

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
RAJYA SABHA
UNSTARRED QUESTION NO. 2342
ANSWERED ON 07.08.2026

OPERATING CAPACITY OF HIGH DENSITY NETWORK ROUTES

2342 SHRI SANJAY SINGH:

Will the Minister of RAILWAYS be pleased to state:

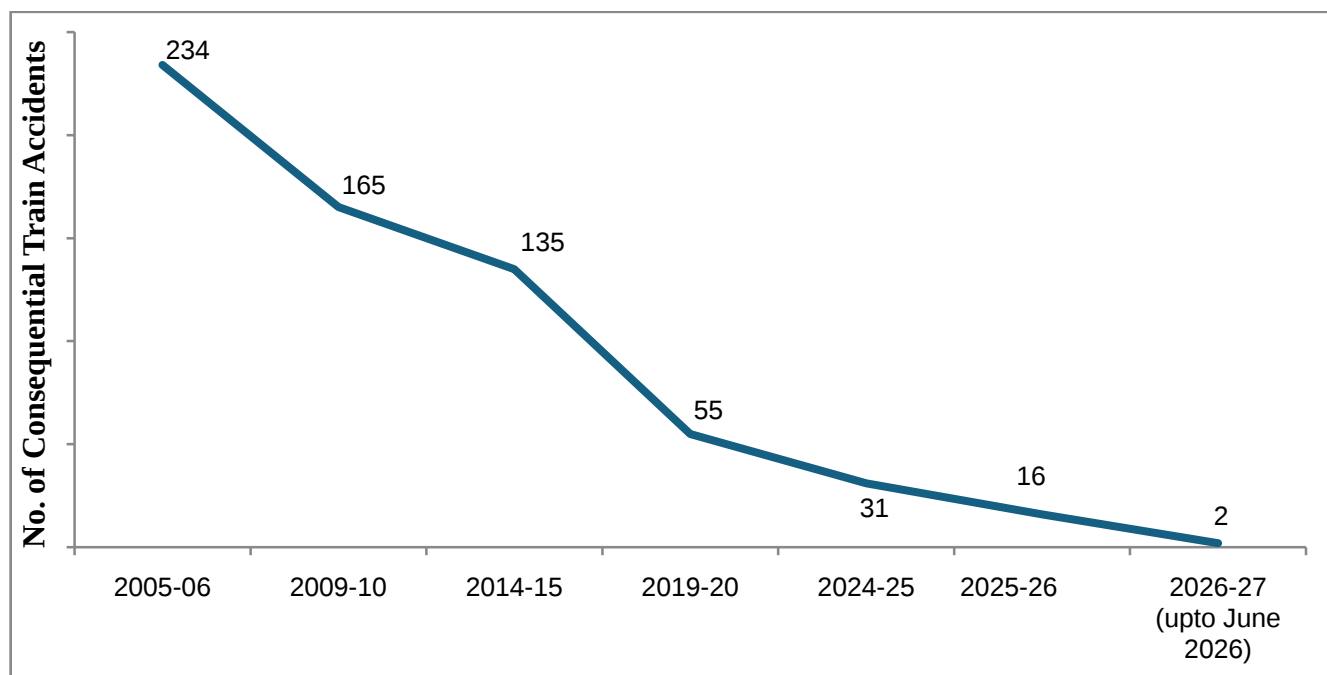
- (a) the measurable improvements expected in punctuality, accident rates and asset reliability in view of the allocation of ₹ 1.2 lakh crore for safety in 2025; and
- (b) whether it is a fact that the National Rail Plan shows over 80 per cent of high-density network routes are operating above capacity, if so, the utilisation percentage for each major corridor, the number of trains operating against designed capacity and the timeline for reducing congestion?

