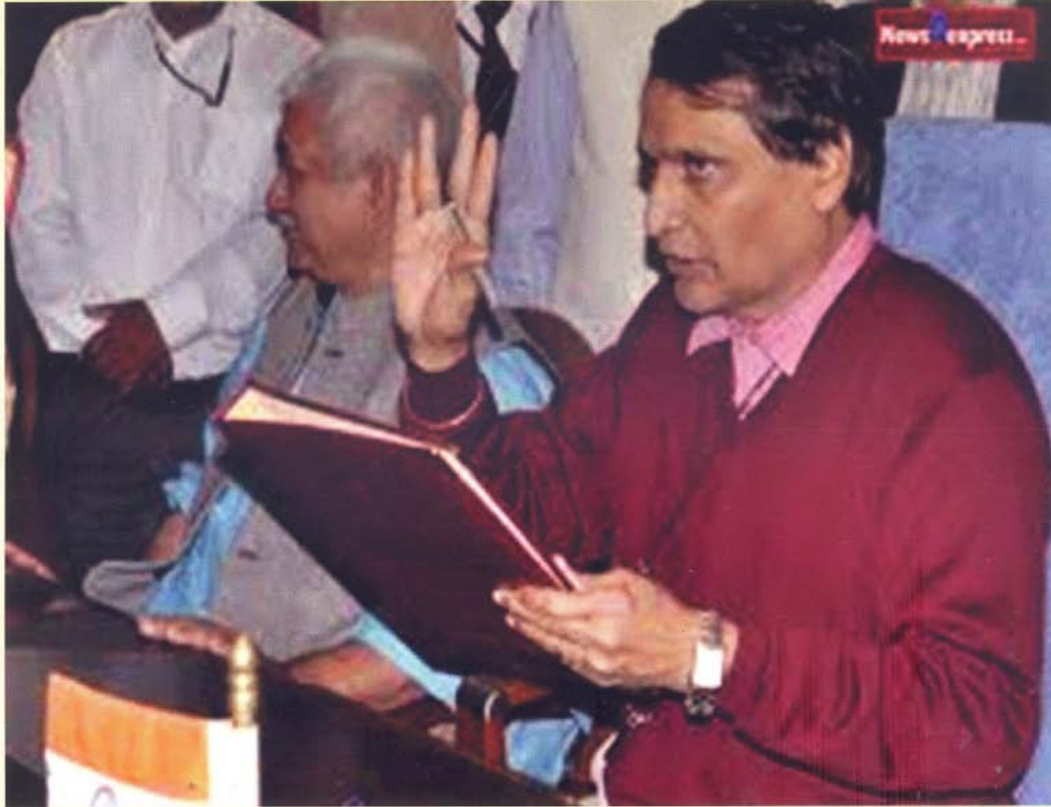


ACTION PLAN 2022

SIGNAL & TELECOM



SIGNALING – A SYMBOL OF TRUST



“यात्री की गरिमा, रेल की गति, राष्ट्र की प्रगति”

Shri Suresh Prabhakar Prabhu,
Minister for Railways,

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Role of Signalling

- **Facilitates Train operations**
- **Enhances Railway safety**
- **Aid to driver**
- **Reduction in human dependence**

Increased deployments of Track occupation devices like track circuits, Axle counters, Audio frequency track circuit has led to substantial improvement in Safety level of Indian Railways

Reduction in Train Collisions in station Area with increased Track circuits

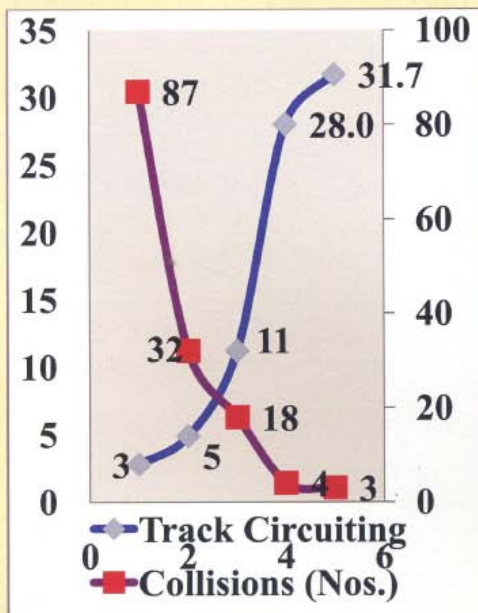
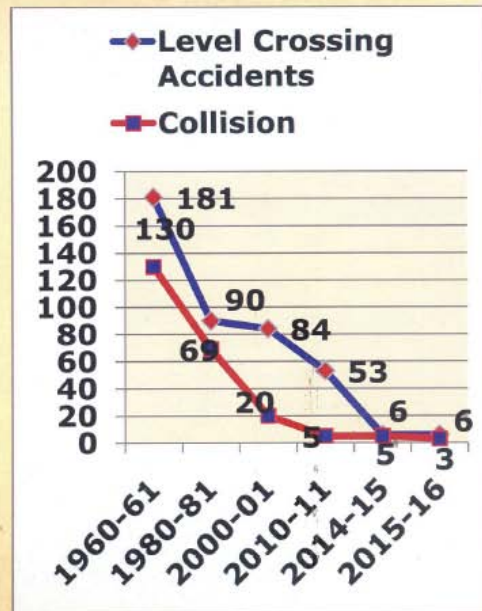


