

ORGANIZATION FOR MAINTENANCE OF ROLLING STOCK

1. INTRODUCTION

The maintenance system for rolling stock requires a proper organization for its smooth functioning. This organization is provided by the mechanical department of Indian Railways. The various posts, their control, direction and inter dependencies are clearly defined in the organization chart. The organization coordinates with other departments at various levels of field, units, divisions, zones and railway board.

2. ROLES AND HIERARCHICAL STRUCTURE OF MECHANICAL DEPARTMENT

One of the roles of mechanical department is to provide maintenance system to Railways for upkeep of various rolling stocks. Under this role, maintenance organizations and infrastructure have been created at different levels. The field level has sick lines and satellite sheds, followed by depots and sheds and finally heavy repairs workshops with adequate facilities and capacities.

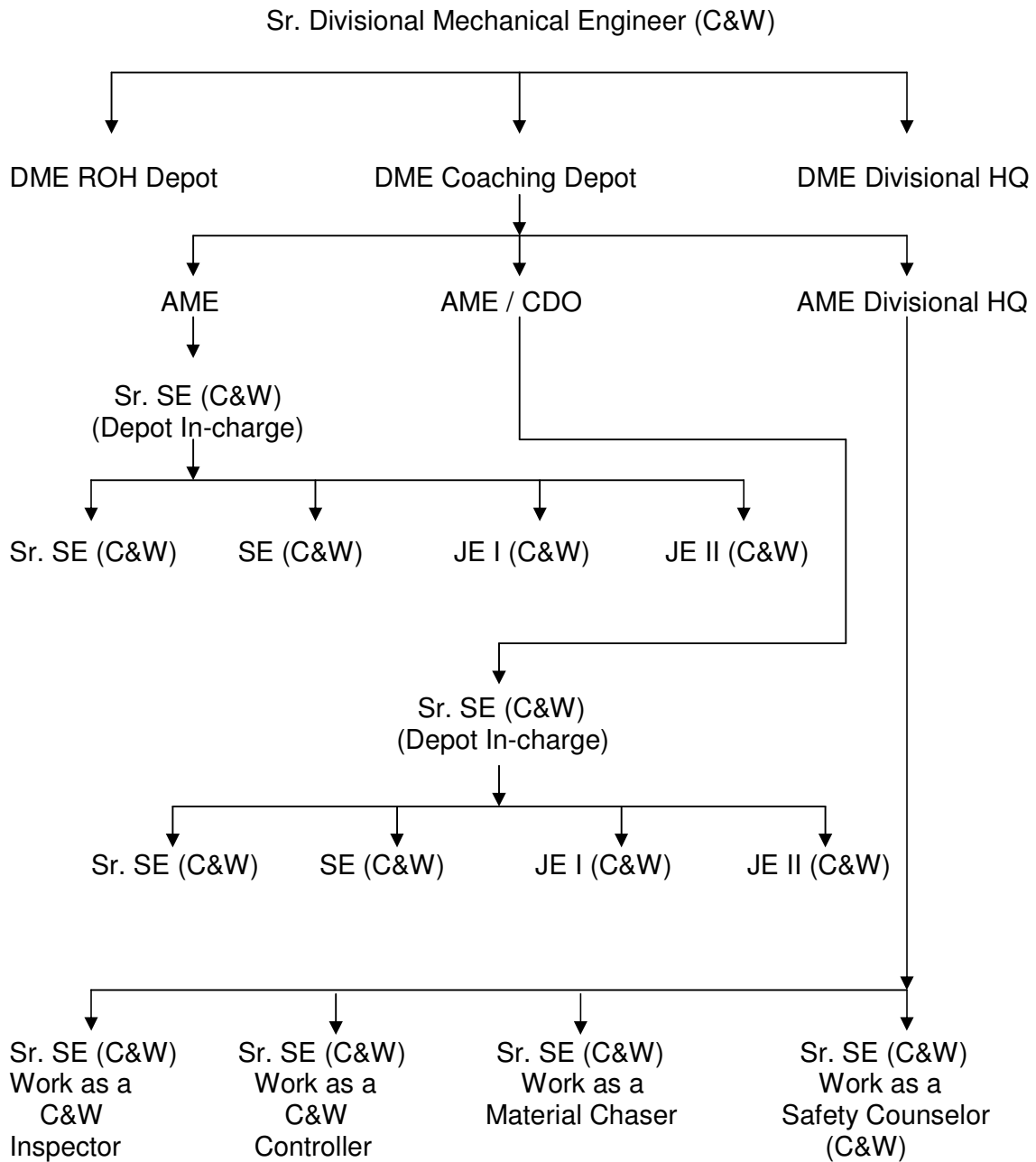
Mechanical department like other department has a hierarchical structure with a distinct cadre for office – IRSME – a cadre for supervisors and artisans. The man power rises in skill from helper to technicians of grade III to I. supervisors have four grades. Officer's ranks rise from junior scale, senior scale, JAG, SG, SAG to HAG (PHOD), which is Chief Mechanical Engineer. The mechanical engineering department is headed by member mechanical, assisted by additional members in railway board, the apex body of Indian Railways.

