Research and Development

Research, Designs & Standards Organisation (RDSO), the R&D Organisation of Indian Railways plays the role of a technical advisor to Railway Board, Zonal Railways and Production Units. It has been instrumental in identification and assimilation of technology suitable for Indian operating and climatic condition and has ensured rightful adaptation of imported technologies, wherever felt necessary. One of the major roles that RDSO has played is that of developing and maintaining standards and specifications which ensures that all different technologies are able to work together as a system and also allows IR to operate seamlessly without any technological limitations. RDSO is working for improvement in quality of service both in the areas of passenger and freight traffic. The projects taken up by RDSO in the recent past have a direct bearing on safer, more comfortable, more economical and more reliable rail travel and to achieve the maximum throughput with the least possible investment in infrastructure and rolling stock. The results in most of these projects have already borne substantially acclaimed fruit for the IR.

Some of the major activities and projects undertaken/ completed by RDSO during the year are given below:

Safety

- Development of crashworthy design of LHB coach.
- Development of improved crashworthy design of WDP4B locomotive.
- Development of CBC with Balanced Draft Gear.
- Circulation of guidelines to Zonal Railways on safety precautions during tunnel construction and also for maintenance and inspection of existing tunnels.
- Development of Gangmen Warning System having RF communication with SIMRAN locomotive equipment, to provide warning of approaching train.
- Development of Audio-visual warning system for the road users at unmanned level crossing gate having RF communication with SIMRAN locomotive equipment.
• Instrumentation of Railway Bridges by introduction of heavier axle load at a restricted speed and monitor the response.

**Passenger Amenities**

• Development of Zero Discharge Toilet through TMRS project.
• Provision of Broadband internet on running trains through two-way satellite communication.
• Development of roof mounted package units for double decker coaches with eco-friendly R407 C refrigerant.

**Infrastructure**

• Development of VoIP based train control communication system.
• Development of 500t Universal Spring Structure Fatigue Testing machine.
• Circulation of guidelines to Zonal Railways for design and construction of tunnels.

**Operational Efficacy**

• Development of design for Light Weight Maintenance Friendly Bogie for High Horse Power Locomotives.
• Development of design for Light Weight Maintenance Friendly HTSC Bogie Frame for WDP4B Locomotives.
• Introduction of Single Pin Design Clevis in H-type Transition Tight Lock Coupler.
• Development of 25 KV HV Connector for multiple operation of WAP5 locomotives with one Pantograph in raised condition.
• Development of Hotel Load Converter for WAP7 locomotives.
• Development of High Sensitivity Thermal Imaging Camera with on-line scanning facility to improve the reliability of electric traction system.
• Development of Electronic Fuel Injection for ALCO locomotives to reduce fuel consumption and eliminate black smoke.
• Development of Emission Test Car to measure exhaust
emission from Diesel locomotives.

- Development of stainless steel EMUs.
- Development of 8-Wheeler Diesel Hydraulic Tower Car for preventive maintenance of overhead equipments of 25 KV AC traction as well as for Railway Electrification Works.
- Development of standard designs of Plate Girder for 25t loading, Open Web Girder for 25t loading, Composite Girder for 25t loading, Plate Girder for DFC loading (32.5t axle load), Open Web Girder for DFC loading (32.5t axle load), Restricted Head Plate Girder for 25t loading-2008, etc.

**Indigenous Development**

- Development of indigenous sources for IGBT Based Propulsion system.
- Development of indigenous insulation system for Hitachi Traction Motors.
- Indigenous development of 3-phase EMUs.
- Development of indigenous Centre Buffer Coupler.

**Inspection & Quality Audit**

- Inspection of CMS crossings, Welded crossings, Diamond crossings, etc.
- Inspection of DRT, SRT, AT weld tester, axle tester, Data Loggers, etc.
- Inspection of various developmental items like welded components of steel bridges, etc.
- Ultrasonic testing of rails.
- Inspection of Trial paintings of coaches to obviate garment blasting.

**Consultancy**

- Technical consultancy to MRVC, which includes evaluation of the technical bids, design documents/drawings approval, inspection, prototype testing, trials and coordination with Railway Board, user Railways, MRVC and ICF.
Consultancy to Zonal Railways suggesting the best possible remedial measures for rehabilitation of weak formation during 2011-12 by Geo-Tech.

Consultancy to PSUs/Private rolling stock manufacturers/Zonal Railways for speed certification of their new rolling stock.

Consultancy of alternate arrangement for ROB girder for West Central Railway for temporary arrangement of damaged bridge.

**Tests and Trials**

For the first time on IR, a real time assessment of Load Environment of freight stock has been carried out through instrumentation of an actual wagon, spanning 16,000 kms. on South East Central, East Central and North Central Railways.

Oscillation trial and speed certification of various rolling stocks including locomotives on Zonal Railways.

Fatigue testing of 60 kg/m rail sample in connection with testing of rails for Flaw Growth Rate.

Fatigue and Bending test of Joggled Fish Plate developed by Engineering Workshop, Sabarmati.

Testing of 60 kg A.T. Welded Rail having riser.