Fig 1- Collision in Station Area versus Track circuits

Level Crossing Interlocking of Level crossing gates in Station area and in Block section has also led to substantial reduction in number of collisions on account of earlier human failures.

Reduction in Level Crossing Accidents and Collisions

Fig 2: Accidents and Collisions on Indian Railways



Automatic Train Protection System

Automatic Train Protection System

Automatic Train protection system is provided to avoid train accidents/collisions on account of human error of signal passing at danger (SPAD) or over speeding.

Train Protection and Warning System (TPWS) based on European Technology ETCS level-1 is a proven ATP system.

Train Collision and Avoidance System (TCAS) developed indigenously by RDSO for collision prevention and protection against signal passing at danger (SPAD)

Train Protection and Warning System (TPWS):- Train Protection and Warning System (TPWS) based on European technology ETCS L-1 is a proven ATP System to avoid train accidents/ collisions on account of human error of Signal Passing At Danger (SPAD) or over-speeding.

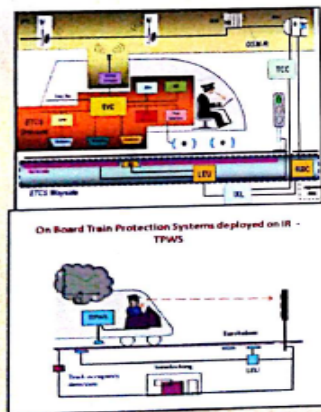


Fig-1: TPWS Schematic



Fig-2: TPWS Balise transmission module

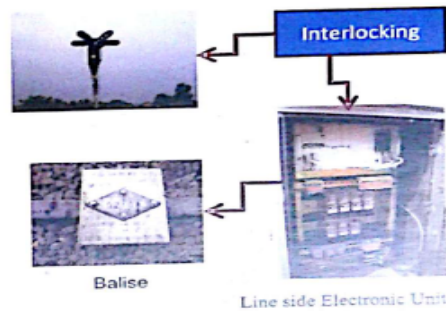


Fig-3: TPWS Line side Layout

TPWS has been provided on 342 Rkms.

Chennai-Gummidipundi Suburban Section of Southern Railway (50 RKms).

Hazrat Nizamuddin – Agra Section of Northern/North Central Railway (200 RKms). Gatiman Express running at 160 Km/h on Delhi-Agra section has been equipped with TPWS.

TPWS has also been provided on Dum Dum-Kavi Subhash section of Kolkata Metro (25 RKms) and introduced in commercial service on all the EMU rakes.

Track side equipments of TPWS on Basin Bridge-Arakonam Section (67 RKms) of Southern Railway.

TPWS has been approved for more than 5000 Route Kilometers (RKMs) covering Automatic Signaling Sections of Indian Railways (IR).