3. FUNCTIONS OF MECHANICAL DEPARTMENT

- Production of rolling stocks in production units (PU's)
- Heavy repairs to rolling stocks in workshops
- Regular maintenance in divisional and zonal setup
- Participate in safety and disaster management in division and zones.
- Running of rolling stock depots and sheds, coaching depots, ROH depots, Diesel sheds etc.
- Running of trains by skilled train driver and assistants
- Liaison with other departments for smooth operations
- Management of fuel supply, storage, distribution and accountal
- Training at various levels in BTC's, STC's and IRIMEE

4. ORGANIZATION OF MECHANICAL DEPARTMENT AT DIVISIONAL LEVEL

Organizational setup of mechanical officer's and supervisor's of C&W wing in a division.



4. RESPONSIBILITIES AND FUNCTIONS OF VARIOUS POSTS AT DIVISION LEVEL

A. Senior Divisional Mechanical Engineer (SR. DME)

He is overall in-charge at divisional level. He reports to chief mechanical engineer at zonal level and in division he reports to divisional railway manager (DRM). Thus there is a dual control. He distributes the maintenance work of division between different officers and supervisors. He plans new depots and facilities depending upon traffic requirements of rolling stocks. He ensures proper budget for various activities and plans deployment of staff. The training of technicians to upgrade their skills is very important. The material planning for maintenance is another crucial function. He coordinates with other departments for smooth operations.

B. Divisional Mechanical Engineer (DME)

He may be independent branch officer looking after diesel shed, power operations or freight or else may be directly reporting to Sr. DME. As BO, he is responsible for smooth operation for shed/depot or freight operations under him. If he is assisting Sr. DME, then works and responsibilities as laid down have to be looked after by him. Most large coaching depots and ROH depots are looked after by DME's, designated as coaching depot officers (CDO).

C. Assistant Divisional Mechanical Engineer (ADME)

He assists Sr. DME and DME's. There are 2 or 3 ADMEs in division for coaching, wagon maintenance, crew management, loco power operations etc. Many coaching depots and ROH depots are headed ADMEs.

D. Senior Section Engineer (SSE)

He is senior most Supervisor. He may be heading coaching and wagon depots or directly assisting Sr. DME and ADMEs in divisional office. There are about 15 to 30 SSE's in a division depending upon nature of operations in a particular division. Important SSE's nomination work wise are –Chief power Controller, Chief Crew Controller, C&W superintendent, Foreman/ART, Chief C&W Controller, SSE/Materials, SSE/Planning, SSE/HQ, Chief Loco Inspector, Chief Fuel Inspector etc.

A maintenance Engineer is not only responsible for the maintenance of discipline, keeping the morale of the staff at a high level, but he is also required to organize the execution of the technical details of work and to ensure that the required tools and raw materials are made available. He has to ensure that quality standards are maintained and should be cost conscious to cut down the expenditure to the minimum.

VARIOUS TYPES OF ROLLING STOCKS:

- ✓ LOCOMOTIVES
- ✓ COACHES
- ✓ WAGONS
- ✓ EMU/MEMU
- ✓ DEMU

Basic components of Rolling Stock

1. Under Frame : Made out of steel members of channel, Angle or required section. These members are joined together by riveting or welding, capable to accommodate all other components and to withstand the load and other forces acting on it while on the run.

2. Running Gear : Consists of pair of wheels connected firmly by an axle with a provision for a bearing at both ends and its housing and guide arrangements. Cartridge bearings are used of late which are more reliable and require no lubrication.

3. Spring Gear : Cushioning arrangements between the Wheel (Axle) and the body of the Rolling Stock to absorb the vertical shocks coming to the wheel while

on the run due to unevenness in the track and also to transmit the load vertically from body to Axle. There are laminated bearing springs (Self damping) and coil spring with separate damping arrangements (Shock absorbers) used in rolling stock. The spring arrangement in a Rolling stock is generally called as suspension

system. In case of Goods stock only one suspension is provided – Primary or Secondary. In case of coaching stock both primary and secondary suspensions are provided to give more comfortable ride.

4. Draw Gear : An arrangement provided in the Rolling Stock at its both ends at the centre to couple several rolling stock together and to make a string of such Rolling Stock in a formation and to haul the formation as one unit by the Train Engine draw gear arrangement is provided. A drawbar hook with a set of screw coupling and straight “U” shackles and coupling screw rod, two drawbar with springs and cotter are assembled at both ends of the rolling stock at its centre. The “U” shackle of the screw coupling is put on to the hook of the adjacent wagon or coach and tightened with the screw rod thereby transmitting the draft force to the rear through the under frame members. To haul heavy loads we have developed high capacity draw gear – Centre Buffer Coupler (CBC) It is important that the draw gear arrangement permits gradual increase of draft force to the locomotive while starting the train from the stabled position and transmitting the draft at the time of acceleration of the locomotive to attain higher speeds.

5. Buffing Gear : To absorb the linear forces coming into the Rolling Stock while on run and during shunting, buffers are provided at the end body at both sides. This consists of two buffer casing fitted at headstock at sides and a plunger with a coil spring or hard rubber pads inside is assembled into this casings and secured. The buffer plunger projecting at the ends will come in contact with the adjacent rolling stock and will absorb the linear shocks coming to the headstock while on run and during shunting thereby protecting the under frame and body from heavy shock. In the advanced Rolling stock the draw gear and buffing gear are combined together and made as one unit which is called as Centre Buffer Coupler (CBC) which is provided at the headstock at its centre. It serves both the purpose of draw gear and buffing gear. In case of MG a Centre Buffer Coupler with hook and yoke end known as ABC (Automatic Buffer Coupler) is used.

