Research and Development

Research, Designs & Standards Organisation (RDSO), is the sole R&D organisation of Indian Railways and functions as the technical advisor to Railway Board, Zonal Railways and Production Units. One of the major roles that RDSO has played is that of developing and maintaining standards and specifications which ensure that all different technologies are able to work together as a system, which permits Indian Railways to operate seamlessly without any technology limitations.

RDSO also offers international consultancy services in matters pertaining to design, testing and inspection of railway equipments as well as survey for construction of new lines. The significant accomplishments of RDSO in the sphere of research and development have always attracted worldwide attention.

Some of the important activities and projects undertaken/completed during the year are given below:-

**Safety:**

- Development of Electronic LC Gate Communication System with Voice Logging Facility.
- Development of Train Collision Avoidance System (TCAS).
- Development of Train Protection and Warning System.
- On-Board Display of Signal Aspect (OBDSA).
- Development of Fuse Auto Changeover System (FACS).
- Development of EP Assist Brake System.
- Safety Device for Aluminium Gearcases used in WAP5 Locomotives.
- Design, Development and Manufacturing of Remote
Monitoring and Analysis for Electric Locomotives (REMAN-EL) for 25 KV Electric Locomotives:

• Development of LED Based Light Unit for SLR Coaches.
• Automatic Smoke/Fire Detection with Alarm System to be Fitted in AC LHB Coaches over Indian Railways.

**Passenger Amenities:**

• Design and Development of Passenger Escalators.
• Development of Induction Heating Based Pantry Equipments in non AC coaches, Air-conditioned self-generating coaches and LHB EOG type Rajdhani express pantry cars.
• Development of LED Based Head Code and GPS Based Public Information System for EMUs & MEMUs.
• Provision of Mobile/Laptop Charging Point in MEMUs.

**Infrastructure:**

• Issue of Guidelines to Zonal Railways for developing Infrastructure to Home 200 Electric Locomotives in Shed.
• Development of Capacity Optimization and Simulation Tool (COST) to examining the effect on line capacity of the technological improvements like Intermediate Block Signalling, introduction of new stations, doubling/tripling/quadrupling, etc.

• Development of LED Signals for Specific Requirement in Tunnels for Metro Railway, Kolkata.

• Development of Silicone Gel Based Jointing Kit for Signalling and Telecom Cables.

• Screening of High Speed Train Drivers for Rajdhani/Shatabdi Express Trains.

**Operational Efficiency:**

• Design and Development of 2400 BHP Multi Genset WDM2G Locomotive.

• Development of 4500HP Diesel Loco with Hotel Load Feature.

• Development of 4500HP Dual Cab WDG4D Freight Locomotive.

• Development of 1600HP AC-AC Diesel Electric Multiple Unit (DEMU).

• Development of Modified Bogie for WDP1 Locomotives.

• Development of Distributed Multiple Unit Coupler System (DPWCS) for Convention Electric Locomotives.

• On line Updating of Trouble Shooting Directory for 3 Phase Electric Locos.

• Provision of Capacitor Bank in LHB EOG AC Coaches of Rajdhani/Shatabdi Express Trains for augmentation of coaches.

• Development of V-belt Driven Permanent Magnet (PM) Alternator.
• Design and Development, Fabrication, Supply, Testing and Commissioning of Stainless Steel AC EMU Coaches.

• Introduction of Three Phase Propulsion System on EMUs/ MEMUs. Modelling and Validation of Interlocking for Railway Signalling Systems.

• Development of Online Insulation Monitoring (OLIM) System.

• Exclusive website 'irptd.org.in' has been developed and launched which depicts the details pertaining to patterns of Aptitude Tests for selection of safety category staff on Indian Railways and practice tests for the candidates besides highlighting the activities of the Psycho-tech Directorate of RDSO.

• Improvement in Specification of LED Based Tail Lamps.

**Indigenous Development:**

• Development of Indigenous Crankshaft for 16 Cylinder High Horse Power (HHP) Loco.

• Development of Indigenous Computerised LCC (CLCC) for DEMUs.

• Insulation Scheme for Rewinding of 3 Phase Traction Motor used in AC/DC EMUs in Mumbai.

• Indigenous Development of Multi Section Digital Axle Counter.

• Development of Block Proving by Axle Counter (BPAC).

• Design & Development of Electronic Interlocking (El) System.

• Development of Conduit System for Cable Management in Passenger Coaches.

**Inspection & Quality Audit:**

• RDSO has carried out wind tunnel test of pantograph for two additional cross wind configurations, namely wind incidence
angle of 45° & 90°, in addition to normal configuration as specified in IEC. Railway Board has advised RDSO to examine the issues related with wind tunnel test of pantographs as brought out by Northern Railway.

- Detailed Quality audit of fitment and maintenance of CTRB has been carried out at a number of railway workshops and wagon builders.

**Consultancy:**

- A new type of Bi-modal wagon ‘Road Railer, is going to be introduced soon on Indian Railways. Detail design of the same has been approved by RDSO and the wagons have been manufactured. Introduction of such services will help in attracting new traffic which requires door to door collection.

- Consultancy to various Metro Railways is provided on a regular basis depending on the requests from different Metro Railways all over the country including DMRC(Delhi Metro Rail Corporation), DAME(Delhi Airport Metro Expressway), MOOPL(Mumbai One Operation Private Limited) , CMRL (Chennai Metro Rail Corporation Limited) etc. In the current year a total of 2,726 Station controllers and Train operators were tested for different Metro Railways.

**Tests & Trials:**

- RDSO along with IIT/Kanpur has undertaken a UIC funded project for proof of concept trial of ”V-SAT based Train Control Communication System” for control circuit working in remote and isolated locations in difficult terrains where maintenance and restoration of control communication is very difficult due to frequent Cable Cuts/Outside Interference/other natural disasters etc.

- Testing and performance evaluation of Wi-Fi Internet Access on 9 coaches of one rake of New Delhi-Sealdah Rajdhani Express Train was carried out during the free of cost trial.
In this trial eight 2G/3G GSM/CDMA SIM were used to provide Internet facility on running trains with the help of Communication Control Unit (CCU), which aggregates available Bandwidth by GSM/CDMA service providers. Salient features of system are :-

- Antenna which are installed on the roof of Train or can interact/communicate with Basic Transceiver Station (BTS) during moving of train and take signal from BTS.
- Communication Control Unit (CCU) has four combiners and it aggregates the available bandwidth from all the service providers.
- Two Access Point (AP) were used in one Carriage for providing internet to the user inside the Carriage and provide the Inter Carriage Link without wire.
- Power Supply was taken from Carriage for Communication Control Unit (CCU) and Access Point (AP).
- Each Access Point has two Antenna -one (2.4GHz) for user link and other (5GHz) for Inter Carriage Link.