



Important Facts For Prelims

Kavach System

Tags:

- Quick Facts For Prelims
- GS Paper - 3
- Infrastructure
- Mobilization of Resources
- Achievements of Indians in Science & Technology

Why in News?

The recent collision between two passenger trains in **Andhra Pradesh's Vizianagaram district** drew attention to the absence of the Traffic Collision Avoidance Systems (TCAS), specifically the indigenously developed system called 'Kavach,' which, if installed, could have averted the tragic incident.

What is Kavach?

▪ About:

- Kavach is a **cab signaling train control system with anti-collision features** developed by the Research Design and Standards Organisation (RDSO) **in association with three Indian vendors.**
 - It has been adopted as our **National Automatic Train Protection (ATP) System.**
- It adheres to **Safety Integrity Level-4 (SIL-4)** standards and acts as a vigilant watchdog over the existing signaling system, **alerting the loco pilot when approaching a 'red**

signal' and applying automatic brakes if necessary to prevent overshooting the signal.

- The system also relays **SoS messages** during emergency situations.
- It features centralized live monitoring of train movements through the **Network Monitor System**.
- The **Indian Railways Institute of Signal Engineering & Telecommunications (IRISET) in Secunderabad, Telangana** hosts the 'Centre of Excellence' for Kavach.
- **Components of Kavach:**
 - Within the **Kavach setup**, designated railway stations along the intended route for deployment **consist of three essential components**.
 - **First Component:** The first component involves the **incorporation of Radio Frequency Identification (RFID) technology into the tracks**.
 - RFID employs **radio waves to identify objects or individuals and utilizes electromagnetic fields** to automatically read wireless device information from a distance without physical contact or line of sight.
 - **Second Component:** The **locomotive**, serving as the driver's cabin, **is equipped with RFID readers**, a computer, and brake interface equipment, comprising the second component.
 - **Third Component:** It encompasses radio infrastructure, **such as towers and modems**, strategically installed at railway stations to support the system's functionality.
- **Challenges in Deployment:**
 - Its deployment cost is **₹50 lakh per kilometer**, with limited coverage of approximately 1,500 km currently, posing a

challenge in comprehensive implementation across the **68,000 km rail network**.

Note: Presently, the Indian Railways has designated ₹4,000 crore within the Signalling and Telecom budget section, encompassing ₹2,000 crore allocated under the Rashtriya Rail Sanraksha Kosh (RRSK) specifically for implementing **Kavach**.

UPSC Civil Services Examination, Previous Year Question:

Q. Consider the following communication technologies: (2022)

1. Closed-circuit Television
2. Radio Frequency Identification
3. Wireless Local Area Network

Which of the above are considered Short-Range devices/technologies?

- | | | | |
|----------------|-----|---|------|
| (a) 1 | and | 2 | only |
| (b) 2 | and | 3 | only |
| (c) 1 | and | 3 | only |
| (d) 1, 2 and 3 | | | |

Ans: (d)