ANSWER

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

(SHRI ASHWINI VAISHNAW)

- (a) & (b): 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	16 (88% lesser)
2026-27 (upto June 2026)	2

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
2014-15	0.11
2025-26	0.01 (91% lesser)

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

$$\text{Accident Index} = \frac{\text{No. of consequential accidents}}{\text{No. of trains X million kilometers run}}$$

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:-

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

2. Electrical/Electronic Interlocking Systems with centralized operation of points and signals have been provided at 6,671 stations up to 30.06.2026 to reduce accidents due to human failure.
3. Interlocking of Level Crossing (LC) Gates has been provided at 10,395 Level Crossing Gates up to 30.06.2026 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 6,671 stations up to 30.06.2026.
5. 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.
6. System of disconnection and reconnection for S&T equipment as per protocol has been re-emphasized.
7. All locomotives are equipped with Vigilance Control Devices (VCD) to improve alertness of Loco Pilots.

8. 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.
9. 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.
10. 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.
11. Mechanisation of track laying activity through use of track machines like PQRS, TRT, T-28 etc. to reduce human errors.
12. Maximizing supply of 130m/260m long rail panels for increasing progress of rail renewal and avoiding welding of joints, thereby improving safety.
13. Ultrasonic Flaw Detection (USFD) testing of rails to detect flaws and timely removal of defective rails.
14. Laying of longer rails, minimizing the use of Alumino Thermic Welding and adoption of better welding technology for rails i.e., Flash Butt Welding.
15. Monitoring of track geometry by OMS (Oscillation Monitoring System) and TRC (Track Recording Cars).
16. Patrolling of railway tracks to look out for weld/rail fractures.
17. The use of Thick Web Switches and Weldable CMS Crossing in turnout renewal works.
18. Inspections at regular intervals are carried out to monitor and educate staff for observance of safe practices.
19. 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.
20. Detailed instructions on issues related with safety of Track, e.g. integrated block, corridor block, worksite safety, monsoon precautions, etc. have been issued.
21. Preventive maintenance of railway assets (Coaches & Wagons) is undertaken to ensure safe train operations.
22. Replacement of conventional ICF design coaches with LHB design coaches is being done.
23. All unmanned level crossings (UMLCs) on Broad Gauge (BG) route have been eliminated by January 2019.
24. 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.

25. 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.
26. 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.
27. Regular counselling and training of staff is undertaken.
28. 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 related to better maintenance practices, Technological improvements, better infrastructure and rolling stock etc. undertaken by Railways are tabulated below:-

S.No.	Item	2004-05 to 2013-14	2014-15 to 2025-26	2014-26 Vs. 2004-14
	Technological Improvements			
1.	Use of high-quality rails (60 Kg) (Km)	57,450 Km	1.63 Lakh Km	More than 2.8 times
2.	Longer Rail Panels (260m) (Km)	9,917 Km	87,219 Km	Nearly 9 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 31.03.26: 31,693 Nos.	352 times
5.	Thick Web Switches (Nos.)	Nil	35,971 Nos.	
	Better Maintenance Practices			
1.	Primary Rail Renewal (Track Km)	32,260 Km	57,583 Km	1.78 times
2.	USFD (Ultra Sonic Flaw detection) Testing of Welds (Nos.)	79.43 Lakh	2.25 Crore	More than 2.8 times
3.	Weld failures (Nos.)	In 2013-14: 3,699 Nos.	In 2025-26: 272 Nos.	93 % reduction
4.	Rail fractures (Nos.)	In 2013-14: 2,548 Nos.	In 2025-26: 208 Nos.	92% reduction
	Better Infrastructure and Rolling Stock			
1.	New Track KM added (Track Km)	14,985 Km	36,429 Km	Almost 2.5 times
2.	Flyovers (RoBs)/Underpasses (RUBs) (Nos.)	4,148 Nos.	14,362 Nos.	More than 3 times
3.	Unmanned Level crossings (Nos.) on BG	As on 31.03.14: 8,948	As on 31.03.26:Nil (All eliminated by 31.01.19)	Removed
4.	Manufacture of LHB Coaches (Nos.)	2,337 Nos.	49,366 Nos.	More than 21 times