6. Brake gear : Brake gear is an arrangement to retard the momentum of a Rolling Stock. Brake gear applies a force on the rotating wheel thereby retarding the motion of a rolling stock. It comprises of pull rod, levers and links, brake beam and brake block. The force developed for brake application may be manual, vacuum system or by compressed air depending upon the type and design of brake system in the Rolling Stock.

7. Body and other Fittings: Over the under frame body is built according to the nature of utilization of the Rolling stock utilization – goods or passenger carrying etc. Floor, side body, end body and doors, securing arrangements for goods stock, and other items like seats, berths and amenity items like fan, lights, toilets, Air Conditioning and others are provided according to the requirements of rolling stock.

PRODUCTION OF ROLLING STOCK:

➤ LOCOMOTIVES

❖ DLW: It is manufacturing HHP Locos.

❖ DMW: Rebuilding of Diesel Locos after service life of 18 years is done here.

➤ COACHES

❖ ICF: Builds several types of coaches with low alloy corrosion resistant steel as per an integral anti telescopic design. Also manufactures for Kolkatta Metro, EMUs&DEMUs of various capacity.

❖ RCF: Manufacture of new LHB type coaches with stainless steel body, superior passenger amenities and higher speed and safety features using advanced manufacturing and design facilities, Equipped with robotic welding machines and a cluster of 70 CNC machines.

MAINTENANCE:

Various Schedules are

- Trip Schedule : After every trip
- Monthly Schedule: 1 month \pm 3 days
- Quarterly Schedule: 3 months \pm 7 days
- Half Yearly Schedule
- Yearly Schedule
- I O H
- P O H
- Special Schedule : As prescribed by each railway

- ❖ April 16, 1853: the first train runs in India signifying the beginning of modern industry.
- ❖ In the immediate aftermath, factories were set up to provide maintenance support and to assemble steam locomotives
- ❖ Ajmer Workshop manufactured the first steam locomotive of India in 1895
- ❖ By the end of 19th century, Railway workshops had grown into the finest manufacturing units of their time

IR has 6 established Production Units manufacturing more than 600 Diesel & Electric locos and more than 3000 coaches per year.

1. CHITTARANJAN LOCOMOTIVE WORKS:

- Indian Railway's first Production Unit established on November 1, 1950.
- Manufactured steam locomotives till 1972.
- Diesel Hydraulic locos were produced till 1993
- Electric loco manufacture commenced in 1961.
- Transfer of Technology contract signed with M/s Adtranz to turn out the first indigenously manufactured 3 phase 6000 HP locomotive in 1998.
- CLW now manufactures 5 types of passenger and freight loco variants ranging from 5000 HP to 6000 HP: WAG7, WAP4, WAP5, WAG9, WAP7.

2. DIESEL LOCOMOTIVE WORKS, Varanasi:

Shri Lal Bahadur Shastri, the then Prime Minister, flagged off the first locomotive from DLW on February 3, 1964. DLW started manufacture of diesel locomotives for main line as well as shunting services in both BG & MG variants, in technical collaboration with American Locomotive Company (ALCO).

First Locomotive of 2600 HP manufactured in 1964. This WDM2 locomotive of DLW had been the main workhorse of Indian Railways till the 1990s.

2600 HP locomotive was upgraded in-house, with minimal inputs, to 3100 HP variant in 1995 and then in-house to 3300 HP in 2003 with Microprocessor based control systems with indigenous effort.

First 4000 HP locomotive turned out in 1999 with Transfer of Technology from General Motors. It has Computer controlled brakes, Microprocessor based

control system etc. and are more reliable and efficient than older locomotives. WDP4 is fit to run at 160kmph.

4500 HP Locomotive Upgraded in-house from GTO to state-of-the-art IGBT based AC-AC Traction System. This is now the main product of DLW. BHEEM - a 5500 HP prototype freight loco WDG5 - the most powerful indigenously developed diesel loco - with state-of-the-art technology.

DLW has exported Locomotives to Angola, Bangladesh, Mali/Senegal, Malaysia, Mozambique, Myanmar, Sri Lanka, Sudan, Vietnam etc.,

3. Integral Coach Factory:

Set up at Perambur in 1955 in collaboration with Schlerien, Switzerland. ICF Builds several types of coaches with low alloy corrosion resistant steel as per an integral anti-telescopic design.

ICF manufactures Regular Passenger Coaches, Kolkata Metros, EMUs&DEMUs of various capacities.

LHB Coach Manufacture commenced in 2014-15. ICF turned out its first complete state-of-the-art LHB coach in September 2014.

Complete switch over to Production of Stainless Steel LHB main line coaches planned in the next 5 years. Facility set up to manufacture 300 LHB coaches per annum.

ICF exports passenger coaches to various countries like Vietnam, Zambia, Philippines, Taiwan, Angola, Mozambique, Bangladesh, Nigeria.

ICF won International “*Golden Green Award*” 2014 for sustainable green energy initiatives.

4. RAIL COACH FACTORY, Kapurthala:

RCF is set up in 1988. The most modern factory of Indian Railways of its time, developing latest designs of coaches.

RCF has advanced manufacturing and design facilities and is equipped with robotic welding machines and a cluster of 70 CNC machines.

Transfer of Technology with GE-ALSTOM – LHB Germany for manufacture of new LHB type coaches with stainless steel body, superior passenger amenities and higher speed and safety features.

RCF is Established to manufacture Indigenously built LHB Coaches fit to run at 160kmph that are upgradable to 200kmph.

5. DIESEL LOCO MODERNISATION WORKS, Patiala:

Set up in 1983 with World Bank aid as Diesel Component Works. Manufactures 200 high precision components and sub-assemblies for WDM-2 locomotives.

