

Kavach 4.0 Commissioned on 738 Route km Across Palwal–Mathura-Nagda Section (633 Rkm) on the Delhi-Mumbai Route and Howrah-Bardhaman Section (105 Rkm) on the Delhi-Howrah Route

Trackside Kavach Implementation Taken Up on 15,512 Rkm Covering All Golden Quadrilateral, Golden Diagonal, High Density Network and Identified Sections of Indian Railways

Kavach 4.0 Features Higher Location Accuracy, Improved Yard Signal Information, OFC-Based Station Interface and Direct Interface to Electronic Interlocking Integration to Enhance Passenger Safety

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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 the National ATP system in July 2020.
5. Implementation of Kavach System involves following Key Activities:
 - i. Installation of Station Kavach at each and every station, block section.
 - ii. Installation of RFID Tags throughout the track length.
 - iii. Installation of telecom Towers throughout the section.
 - iv. Laying of Optical Fibre Cable along the track.
 - v. 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 738 Route km on Palwal – Mathura- Nagda section (633 Rkm) on Delhi – Mumbai route and Howrah–Bardhaman section (105 Rkm) Delhi – Howrah route. Kavach implementation has been taken up in balance sections of Delhi – Mumbai & Delhi – Howrah corridors.
10. Progress of key items of Kavach on High density routes including Delhi– Mumbai & Delhi– Howrah corridors are as under:

SN	Item	Progress
i	Laying of Optical Fibre Cable	7129 Km
ii	Installation of Telecom Towers	860 nos
iii	Provision of Kavach at Stations	549 nos
iv	Installation of Track side equipment	2674 RKm
v	Provision of Kavach on Locos	4,154

11. Further, track side Kavach implementation work has been taken up on 15,512 RKm covering all GQ, GD, HDN and identified sections of Indian Railways.
12. Bids have been invited for equipping another 9,069 locomotives with Kavach version 4.0. Kavach is being provided progressively in a phased manner in locomotives.
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 40,000 technicians, operators and engineers have been trained on Kavach technology. This includes 30,000 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 Oct'25 is Rs. 2,354.36 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.

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

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