also reduces the susceptibility of the electrical systems of passenger coaches to electrical short circuit.

iv. 110 Volt Direct Current two wire insulated system is used for lights and fans. Positive and negative cables for train lighting system working with 110 Volt Direct Current are run in separate conduits.

v. The layout and cable harness scheme for electrical wiring in the coaches are such as to minimize the number of joints and junction boxes.

vi. Wiring for fan points, berth lights, step lights, tail lights and side light fittings etc. on the coach are terminated in a connector. This ensures that when these fittings are removed from the coach, the coach wiring is not disturbed and remains in position with its opposite polarities terminals adequately apart.

vii. The mobile charging sockets are being provided with glass fuses to protect in case of overload.

viii. Fuse distribution board covers have been modified to restrict entry of foreign material.

ix. LED light fittings are used in coaches. These consume less current.

x. Sparkles Brushless Direct Current (BLDC) fans with inbuilt overload protection have been developed and are being provided.

xi. It is ensured that all the protective relays are in good working order and are properly calibrated as per the schedules laid down and any protection system is not being by-passed.

xii. The proper functioning of protection system with thermostats for checking the overheating of heater is checked during every IOH/POH (Intermediate Overhaul/ Periodic Overhaul).

xiii. The working of Over Voltage Protection (OVP) is checked as per laid down schedule as follows:

- During Periodic Overhauling
- Before commissioning of new alternators on Air Conditioned (AC) coaches at production units (PUs)/workshops
- Whenever RRU is repaired/ replaced at AC depots.

xiv. The control panels comprise cables, connections, contactors, fuses, Miniature Circuit Breakers (MCBs) etc. and given proper attention during maintenance. Proper maintenance of the equipment and switchgears inside electrical control panels is ensured as per schedules laid down and these panels are carefully checked for any developing fault.

xv. To prevent any failure from loose connections in the electrical systems proper tightness of all connections is ensured during inspections.

xvi. Approved quality and proper size of cables are being used for repairs. Cable jointing has been prohibited.

xvii. Proper cleaning of terminal connections, bus bars, insulators and equipment is done during schedules as laid down to remove dust and dirt particles to prevent insulation failures.

xviii. The earth fault in the wiring of the coach is checked rigorously both on phase and neutral wires separately and on positive and negative wires separately (for 110V DC system). Particular attention is being paid at the time of fitment and during maintenance of light/ fan fittings, brush holder of the fan, toggle switches to minimize the possibility of electrical earth in metal bodied coaches. Proper attention is also paid during laying of wires in lavatory, near water tank and wash basin area to avoid contact with water. All the electrical fittings both on super structure and on under-frame are mounted directly on the coach body. All the electrical equipment above 110 Volt are individually provided with earth shunts between equipment body and coach body.

xix. Coach Insulation Resistance Test – Insulation resistance is tested as per laid down procedure during maintenance schedules to ensure safety of electrical systems of coaches and to prevent short circuit from developing.

xx. Aerosol based fire suppression system is being provided in electrical cabinets of coaches. Till date, approx 75% AC coaches have been equipped with Aerosol based fire suppression system. All new coaches being manufactured by PUs have Aerosol based fire suppression system.

xxi. Thermal scanning of coaches during commissioning, monthly and higher maintenance schedules are carried out by Zonal Railways. Special thermal scanning drives are also conducted time to time. Fire and smoke detection system has been provided in all air-conditioned coaches.

xxii. Fire Detection and Suppression System has been provided in all pantry cars and power cars.

The statutory framework for safety in Indian Railways is provided by the Railways Act, 1989 (as amended from time to time). This Act covers *inter alia* the organization, conditions of carriage, regulation of hours of work, handling of accidents and liabilities of railway administration arising out of accidents, all of which have bearing on aspects of safety in Indian Railways. The Act also empowers Indian Railways to make rules in respect of matters covered by the Act. In accordance with these powers, Indian Railways has made the required rules that ensure safety in day-to-day safety train operations. The Act also provides for the appointment of Chief Commissioner of Railway Safety and Commissioners of Railway Safety along with their powers and functions. These authorities are under the administrative control of Ministry of Civil Aviation independent of the Ministry of Railways.

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