Midlife Rebuilding of Diesel Locomotives after a service life of 18 years started in 1989, is renamed as Diesel Loco Modernisation Works in 2003 to signify the modernisation of Diesel Locomotives being done. After Rebuilding loco is 'as good as new' with all latest modifications and incorporation of most recent technology.

DMW has also started manufacture of ALCO type locomotives in 2011-12.

6. RAIL WHEEL FACTORY, Bengaluru:

RWF is Set up at Yelahanka in 1984. A wheel cast every 2 minutes, an axle forged every 4 minutes. Only unit producing Wheels, Axles and W/Sets under same roof. Adopted the upward pressure pouring cast wheel technology.

Precision axle manufacture facility equipped with long forging machines with multiple hammers and high productivity axle machining centres, turning out about one lakh axles per year. RWF Manufactures about 2 lakh wheels per year for locos, coaches and wagons

ROLE OF C&W WORKSHOP:

Periodic Overhauling of Coaches and Wagons are carried out to ensure safe and timely operations are carried out maintaining punctuality and reliability in operation.

OBJECTIVES:

- To increase POH capacity of AC&Non AC coaches.
- To increase POH capacity of wagons
- To meet the increased outturn of 8-wheel wagon, since all the 4 wheeler wagons are likely to be phased.
- To attend IOH of coach Bogies

ORGANISATION: C&W Workshop is headed by Additional Member PU who also looks after the functioning of Production Units, Mechanical wing of RDSO&COFMOW.

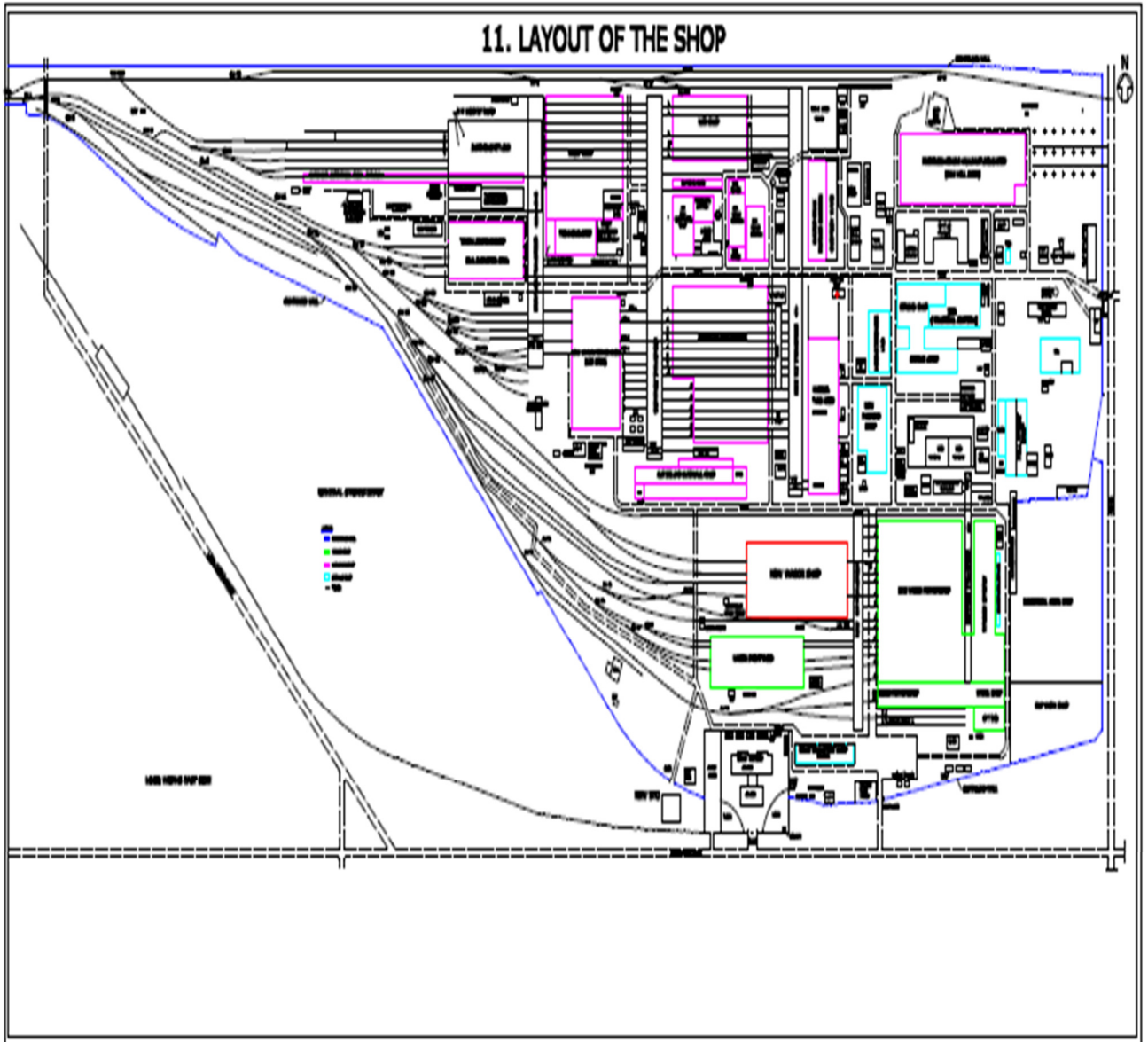
He is assisted by Advisor (HA Grade), Executive Directors (SA Grade), Directors (Selection Grade), Joint Directors (JA Grade), Deputy Directors (Junior Scale).