TPWS- Trackside Equipments

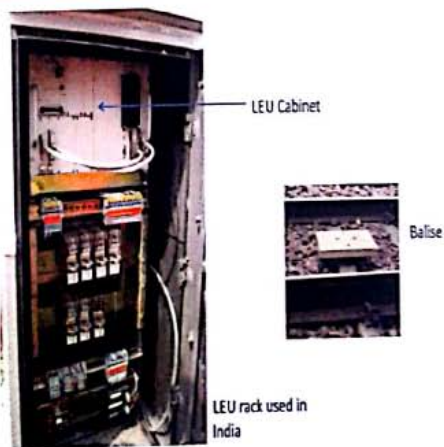


Fig-4: TPWS Trackside Equipments

TPWS- Onboard Components

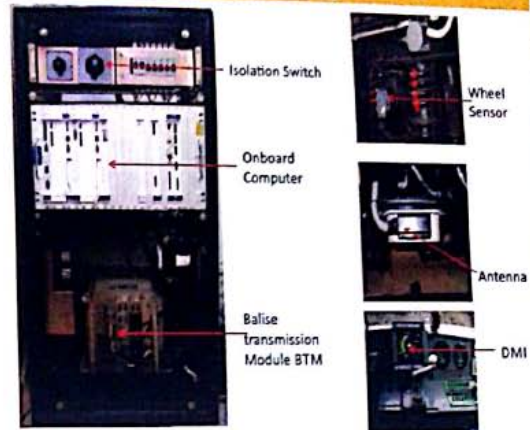


Fig-5: TPWS On Board Components

TCAS is being developed indigenously by RDSO in association with Indian vendors as a cost-effective ATP (Automatic Train Protection) solution having capabilities for preventing over speeding, SPAD as well as Collisions.

By 2022 ATP systems will be provided on more than 10,000 Rkms of High Density Network (HDN) routes

Electronic Interlocking

Electronic Interlocking system ensures Safety of train movements by monitoring and controlling train movements on the lines according to the operational requirements of the Railway.

Intricate wiring in relay based interlocking system is replaced by electronic logic circuit cards.

Electronic Interlocking system is completely preassembled and tested as per interlocking design requirements. Electronic cards are placed in modular containers. This play a key role in cutting time and costs for installation and commissioning

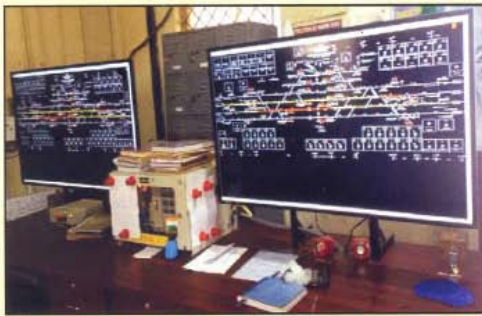


Fig-1: Dual Video on EI Panel

Electronic Interlocking system has been provided at more than 1200 stations on Indian Railways as on 31st March 2017.

By 2022 electronic interlocking system will be provided at more than 3000 stations of Indian Railways.



Fig-2: EI Relay Room



Fig-3: RRI Operations Panel and RRI Indication Panel



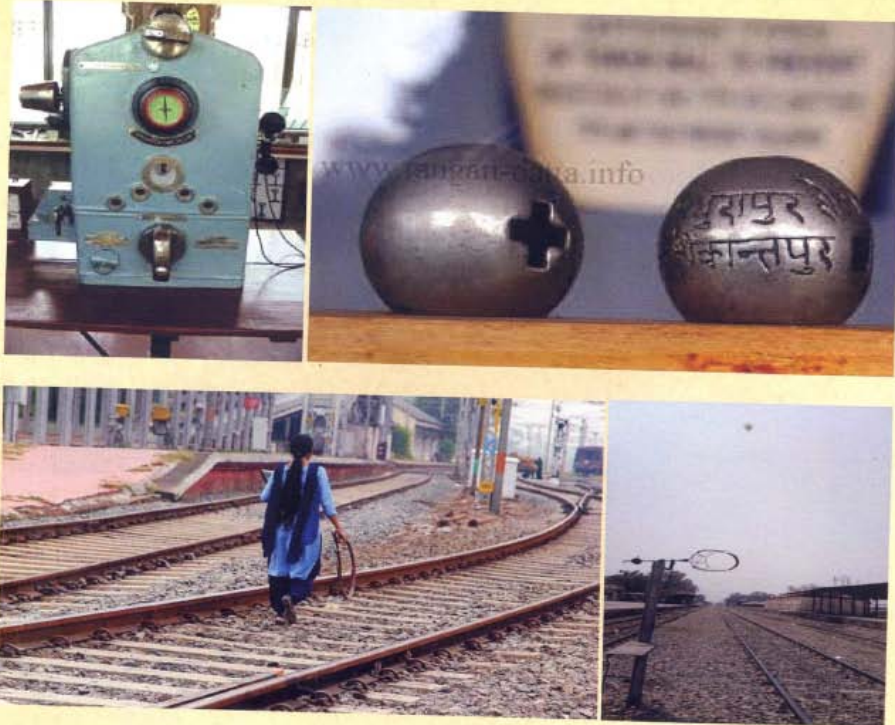
Fig-4: Complex and Intricate Wiring of RRI
LED Signals

