

3.0 Electric Locomotives :

| Holding | WAM4 type Loco | WCAM1 type AC/DC Loco | WCAM2 type AC/DC Loco | WAG5 type AC loco | WAP4 type AC loco | WAP5 (3phase loco) | Total |
|----------------------------------|----------------------|--------------------------------|--------------------------------|-------------------------|-------------------------|--------------------------|-------|
| As on 31.3.12 | 20 | 44 | 06 | 150 | 59 | 8 | 287 |
| Additional during the year | - | -9* | - | +20 # | +6# | +7# | +24 |
| As on 31.3.13 | 20 | 35 | 06 | 170 | 65 | 15 | 311 |

Note- * 9 WCAM1 loco condemned, #20WAG5A from LDH/NR and 6 WAP4 & 7 WAP5 new locos from CLW received during the year.

3.1 A) Locomotives received during the year 2012-13

- Total 13 new locos (6 WAP4 and 7 WAP5) received from CLW during this year
- 20 WAG5A of locos transfer received from LDH/NR during this year.

B) Locomotives Transferred during the year 2012-13

Nil

C) Locomotives Condemned during the year 2012-13

Total 9 WCAM1 locos were condemned during the year 2012-13.

3.2 Performance of Locomotives:

| Performance of Locomotives | 2011-12 | 2012-13 |
|--|---------|---------|
| On line (Average holding) | 281.7 | 292.9 |
| In use (Average available for traffic) | 250.9 | 267.3 |
| Percentage Ineffective | | |
| 1) Statistical | 5.7 | 5.6 |
| 2) Hourly | 11.1 | 8.7 |
| Statistical loco failures | 10 | 7 |
| KM/failure in thousands | 1021.64 | 1023.28 |
| Failure rate/100 locos/month | 0.30 | 0.20 |
| Engine Kms/day/ loco in use (Goods) | 608 | 608 |
| % age availability of locos for traffic (Hourly basis) | 90.6 | 91.3 |

3.3 Maintenance of Electric locos.

Western Railway have two electric loco sheds at BL& BRC. The shed wise & type wise **average loco holding** of these sheds **during 2012-13** was as follows.

| Shed | Loco type | | | | | | | Total |
|-------|-----------|-------|------|------|------|-------|-------|-------|
| | WCAM1 | WCAM2 | WAM4 | WAP4 | WAP5 | WAG5H | WAG5A | |
| BL | 38.5 | 6 | - | - | - | 80 | - | 124.5 |
| BRC | - | - | 20 | 63.8 | 8.7 | 21.8 | 54.1 | 168.4 |
| Total | 38.5 | 6 | 20 | 63.8 | 8.7 | 101.8 | 54.1 | 292.9 |

3.4 Electric Loco shed, Valsad is repairing TAO-659 stators and rewinding of armatures is also carried out. .

3.5. During the period 01.04.11 to 31.03.13, electric locos were given the following maintenance schedules.

| Maintenance schedules | Year ending 31.03.12 | Year ending 31.03.13 |
|-----------------------|----------------------|----------------------|
| IA+IB+IC | 1953 | 1912 |
| AOH + IOH | 153 | 141 |
| Unscheduled repairs | 136 | 127 |

No loco was overdue POH by the end of the year 2012-13

Note: During 2012-13 POH of WR Locos was carried out at ELW/BSL& ELW/LKO, MTR of WR WAG5 locos was carried out at DHD Workshop.

3.6 **Major defects/failures observed and improvement and modifications carried out during the year are as under:**

A. **Reliability improvement initiatives:**

- **Conversion of existing DC Panto into AC Panto**

ELS BL has modified DC Pantograph into AC Pantograph by replacing the DC Pan with AM-12 AC Pans with plunger and the other parts of both the panto are same. **This innovative work results into saving of Rs. 60,000/- per panto.**

- **Test bench for PC-8 relays :**

ELS/BRCY and ELC/BL have developed a Relay Test Bench for PC-8 Relays for reliability improvement of relays. The test bench facilitate testing of one loco set (16 relay) relays at a time. The relays are fitted on test bench and tested for 200 operations. For checking condition of interlock LEDs have been provided across timers interlocks of relay. A counter has been provided on the test bench for counting number of operations. By this innovation problem of malfunctioning of relays on line can be avoided.

