

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

RAJYA SABHA
UNSTARRED QUESTION NO. 3946
ANSWERED ON 04.04.2025

MONITORING AND EVALUATION OF 'KAVACH' SYSTEM PERFORMANCE

3946 Dr. SYED NASEER HUSSAIN:

Will the Minister of RAILWAYS be pleased to state:

- (a) the mechanisms established to monitor and evaluate the performance of the 'Kavach' anti-collision system post-implementation;
- (b) the details of the key performance indicators used to assess its effectiveness in enhancing rail safety; and
- (c) the frequency of these evaluations and the process for addressing any identified issues?

ANSWER

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

(SHRI ASHWINI VAISHNAW)

- (a) to (c): 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 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.

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, 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.
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 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.
9. Progress of Key items comprising Kavach system on Indian Railways upto Feb' 2025 is as under: -

SN	Items	Progress
i	Laying of Optical Fibre Cable	5743 Km
ii	Installation of Telecom Towers	540 Nos.
iii	Provision of Kavach at Stations	664 Nos.
iv	Provision of Kavach in Loco	795 Locos
v	Installation of Track side equipment	3727 Rkm

10. 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 15,000 Rkm have been invited covering all GQ, GD, HDN and identified sections of Indian Railways, out of which works of 1865 Rkm have been awarded.
11. 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 20,000 technicians, operators and engineers have been trained on Kavach technology. Courses have been designed in collaboration with IRISSET.
12. The Kavach system goes through strict quality check as per CELENEC standards. It is inducted only after approval from the Independent Safety Assessor (ISA) to ensure high reliability.
13. Maintenance guidelines for the Kavach system have been issued for post installation maintenance by RDSO in order to maximise the availability of the system and ensure optimum performance of Kavach functioning across Indian Railway network. In addition, Kavach Network Monitoring System (NMS) is also being provided at each divisional Head Quarter to monitor and evaluate the performance of Kavach on-real time basis post installation.