Elimination of Mechanical Interlocking



- Mechanical System depends on human skill and effort.
- Mechanical System operates signals and switches using wires and rods
- Replacement is being done by electronic/electrical systems.
- Replacement reduces failures due to temperature changes, wear and tear of mechanical items & human errors.
- The new systems require reduced maintenance effort.
- The replacement by modern electrical/electronic systems results in reduction in asset failures and improved reliability.
- All remaining stations with mechanical semaphore signals on BG route will be replaced by 2020

Elimination of Token Block Instruments



- In token system there is physical delivery of token to loco pilot as authority to enter next block section.
- In token systems,
 - - There are incidences of injuries to loco pilots
 - Token loss cases causing undue delay to trains
 - Speed limitation in the block section
- Replacement is done by systems which prove clearance of next section through electrical detection
- The tokenless systems result in
 - improved line capacity as time taken to physically deliver tokens is eliminated
 - reduced failures as the mechanical parts are eliminated which are prone to wear and tear
- Token instruments from all remaining block sections will be eliminated by March 2019.

Block Proving By Axlecounters

PROVISION OF BLOCK PROVING THROUGH AXLE COUNTER



- Presence of a train in a section between two stations was ascertained by the duty station masters at both ends jointly.
- In fully automatic 'Block Proving Axle Counter' system, there is no human dependence to ascertain complete arrival of a train by ensuring that no vehicle is left behind, thereby improving safety.
- Remaining all block sections on A, B, C, D-Spl & D routes will be equipped with 'Block Proving by Axle Counter' upto March 2022

Interlocking of LC Gates

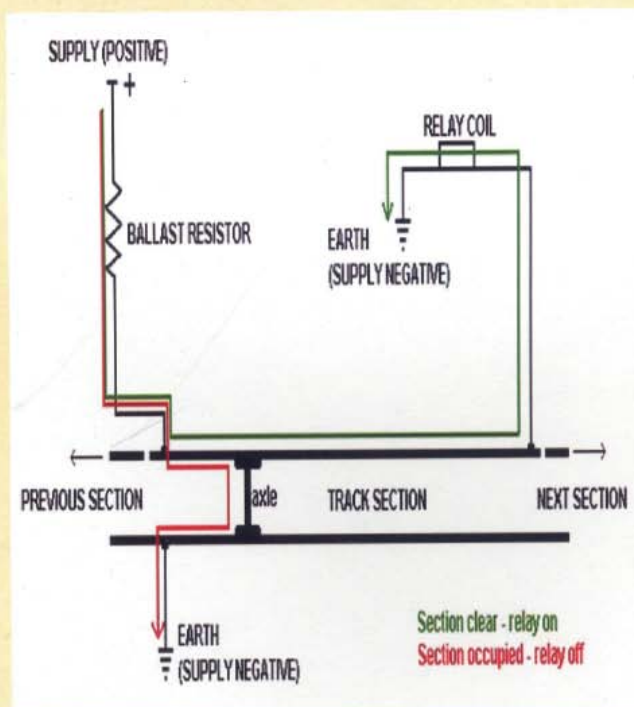
INTERLOCKING OF MANNED LEVEL CROSSINGS



- Interlocking provides protection of level crossing through signals
- Improves safety for both rail and road travellers ; reduces fatal accidents
- Improves confidence of loco pilots.
- As per present policy, the interlocking is done at LC gates
 - having train vehicle units more than 20,000.
 - having train vehicle units less than 20,000 if visibility is an issue or there is a history of accidents at the gate.
- Remaining 975 manned level crossing gates will be interlocked by 2022.

TRACK VACANCY DETECTION OF COMPLETE STATION YARD

- IT IS A SYSTEM TO DETECT PRESENCE OF A VEHICLE ON A PORTION OF TRACK. THIS ELIMINATES HUMAN DEPENDANCE AND THIS ENHANCES SAFETY. THIS CAN BE ACHIEVED USING TRACK CIRCUIT OR AXLE COUNTER.
- TRACK VACANCY DETECTION HAS BEEN COMPLETED ON IMPORTANT ROUTES.
- BY 2022, IT IS PLANNED TO COMPLETE TRACK DETECTION WORKS ON ALL STATIONS OF INDIAN RAILWAY.