BENEFITS :Reduction in line failures on account of relay I/L failures.

- **TEST BENCH FOR VCD OF M/s. STESALIT :**
VCD test bench has been developed in house for testing of VCD (Vigilance Control Device) which having following features :
 1. It will test VCD Main Unit as well as both the cab Units.
 2. Checking of VCD system for acknowledge by devices such as foot switch, horn etc**BENEFITS:** The system helps in reliability improvement of VCD on line.
- **IN HOUSE DEVELOPMENT OF VACUUM CLEANING SYSTEM OF 3 PHASE LOCOMOTIVES :**
ELS/BRCY has developed in house Vacuum Cleaning System for 3 phase locomotives. Cleaning of Machine Room & Crew cabs of 3 phase locomotives is being done by the system. The system comprises of 2 nos. released Exhausters, GD80H filters, Snifter Valves, gauges etc. it is very critical for ensuring proper cleaning of filters of WAP5 loco.
- **MODIFICATION IN DIMMER CIRCUIT OF HEAD LIGHT OF 3 PHASE LOCOS:**
LPs have been facing problem of poor visibility of light during night while applying dimmer of headlight in WAP5 locos. **Modification in Dimmer circuit of Headlight of 3 Phase Locos** by replacing 47 ohm/250V resistance with 10 ohm/250V to improve visibility of Headlight done by ELS/BRC **First on IR.**
BENEFITS : This modification helps in better visibility of head light in dimmer condition. Thus safety improved.
- **MODIFICATION OF CBC LOCKING PIN IN LSB COACHES :**
Several Shatabdi & Doronto Loco Pilot had complained about CBC locking pin coming out & CBC opening on run due to LHB coaches Lateral & Vertical & H type tight coupler having spring under the CBC there is excessive vibration. ELS/BRCY has developed an additional locking arrangement is made to avert the opening of CBC on run. This arrangement helps in safety.
- **IN POSITION POLARIZED INDEX ANALYSIS OF AUX. MOTORS**
In Position P.I. analysis of Auxiliary Motors has been started with the help of P.I. measurement instrument & Laptop. By this measure, the condition of motor is by P.I. measurement. Earlier the P.I. analysis was done separately on the PC.
- **ON-THE-SPOT BALANCING OF AUXILIARY MOTORS BY PORTABLE BALANCER**
During the month In Position balancing of Auxiliary Motors has been started with the help of Portable Balancing Instrument. This helps in balancing of Impeller & Rotor in position during testing.
This reduces failure of Auxiliary motors on account of abnormal sound.
- **DEVELOPMENT CARBON BRUSH BEDDING JIGS :**
 - a) In existing system Traction Motor has to be run on NO LOAD testing for 16 hrs for ensuring bedding of carbon brushes.
 - b) A carbon brush bedding Jig has been developed for pre bedding of Carbon Brushes of HA & TAO types Traction Motor.
 - c) This facilitates to reduce the testing time about 4 hrs. and achieving 100% C/Brush bedding before putting TM in service thus TM flashing on line reduced.
 - d) The NO LOAD testing time of Traction Motor reduced from 16 hrs to 4 Hrs i.e. 75 % time & energy saving.

3.7 Accident prevention measures :

- There has been no case of accident on Electric loco, EMU/MEMU & crew account.
- There has been no case of fire on Electric Loco, EMU & MEMU.
- In order to improve safety awareness of staff of electrical department 'Safety Seminars were organized at HQ /Divisional/Sheds. This has proved to be highly useful and extremely informative for staff, supervisors and Officers of the department.
- **No crew overdue** for Technical / Transportation refresher courses and PME.