All Workshops in a Zone are headed by CWE. A Workshop is headed by CWM/DY.CME/WM/AWM depending upon *the size of the workshop*. Other department Officers in lower grades like Electrical, Stores, Accounts, etc. are placed under his administrative control.

- CWM :-Overall Incharge & CEO
- Dy.CME/C:- Incharge for entire coaching complex, Dy.CRA & Factory manager
- Dy.CME/W:- Incharge for entire Wagon complex, Spring shop, Training centre, MR&Factory manager

- Dy.CME/P:- Incharge for entire Service shop, Production shop&Factory manager
- Dy.CE/CW :- Incharge for entire Engineering Works
- Dy.CMM :- Incharge for entire Store complex,
- WM/C:- Incharge for entire coaching complex & assisting Dy.CME
- WM/Fur:- Incharge for entire Furnishing& Finishing in coaching. assisting Dy.CME
- WM/W:- Incharge for entire wagon complex assisting Dy.CME
- WPO:- Incharge for All Personnel Branch activities
- AWM-(FUR):- Incharge for coaching complex & assisting WM/ FUR
- APE:- Production Incharge & assisting Dy.CME/P
- ACMT:- Incharge for chemical & metallurgical testing
- AEN:- Incharge for civil works & Assisting Dy.CE

TYPICAL LAYOUT OF A C&W WORKSHOP:



- ❖ C.R. Shop
- Lift
- Bogie
- Wheel & Tyre

- HCR (OCV)
- HCR (PCV)
- Paint
- LCR
- Air brake
- Draw & buffing gear
- CRC
- Machine
- Water service
- Ancillary
- Finishing

❖ CB.SHOP

- Non-Ac Ocv Poh
- AC POH
- Saloons
- Glass Room

❖ WAGON SHOP:

- Body repairs
- Heavy Repairs
- Lift

- Bogie
- Machine
- Smithy & fabrication
- Spring shop
- Tank wagon
- Wheel turning
- CTRB
- CBC
- Air brake
- Wagon paint
- Finishing
- New Wagon shed

❖ SERVICE SHOPS:

- GC Shop
- RT shop
- New machine shop
- Stores
- Electrical maintenance

❖ ASSISTING WINGS:

- Planning
- Progress
- Accounts
- Personnel
- SRC
- RPF

- Engineering
- Canteen
- Time office

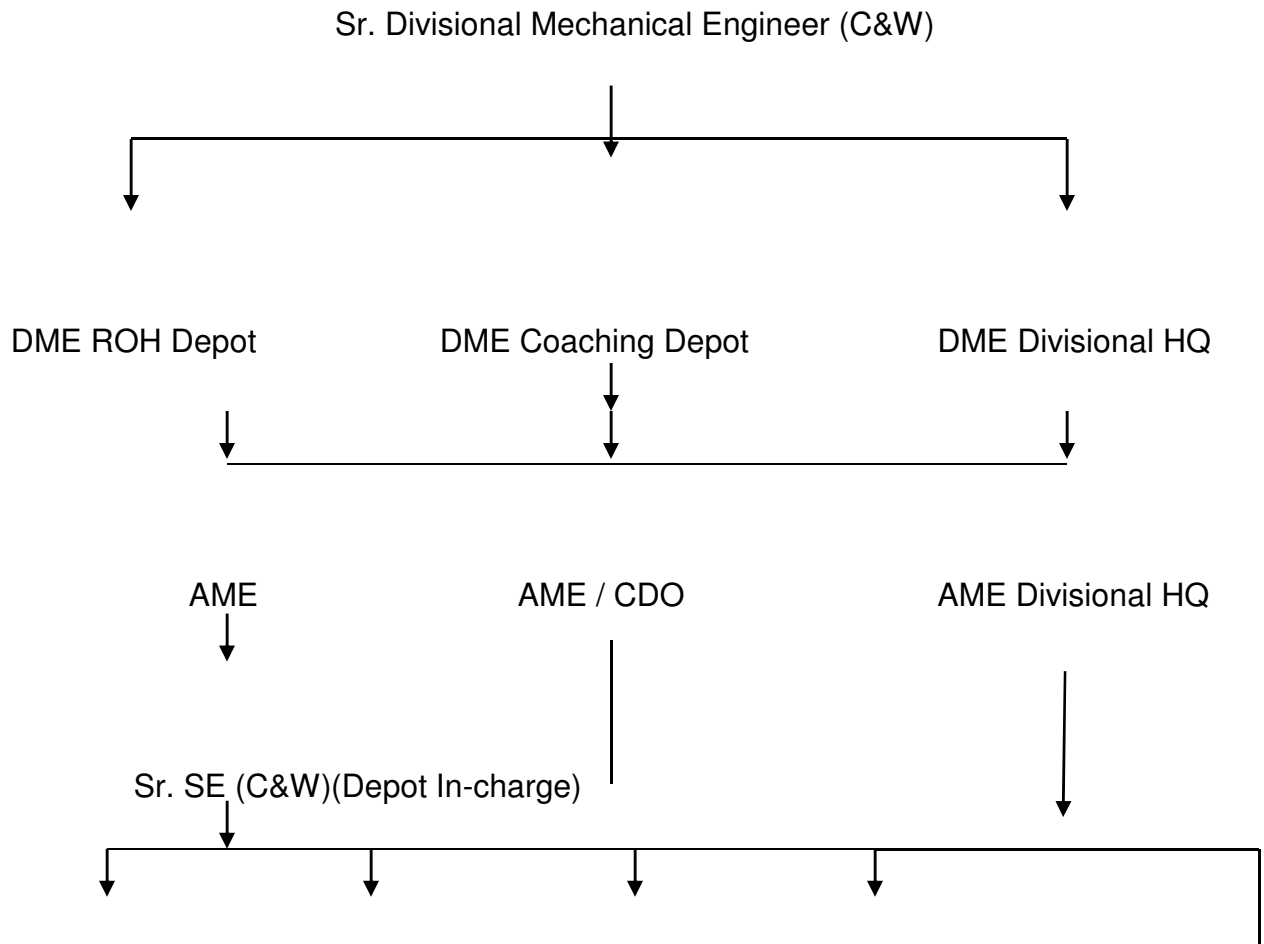
ROLL OF C&W DEPOT:

