

•Magnetic Particle inspection :-

1. Magnetic particle inspection is based on magnetism.
2. It is a Magnaflux leakage testing
3. if we place a ferromagnetic material in magnetic field it is attracted towards pole of magnet
4. If we apply ferromagnetic particle On the surface particle will be attracted to their crack it will be visible indication of defect
5. Steps :-
 - a. cleaning
 - b. magnetization
 - c. application of magnetic particles
 - d. inspection
 - e. demagnetization

COMPONENTS OF AIR BRAKE SYSTEM

- 1.Brake pipe and feed pipe (twin pipe system for coaching stock, single pipe system for goods stock).
- 2.Air brake cylinder
- 3.Distributor Valve.
- 4.Passenger Emergency Alarm Signal Device.
- 5.Passenger Emergency Valve.
- 6.Guard's Emergency Valve.
- 7.Slack Adjuster.
- 8.Hose coupling for brake pipe and feed pipe.
9. Auxiliary reservoir 100 lit capacity for Wagons & 200 Lit for Coaching Stock.
10. Cut off Angle cock.
11. Check valve with choke.
- 12.Dirt collector.

MAIN FUNCTIONS OF DISTRIBUTOR VALVE

1. Charges the system to regime pressure
2. Helps in all types of brake application:Graduated, full service as well as emergency type.
3. Helps in brake release: Graduated as well as manual.
4. Controls the brake application & release time: As per service conditions.
5. Limits max. designed BC pressure.

6. Accelerates propagation of initial reduction of BP pressure throughout the length of the train
7. Protects overcharging of CR up to some extent
8. Facilitates to isolate the system if required,
9. Complete system can be evacuated manually

• **WSP :-**

1. It is a wheel slide protection device
2. WSP is used for high speed train and where insufficient adhesion
3. It simply works as a BC pressure regulation device
4. It works during brake application
5. Its major components are speed sensor, dump valve, pressure switch, motherboard and phonic wheel
6. Used in LHB coaches

• **LHB bogie superior to ICF bogie :-**

1. Higher carrying capacity- these coaches are about two meter longer than ICF coaches. This extra length means two additional rows of chairs in chair cars or one additional row in sleeper coaches.
 2. Better pay to tare ratio- LHB coaches shall weigh approximately 40.3 tonnes. This weight is less than ICF coaches even with 2 meter extra length.
 3. Low corrosion- there shall be low corrosion on LHB coaches due to extreme usage of stainless steel, better design and manufacturing techniques.
 4. Low maintenance- Replacement or removal of sub-system shall be required only after one million kilometres. There are no door handles projecting outside the coach and mechanized car washing is facilitated.
 5. LHB coaches have authentically superior interior with GRP panels for side wall and roof panelling. They can be removed easily for maintenance, resist water seepage and are wear resistance.
 6. There are no visible screws inside the passenger compartments.
 7. Higher passenger comfort- Ride index of 2.5 (not exceeding 2.75) has been specified.
 8. LHB coach offers better passenger safety due to use of fire retardant material for furnishing.
- Provision of emergency openable windows.
 - Centre buffer couplers, vertically interlocked.
 - Visible doors have thermal locking.

• CLW Pattern (chitranjan Locomotive works) :-

1. It is individual based incentive scheme.
2. group attendance will not affect the incentive of individual.
3. Once the outturn is dispatched from shop there is no provision for deduction of incentive for the bad workmanship.
4. Minimum bonus earning is at 33 1/3%.
5. Max permissible bonus limit is 50%.

Tirupati pattern:-

1. It is Group based incentive scheme.
2. Group attendance will affect the individual incentive.
3. Quality linkage factors are taken into consideration and they affect the outturn.
4. Minimum bonus earning at 20%.
5. Maximum permissible Bonus limit 50%.

•Auxiliary generator :-

- 1.It is a DC generator
2. it supplies current for batteries charging on loco
3. it supplies current for piston fuel pump relay lighting
- 4.Driven by camshaft at three times of engine speed.
- 5.It supply AC power to rectifier in the battery charging system. Then it is converted into 74V DC for companion alternator excitation control system & locomotive battery charging.
6. It also supplies DC power to Fuel p/p motor, TSC lube oil P/P motor, Battery charging,locomotive lighting etc.

•Pneumatic system :-

1. Working fluid used in air
2. the operation is noisy
3. air compressor is necessary
4. no return lines are required
5. very high speed
6. overall cost is low
7. pressure is low, flow velocity is high
8. it is safe in this case

•Hydraulic system :-

1. Working fluid used is oil
2. the operation is quiet
3. to pressurized the oil pump is necessary
4. It requires return lines
5. speed is low
6. overall cost is high
7. pressure is high flow velocity is low
8. There is possibilities of fire hazard when working with high temperature

• Soak Back Oil System :-

1. Ensure lubrication of the turbosupercharger bearing prior to engine start.
2. Remove residual heat from the turbo after engine shutdown.
3. A separate lube oil pressure source is provided, this pressure system is controlled automatically by the locomotive control system.
4. An AC electric motor driven pump is used to draw lube oil from oil pan, pumps the oil through soak back filter and head of the turbo charger oil filter assembly directly into the turbocharger bearing area.