3.8 Safety drives :

Safety drive advised by Railway Board & CSO/WR from time to time during the year 2012-13 have been complied. Special emphasis was given on counseling & improving the knowledge of Crew for train operation. Loco Pilots were counseled for strictly ensuring the provisions of G&SR making NO COMPROMISE WITH SAFETY. In the year following subjects were covered during the safety drives:

- Working of Trains in Automatic Signaling Territory.
- Train operation during FOG in Automatic Signal Territory & Absolute Block System Territory.
- Prevention of accidents at Manned & Unmanned level crossing gates, whistling continuously while passing Manned & Unmanned Level crossing Gates.
- 'Not to leave Loco / MEMU / EMU un-manned while on duty.
- Prevention of Accidents on Crew Account.
- The importance of taking proper rest before signing ON duty. Vigilance of engine crew in respect of observing & calling out aspect of signals loudly & clearly.
- Alertness of ALPs, LPs, Guards in wee hours of morning.
- Unusual incidences of SPAD in which accidents have been averted.
- Breathalyzer test of Loco Pilot/Asstt. Loco Pilot & Guards while Signing ON & OFF duties in the crew booking lobbies.
- Brake feel & continuity test on train by Loco Pilot.
- Inspection of Asstt. loco Pilots after passing neutral section.
- Ensure use of Walkie Talkie Sets for strictly emergency communication only.
- Prohibiting the use of mobile phone during run.
- Use of PVEF paddle switch by Electric loco pilots.
- Prevention of Rolling down of load.
- Precautions to be taken during reversal of locos specially in Goods trains
- Prevention of Fire in Pantry Car
- Safety Drive for taking precautions/Action to prevent tree falling on the track due to wind storms etc.

- Safety Drive to observe one day as the International Level crossing Awareness Day
- To check the train formation strictly as per rule before taking charge of the train.
- Prevention of fire on loco & coaches. Special emphasis was given on availability of Fire Extinguishers & Loco pilots were counseled for knowledge of handling fire extinguishers. Special checks were also carried out for electrical wiring/fitting deficiencies, proper function of protection relays and hot axle.
- Winter preparedness drive
- Monitoring of working of Vigilance Control Device Equipped loco & counseling loco pilots in case of non functioning of VCD.
- Counseling loco pilots in case of non functioning of MBFDS Equipped loco
- Drive for summer and monsoon preparedness.
- Proper functioning of sanders on electric loco.
- Proper functioning of air dryer on Electrical loco.
- For undertaking essential measures to prevent wheel skidding on electric locomotives / rolling stock and action to be taken on notching wheel skidding.
- For checking of under frame fixture.
- Checking for integrity of Head stock, cattle Guard and availability of Nuts & Bolts on all electric locos.
- For checking equalizing beam cotter pin.
- Joint checking of pantograph on electric locos & MEMUS in shed/Trip sheds jointly with TRD staff for its integrity & various critical parameters.
- Intensive Drive for checking Full rake under gear components including screw coupling of coaching stock and Intensive Drive for checking "Fitness of locos for Safe running"
- Drive for checking the arrangement of under slung equipments in EMU/MEMU stock
- For taking necessary precautions during Monsoon season to prevent accidents due to Cyclonic storm, Heavy Rains, Landslides etc.
- To ensure that contractors are following safety precaution at work site.
- JPO for use of CUG/Personal Mobile Telephones by Loco Pilots/ALPs/Motormen & Guards.
- Incidences of Signal Passing at Danger (SPAD) - 12 point action plan
- Summer & Monsoon preparedness drive
- Special Drive for Fire prevention measures on three phase Electric Locomotives.
- Safety drive for ultrasonic testing of electric loco axles

Other measures:

- As per the recommendations of RSRC, to enhance safety, VCD, Dynamic Braking Resistors (DBR), Microprocessor based Speed Cum Energy Meters and Air Dryers have been provided on all W.Rly. based electric locomotives.
- It is also ensured that locomotives are turned out from shed with 100% complement of safety equipments such as speedometers, flasher lights, headlights & fire extinguishers etc.

- In addition, various laboratory tests on vital safety items such as, ultrasonic testing of axles and traction motors armature shafts, Red Dye Penetrant Tests of pins & bushes provided on the bogies and brake rigging and magna-flux testing of loco couplings is being carried out during schedule inspections & overhauls.
- To upgrade the knowledge of running staff with respect to rules and regulations concerning safety in train operation and also to sustain safety awareness amongst them, PC based "Self – Evaluation software" viz. "Gyan Kasauti" developed and installed in the Loco Pilot lobbies, is being regularly used. Additional modules covering questionnaires on automatic signaling system, trouble shooting of 3 phase electric locos, microprocessor based locomotives & SI unit has also been included.
- Scheme of provision of subsidized meal/food to the running staff in the running rooms as per the guidelines issued by Rly Board vide letter No. 2006/M (L)/467/2 dt. 24.02.10 has been implemented in all running rooms under the control of Sr.DEE(TRO)s (RTM, UJN, IND, BCT, BSR, BL, UDN, NDB, BRCP & BRCY) except GDA which is targeted to be provided on 30.08.13..