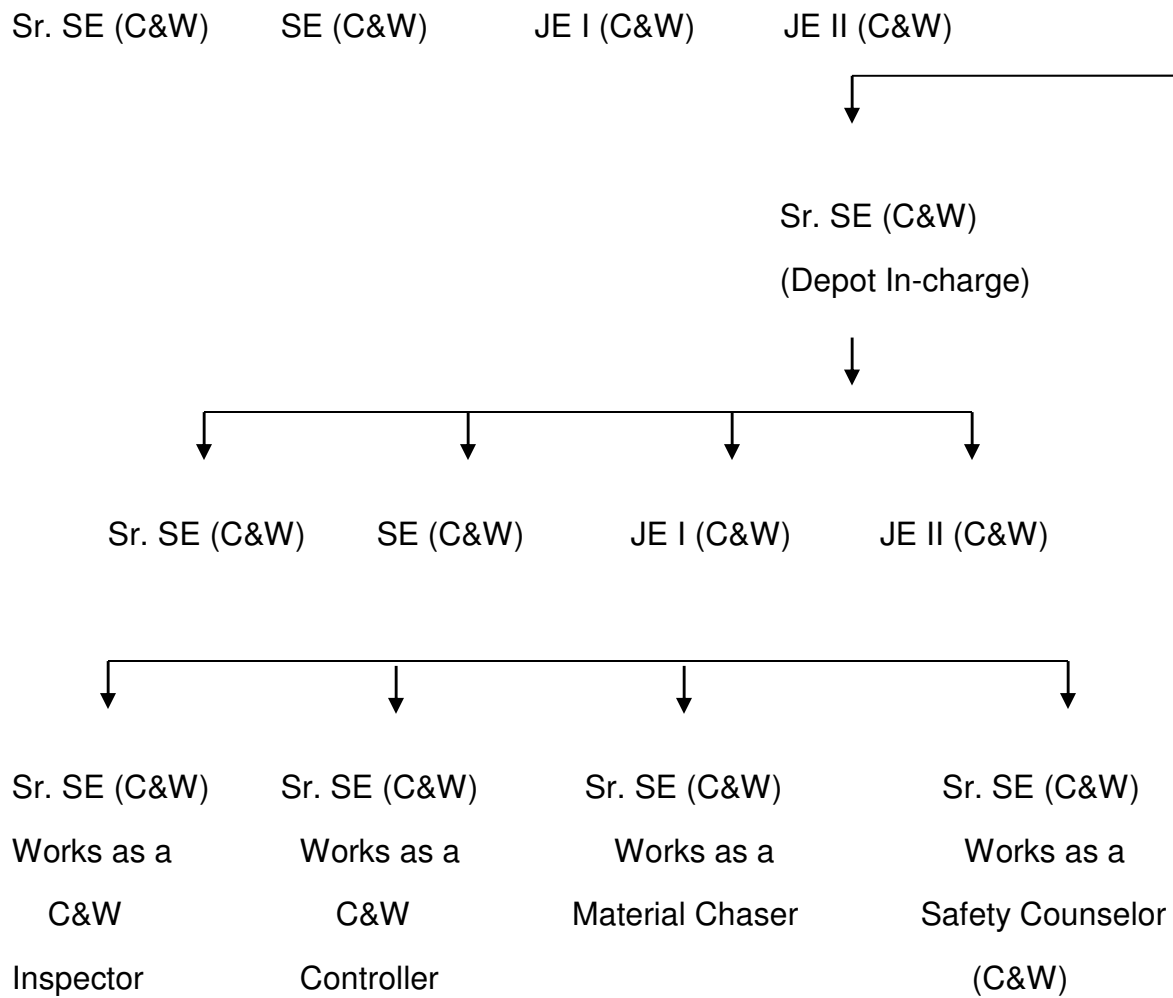
- To Carry out various Schedules of Maintenance
- Maintain Punctuality by assisting in Trouble Shooting while Vehicle is Online.
- Assisting in Accident Investigation
- To carry out I O H of Carriages and Wagons

OBJECTIVES: To carry out the maintenance of Carriages and Wagons with the available resources without violating Railway Board Regulations. To decrease detachment of vehicles en route.

ORGANISATION:

Organizational setup of mechanical officers and supervisors of C&W wing in a division.