INTEGRATED POWER SUPPLY SYSTEM

- RELIABLE POWER SUPPLY IS IMPORTANT FOR EFFECTIVE FUNCTIONING OF SIGNALLING EQUIPMENT IN ORDER TO REDUCE ASSET FAILURE.
- IN ORDER TO HAVE STABLE, RELIABLE AND UNINTERRUPTED POWER SUPPLY FOR SIGNALLING SYSTEM AT A STATION, INTEGRATED POWER SUPPLY SYSTEM IS PROGRESSIVELY BEING PROVIDED ON INDIAN RAILWAY.
- BY 2022, INTEGRATED POWER SUPPLY SYSTEM SHALL BE PROVIDED ON ENTIRE BG ROUTES OF INDIAN RAILWAY.



EARTH LEAKAGE DETECTOR

- IN ORDER TO ENSURE EFFECTIVE MAINTENANCE OF SIGNALLING SYSTEM, AS A RELIABILITY IMPROVEMENT PLAN, EARTH LEAKAGE DETECTOR SYSTEM BEING PROVIDED AT ALL SIGNALLING INSTALLATIONS.
- EARTH LEAKAGE DETECTOR SYSTEM CONTINUOUSLY MONITORS THE INSULATIONS OF CABLES WITH RESPECT TO THE EARTH.
- EARTH LEAKAGE SYSTEM HAVE BEEN MADE MANDATORY TO BE PROVIDED AT ALL STATIONS.
- BY 2022, EARTH LEAKAGE SYSTEMS SHALL BE PROVIDED AT ALL SIGNALLING INSTALLATIONS.



DATA LOGGER SYSTEM

- IN ORDER TO ENSURE EFFECTIVE MAINTENANCE OF SIGNALLING SYSTEM, AS A RELIABILITY IMPROVEMENT PLAN, DATA LOGGER SYSTEM BEING PROVIDED FOR ALL SIGNALLING INSTALLATIONS.
- DATA LOGGER HELPS IN ANALYSING THE FAILURES AND FOR PREDICTIVE MAINTENANCE. IT ALSO HELPS TO CRITICALLY ANALYSE UNUSUALS LIKE SPAD, TRAIL THROUGH, ACCIDENTS INCLUDING OPERATIONAL UNUSUALS. IT STORES ALL INFORMATIONS REGARDING THE CHANGES WITH DATE & TIME LIKE A BLACK BOX IN AN AIRCRAFT.
- DATA LOGGER SYSTEM HAVE BEEN MADE MANDATORY TO BE PROVIDED AT ALL STATIONS.
- BY 2022, DATA LOGGER SYSTEM SHALL BE PROVIDED AT ALL SIGNALLING INSTALLATIONS.



Railway Display Network (RDN) at 2000 Railway Station:



- A Centralised managed Display network at 2000 stations consisting of more than one lakh display screens at stations.
- Train Information for Passengers viz. Train running status, Route and Destination information etc.
- Disaster Management through centrally broadcast emergency messages
- Socially relevant messages regarding government schemes/initiatives viz. Beti Bachao, Swatch Bharat & Pulse Polio etc.
- Advertisements – by using part of the display time to generate additional revenues.
- Presently Proof of Concept (POC) at 20 stations being done.
- Target for final role out at 2000 Stations- March 2020.

Wi-Fi internet facility at Railway Stations:



- Wi-Fi internet facility is planned to be provided at 709 stations (A1-75 stations, A-332 stations, B-302 stations.)
- Wi-Fi facility will provide internet connectivity to passengers and will aid in implementing Govt's "Digital India" initiative.
- Being done through M/s RailTel – a PSU under Ministry of Railways.
- RailTel in association with Google has planned for providing Wi-Fi internet facility at 405 stations (all A1 & A category stations) without any CAPEX and with revenue sharing model.
- 115 stations completed upto March 2017.
- About 2 million peoples are using Wi-Fi internet facility at stations every month
- All 709 stations are targeted for commissioning by March 2020.

Video Surveillance System at Stations under 'Nirbhaya Fund':



- Video Surveillance System planned to be provided at 983 Stations.
- System will enhance security for women passengers and other customers.
- Work entrusted to M/s RailTel – a PSU under Ministry of Railways
- Special features-
 - 30 days recording at divisional HQs by using RailTel OFC for bringing video feed from stations to divisional HQ.
 - Real Time monitoring facility to all Stations Masters, RPF and GRP chowkies and Posts.
 - Main control and command centre at divisional HQ
 - Real Time facial recognition of all criminals whose Data has been feed in central Data base.
 - Real time alert on monitoring consoles.
 - Internet login facility authorised persons into recording servers for Real Time monitoring from anywhere.
- Target for commissioning – June 2018.



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