3.9 Other Highlights & Operating Performance -

- FRPCPM on ownership basis of electric loco failures in **1.6 which is the BEST on Indian Railway.**
- FRPCPM on ownership basis for incidences affecting punctuality is **2.6 which is Second Best on Indian Railway** holding three phase and coaching locomotive.
- Reduction in stalling of Goods Trains hauled by Electric Loco is **40.9% which is BEST EVER.**
- No. of Mail/Express trains lost per 100 Locos on territorial basis has **reduced by 1.6% respectively which is BEST EVER.**
- Electric Loco outage for goods train is **14% more than target.**
- **Working Training Console** having all feature of conventional loco, SI and VCD have been developed at BL Lobby **to impart hand on training first time.**
- WR has undertaken first time **assembly of new WAG7 locomotives and 7 WAG7** locos after assembly have been turned out from DHD Workshop.
- **BRC & GDA lobbies have been provided with** BIO-metric based BA Test linked with CMS which is being extended to all lobbies.
- **ISO 9001 Certification for Running Room at BL, UDN, BRCY, GDA, RTM, UJN & IND** of Electrical Department have been awarded.
- **Four new MEMU train services** between DHD-ANND-DHD and GNC-ANND-GNC were inaugurated **by MOSR on date 01.10.2012.**

- **Documentary film on working of Loco pilots of Train have been developed in ZETC/BRC to explain importance of rest to show family members of crew to understand and realize importance of Rest.**
- **Crew friendly lobbies- (Improvement in Crew Rest) Crew friendly lobbies concept have been introduced on WR which is First on IR at BRCY & GDA lobbies now extended to all lobbies of WR.**
- **Territorial and ownership holding of Electric locomotive has increased by 3.1% and 3.8% respectively over last year.**
- **Utilization of Coaching Locos has gone up from 530 KM to 690 KM which is BEST EVER.**
- **Operation of Coaching Train have increased by 52 trains over last year hauled by Electric Loco which is BEST EVER.**
- **Utilization (FOIS) of Goods Locos has increased to 580 KM during March 2013, which is BEST EVER.**
- **Electronic Lab has been set up in ELS/BRC for 3 Phase Loco Maintenance.**
- **Out of 170 WAG5 Loco of W.Rly, 142 WAG5 are in MU operation, which is HIGHEST EVER.**
- **2013-14 is decided as 'SAHAYAK CHALAK VARSH' to improve their safety skills on Trouble shooting and safety.**
- **15 Nos WAP5 Electric locomotives are homed in Electric loco shed, Vadodara first time and their maintenance, infrastructure and training to staff are developed successfully.**
- **100% use of CMS has resulted in 18% reduction in OT hours and Improved to periodical rest to 4.0**
- **New concept of "HANDS ON TRAINING" is started in ZETC/BRC and Trip shed of ADI, BL RTM & BRC to develop confidence of LPs during driving of locomotive.**
- **ZETC /BRCY have developed audio visual training modules for imparting training of coach isolation and Hand brake Operation for running staff.**

3.10 National Energy Conservation

During current year 2012-13 SEC has been achieved as **6.13 KWH/1000GTKM** against **6.02 KWH/1000 GTKM** achieved during previous year 2011-12.

Energy conservation has been taken up as a mission area by Western Railway. To promote awareness on energy conservation among staff and

general public, continuous efforts are being made. Some of the initiatives taken by Western railway for energy conservation are as under -

- Providing of Energy cum speed monitoring system (ESMONS) in all electric locomotives.
- Benchmarking of energy consumption for various sections based on trials & monitoring Loco Pilot wise energy consumption by downloading data from ESMONS.
- Regular counseling of Loco Pilots to observe various energy conservation measures such as observing maximum coasting, switching off the blowers during longer halts, ensuring complete release of load brakes before starting etc were initiated.