Implementation of 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.
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 2,633 Route Kilometres as on 31.07.2026, covering the high density Delhi- Mumbai and Delhi-Howrah routes as below:-

S. No.	Section	Progress (Route Km)
(1)	Delhi-Mumbai route: 1,423 Rkm	
i	Tilak Bridge – Junction cabin – Palwal – Mathura – Kota- Nagda-Ratlam – Vadodra– Virar section	1,327

ii	Vadodara – Ahmedabad section	96
(2)	Delhi – Howrah route: 1,210 Rkm	
i.	Chipyana – Tundla– Kanpur – Subedarganjsection	563
ii.	Kanpur – Lucknow section	71
iii.	Mirzapur - DDU (Excluding) section	64
iv	DDU(FOC) –Bhabua Road section	50
v.	Sasaram – Pheser section	43
vi.	Gaya – Sarmatarn – Nimiaghat section	159
vii.	Chota Ambana - Bardhaman – Howrah section	260

10. In addition, track side Kavach implementation work is being taken up on 21,794 RKM covering all GQ,GD,HDN and identified sections of Indian Railways.
11. The total progress of key items of Kavach on Indian Railway sections are as under:-

S. No.	Item	Progress
i	Laying of Optical Fibre Cable	11,547 Km
ii	Installation of Telecom Towers	1,721 Nos.
iii	Station Data Centre	1,009 station
iv	Installation of Track side equipment	7,726 RKm
v	Provision of Kavach in Loco	6,290 Nos.

12. In addition, work for installation of Kavach in 7,190 Locomotives and 1,200 EMU/MEMU has been taken up.
13. 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 94,000 technicians, operators and engineers have been trained on Kavach technology. This includes about 57,000 Loco Pilots & Assistant Loco Pilots. Courses have been designed in collaboration with IRISSET.
14. 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.
15. The funds utilized on Kavach works so far up to Jun'26 is Rs.3,875 Crores. The allocation of funds during the year 2026-27 is Rs.2,066 Crores. Kavach work is going at good pace in the entire country. Requisite funds are made available as per the progress of works.

Punctuality:-

Punctuality is accorded high priority on Indian Railways (IR) and all possible efforts are made to run trains on time. However, on Indian Railways, several factors affect punctuality which include foggy weather, path constraints/congestion, asset maintenance and other issues, alarm chain pulling, agitations, cattle run over and other unforeseen circumstances.

The steps taken to improve punctuality of train services include:

- Regular, continuous and real-time monitoring of punctuality of trains using technological tools and IT systems.
- Use of an integrated digital platform for monitoring of train operations comprising Integrated Coaching Management System (ICMS) and Control Office Application (COA) which are integrated with National Train Enquiry System (NTES).
- Progressive advancement for automatic uptake of timings by the train movement itself, is being achieved through GPS devices fitted locomotives {Real-Time Train Information System (RTIS) and Remote Monitoring and Management of Locomotives and Trains (REMMLOT)} and Data loggers integrated with the station signaling system.
- Data loggers ensure real time and realistic reporting of arrival / departure of passenger trains at stations.
- IR has been replacing conventional coaches (ICF coaches) by modern light weight LHB coaches having state-of-the art technology. The Production units of Indian Railways are producing only LHB coaches from April 2018 onwards. The production of LHB coaches has continually increased during the years and about 50,000 LHB coaches have been turned out since 2014. IR has also been proliferating Vande Bharat, Namo Bharat Rapid Rail and Amrit Bharat trains, for quick acceleration and deceleration.
- To improve punctuality, IR also undertakes rationalisation of time tables. One such exercise, in a scientific manner, was undertaken with the assistance of IIT- Mumbai using their traffic simulator. The exercise also aimed at provisioning of fixed Integrated Maintenance blocks on all sections to minimise detention and improve punctuality.
- New generation High capacity Locomotives are being utilised for Right powering of trains.
- Further, with a view to minimise and mitigate the effect of fog and to assist the Loco Pilots run the train during foggy weather conditions the following steps have been taken by Indian Railways:

(i) GPS based FOG SAFE DEVICE: A Global Positioning System (GPS) based portable 'Fog Safe Device' (FSD) is being provided to Loco Pilots, which displays upcoming critical landmarks such as approaching signal, level crossing gates, permanent speed restrictions etc. in advance during poor visibility conditions like fog. This device is used for safe train operation especially during winter season and to help reduce stress on Loco Pilots while running in poor

visibility conditions. As on 31.05.2026, there are 33,624 Fog Safe devices available over Indian Railways.