LAYOUT:-

MAINTENANCE BAY:

- Covered shed
- Broad and obstacle free pathways
- Under pit pathway below the rake/track
- Ramp at both the sides to go from ground level to pathways

- Provision of stairs to go from ground level to pit pathway
- Provision of service rooms
- Provision of mobile lifting platform.
- Provision of compressed air pipe line
- Provision of in situ wheel changing system
- Provision of overhead light
- Provision of under pit light
- Provision of 11V,230V ,440V cables and sockets

WASHING AND WATERING BAY:

- Provision of Shed
- Provision of overhead light
- Provision of pathways each side.
- Provision of watering arrangement
- Provision of 230V supply.
- Provision of drain below the rake
- Provision of service rooms
- Provision of mechanized cleaning system
- Provision of waste removal system for vacuum toilets

MAINTENANCE SICK LINE:

- Provision of 30m long examination pit – one on each line
- Provision of EOT cranes

- Provision of wheel profile lathe
- Provision of bogie/coach lifting system-one for each line
- Provision of equipments like whiting jacks, Trestles, material carrier, fork lifter, hoist, bogie turn table.
- Provision of service rooms, store and vehicle parking space
- Provision of wheel parking
- Provision of covered shed
- Provisions of electrical fitting, light, fan etc and electric supply to all fixed and portable machines and equipments

MODERN EQUIPMENT AVAILABLE IN C&W DEPOT:

- Wheel Diagnostic System
- Mobile Lifting Platform
- Bogie/Car body lifting system
- Wheel changing system
- Waste removal system for Vacuum Toilets
- Automatic in motion Train Washing System

ACTIVITIES OF DIFFERENT SECTIONS

- Train entering into the coaching depot
- Outside train washing on automatic in motion coach washing plant
- Detection of wheel defect on wheel diagnostic system
- Positioning of Coach for wheel changing (if required) on the track bridge in maintenance bay
- Placement of rake on maintenance bay for
- complete maintenance and safety examination
- Pulling the rake in shunting neck

- Placement of rake on washing and watering apron for internal washing and watering
- Train going out of the coaching depot after complete maintenance

ROLE OF DIESEL SHEDS IN INDIAN RAILWAYS:

- Maintenance of Diesel Locomotives
- Maintain Punctuality by assisting in Trouble Shooting while Loco is Online.
- Assisting in Accident Investigation
- To carry out I O H of Diesel Locos

OBJECTIVES: To carry out the maintenance of Diesel Locos with the available resources without violating Railway Board Regulations. To increase the Shed Outage.

ORGANISATION: A Diesel Shed is controlled by Chief Mechanical Engineer (PHOD) at Zonal Level and by Divisional Railway Manager (SAG) at Divisional Level. It is headed by a Sr.DME (JAG)/DME (Sr Scale) at shed who is assisted by ADMES (Jr Scale) and SSEs and other supervisory staff.

A Diesel Shed is provided with the following in general :

1. Washing And Cleaning
 - Washing Apron & Pit
 - Provided With Concrete & Good Drainage
 - Suitable Hydrant Points & Adequate Supply Of Water
 - Automatic Washers With Mechanised Sprays, Brushes
 - Provision Of Boiler To Give Steam Jet
2. Fuel Supply Installation
 - Provision Of Fuel Oil Storage Tanks
 - Provision Fuelling Pionts
3. Lubricating Oil
 - Lube Oil Storage Tanks
 - Despensing System
4. Cooling Water For Locos
 - Treated Water Should Supply (D.M.Water Plant)
5. Repair Area
 - Generally Two Parts
 - D)Light Repair Bay (Up To Half Yaerly)
 - A)Mail Locos Repair Bay
 - B)Goods Section Repair Bay Including Quartly & Hyly

- ii) Heavy Repair Bay (With Overhauling Sections)
- Separate Areas Should Be Demarcated For Sub-Assembly Overhauling
- Dieseleines, Electrical Rotating M/C, Turbo,
- Express, Cooling Equipments & Radiators,
- Under Gearing Components,
- Speedometer And Millright Section

6. Shed Building

- Should Be Besides The Repair Area
- Batterycharging And Storage Room
- Instrument Repair And Testing Room
- Fuel Injection Repair And Testing Room
- Engine Governor Repair And Testing Room
- Brake Testing Room
- Flaw Detector Room (Magnetic And Zygl)
- Filter Storage
- Tool Room,
- Lockers & Washing Room
- Laboratory
- Booking Office
- Supervisors Office Room
- Shed officers Rooms
- Office Room And Recordroom
- Library
- Lecture /Meeting Room
- Fire Fighting Equipments
- Rpf Post
- Load Box Room
- Pit Wheel Lathe Area

7. Shed Stores

- Shed Store Should Have Approach By Rail As Well As Road
- Proper Bins And Racks Should Provided
- Adequate Lifting Facilities To Be Provide
- Special provision For Storage of rubber Components

8. Lifting And Material Handling Facilities

- Over Head Crans 40tons, 10tons & 3 Tons
- Heavy Duty High Lift Electrical Operated Jacks - 10
- Tram Beam 3 Ton Cranes – 6
- Forklift Truck – 2
- Plat Form Truck- 2
- Trolleys-04

9. Auxiliary Buildings

- Under Floor Wheel Lathe M/C
- Load Box Room
- Compressor Room

10. Illumination

- Fluorescent Light Or Mercury vapour Lamps (Min 200 Lux)
- On Pit Area Bulkhead Fittings should be Provided (Min 200 Lux)
- Low Voltage Plug Points Should be Provided

11. Laboratories

- Spectrograph For Lube Oil Testing
- Magnaflux Testing M/C
- Rubber Tensile Testing M/C
- Zygo Testing M/C
- Ultrasonic testing M/C