• Silent feature of GE Locomotive WDG4G :-

1. Model -GEVO 12, 12 cylinder, V-type, 4 stroke engine .
2. Max tractive effort- 544KN
3. AC-AC transmission system
4. 6 Nos. – 3 phase AC Traction Motor.
5. Electronic Air brake system
6. Air to air charge air cooler arrangement.
7. Blended brake facility
8. 2 driver cab (WDG4G),4 TCD (Thin Client Display) per cab.
9. Event recorder with 90 days memory storage capacity
10. Parking brake facility at 1,5,8,12 number wheel.
11. High adhesion fabricated bogie.
12. APU available in radiator cab.
13. Roof mounted Radiator core cooled by Ac Motor driven R/fan.
14. AC motor driven Screw Air Compressor.

UST-

Principle- Ultrasonic Testing Uses high frequency sound energy to conduct examinations & make measurements for flaw detection, Dimensional measurements.

- There are three basic techniques applied for UST Recommended by RDSO :-
 1. FE scanning/straight beam technique (using normal Probe):- Through scanning of whole length of the axle. Mandatory for all type of axles.
 2. NELA (scanning from axle end & in to the nearer wheel seat using angular probe lower than 20°)- Mandatory for B, C & D type of axles
 3. HA (scanning across the diameter using angular probe with an angle Higher than 35°). Mandatory where indicated by RDSO & confirmatory for the findings in FE & NELA. An additional technique i.e.TD. (using normal probe). Not mandatory in any case. Confirmatory technique in case of doubt.

•REMMLOT - Remote monitoring and management of locomotive and Train.

SCR - Silicon Control Rectifier.

ACCR - Armature current control Reactor

OPS- oil pressure switch

EPD - Engine Protection device

OSTA - Over speed trip Assembly

BAIT-

COIS - Coaching operation Information system

LCC

MCDO=

DLSC = Diesel Loco Service center

FOIS - freight operation Information System

CTRB – Cartridge taper roller bearing

- **Merits of MCBG :-**

1. Control of engine RPM without hunting.
2. Online fault diagnostics and fault message display.
3. Mechanical OSTA test facility.
4. Electrical OST test facility.
5. Independent notch wise engine rpm setting.
6. Fail safe shutdown of engine in case of power failure and any major malfunction of eqpt.

- **Main features of S-Trap Design are followings :-**

1. Complete elimination of foot paddle, Ball valve, P-trap and flexible rubber hose connector from tank unit.
2. In place of existing 60 mm diameter P-trap, a „S“ band of 100 mm diameter(ID) is directly coupled to commode pan thus increasing flow area and streamline the waste flow into Bio-Toilet tank.
3. First chamber is increased with available space of fourth chamber to increase volume and to accommodate „S“ band.
4. The material of S-Trap is poly ethyl vinyl Ester.
5. S-Trap wall thickness is 3.5 + 0.5 mm.
6. The S-Trap is seamless pipe of above material.

- **Technical requirements of chlorine tablet :-**

1. The tablet size should be 78 mm diameter and weight should be of approximately 200 g.
2. The tablet should have active molecule of 3, 5 di-chloro-iso-cyanuric-acid.
3. It should have effective chlorine of = 50% chlorine.
4. The tablet should have formulated for sustained release (should last for at least 21 days in tap water).
5. Moisture content should be = 4%.
6. the tablet should be stable during storage for at least one year.

- **Galvanic corrosion :-**

1. It is also known as bimetallic corrosion, is an electrochemical process whereby one metal corrodes in preference to another metal that it is in contact with through an electrolyte.
2. Galvanic corrosion occurs when two dissimilar metals are immersed in a conductive solution and are electrically connected. One metal (the cathode) is protected, whilst the other (the anode) is corroded. The rate of attack on the anode is accelerated, compared to the rate when the metal is uncoupled.

- **Galvanic corrosion can be prevented by:**

1. Selecting materials with similar corrosion potentials.
2. Breaking the electrical connection by insulating the two metals from each other.
3. Applying coatings to both materials. The coating on the cathode is the most important and must be in good condition, otherwise the galvanic corrosion could be worsened.
4. Separating the two materials by inserting a suitably sized spacer.
5. Installing a sacrificial anode that is anodic to both metals.
6. Adding corrosion inhibitor to the environment.

- **Pitting corrosion :-**

1. It is a localised form of corrosion by which cavities or “holes” are produced in the material.
2. Pitting is considered to be more dangerous than uniform corrosion damage because it is more difficult to detect, predict and design against. Corrosion products often cover the pits.
3. A small, narrow pit with minimal overall metal loss can lead to the failure of an entire engineering system.
4. Pitting corrosion, which, for example, is almost a common denominator of all types of localised corrosion attack, may assume different shapes.
5. Pitting corrosion can produce pits with their mouth open (uncovered) or covered with a semi-permeable membrane of corrosion products. Pits can be either hemispherical or cup-shaped.

- **BOXNHA :-**

1. It is a type of Open wagon of high axle load
2. Design in 2001 for transportation of coal and iron ore

3. axle load of 22.1t
4. bogie -IRF 108HS
5. Its height is more than BOXN
6. Speed at 20.32t and 22.1t axle load 90/80 kmph & at 22.2t axle load 60/65 kmph
7. Tare weight – 23.17