(ii) Modified Semi-Automatic Stop Signal (MASS) System: MASS has been introduced on the Automatic Signalling territory during abnormal conditions like Fog & Bad Weather impairing visibility. The system helps minimise delay in train operation during foggy weather conditions.

Train operation during fog and poor visibility conditions is an essential component of the training curriculum and the same has already been incorporated in the Transportation Module and Technical Module of the prescribed training syllabus for Loco Pilots (LPs) and Assistant Loco Pilots (ALPs).

- **Modernisation of Signalling infrastructure:** Indian Railways is modernising the signalling infrastructure for enhanced reliability & safety. It is using reliable digital technology by provision of electronic interlocking systems with adequate redundancy (in power supply & transmission media), dual detection systems for train vehicle verification and replacement of electromechanical installations. Several improvement measures have been taken such as:

- Provision of Electrical/Electronic Interlocking Systems with centralized operation of points and signals in place of old mechanical signalling. It has been provided at 6671 stations as on 30.06.2026, out of which Electronic Interlocking have been provided at 3954 stations.
- Complete Track Circuited stations to enhance safety for verification of track occupancy by electrical means has been provided at 6671 stations upto 30.06.2026.
- Axle counters for automatic clearance of Block Section, BPAC (Block Proving Axle Counter) are provided to ensure complete arrival of train without manual intervention before granting line clear to receive next train and to reduce human element. These systems have been provided on 6085 Block Sections up to 30.06.2026.
- Signalling assets maintenance are planned & under taken during 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 in advance on rolling basis and executed.

Due to these initiatives, Indian railways, during 2025-26 recorded an overall punctuality of more than 77% and the details are given under:-

No. of Zones	Punctuality percentage
3	Punctuality of more than 90%
9	Punctuality between 75% and 90%

Capacity Utilization on High Density Network (HDN):-

There are total 7 High Density Network (HDN) routes over Indian Railway Network. These routes are divided in 308 sections. Out of total HDN sections, 172 sections have line capacity utilization exceeding 100%.

Capacity Enhancement and Infrastructure Augmentation:-

Capacity enhancement of railway network has been taken up by Indian Railways in a big way during the last 12 years. The details of commissioning/laying of new track across Indian Railways are given below:-

Period	New track Commissioned	Average commissioning of new tracks
2009-14	7,599 Km	4.2 Km/day
2014-26	36,429 Km	8.32 Km/day (nearly 2 times)

As on 01.04.2026, across Indian Railways, 514 Railway infrastructure projects (169 New Line, 29 Gauge Conversion and 316 Doubling) of total length 40,000 Km, costing approx. Rs. 8.31 lakh crore are sanctioned. The summary is as under:-

Category	No. of Projects	Total Length NL/GC/DL (km)	Length Commissioned till Mar'26 (Km)	Total Expenditure upto Mar'26 (Rs. in Crore)
New lines	169	16,634	3,361	1,57,572
Gauge conversion	29	3987	3,045	24,227
Doubling	316	19,379	6,177	1,23,454
TOTAL	514	40,000	12,583	3,05,253

Completion of Railway project/s depends on various factors which include the following:

- Land acquisition
- Forest clearance
- Shifting of infringing utilities
- Statutory clearances from various authorities
- Geological and topographical conditions of area
- Law and order situation in the area of project site
- Number of working months in a year for particular project site etc.

All these factors affect the completion time and cost of the project/s.