12. Cleaning And washing Of Components:

- Cleaning Of Components Immediately After Their Dismantling
- For Degreasing And Cleaning
- Should Provide Special Cleaning Plants With Spray Jet Type M/C

13. Training School:

- Theoretical And Practical training To Various Categories Of Staff

14. Staff Amenities:

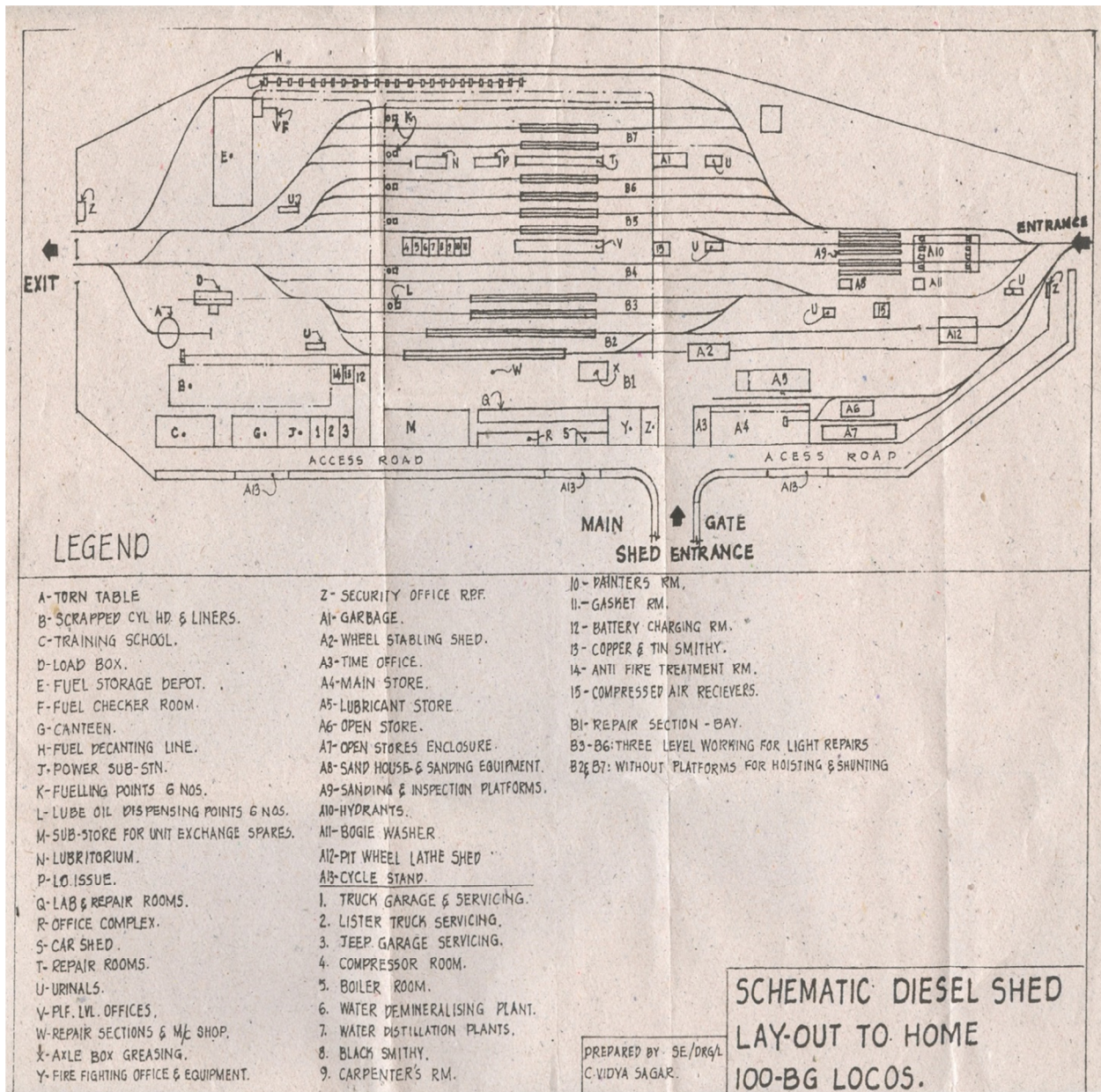
- Water Coolers Should be available At working Area
- Cleaning Agents Are Necessary Against Dermatitis
- Staff Lockers Room, Toilets

- Cycle & Scooter Stand
- Staff Canteen

15.Environment Friendly Equipments:

- Incenerators To Dispose Off Waste Material
- Effluent Treatment Plants (ETP)

DIESEL SHED LAYOUT:



RDSO-Research Designs and Standards Organisation:

- Railways were introduced in India in 1853
- To enforce standardization and co-ordination amongst various railway systems, the Indian Railway Conference Association(IRCA) was set up in 1903
- Followed by the Central Standards Office (CSO) in 1930, for preparation of designs, standards and specifications
- Till independence the designs and manufacture was entrusted to foreign consultants
- New organisation called Railway Testing and Research Centre (RTRC) was setup in 1952 at Lucknow
- CSO and RTRC were integrated into a single unit named Research Designs and Standards Organisation (RDSO) in 1957, under Ministry of Railways
- RDSO is headed by a Director General Assisted by Additional Director General, Sr. Executive Directors and Executive Directors, heading different directorates
- RDSO has various directorates for smooth functioning
- RDSO is the sole R&D organisation of Indian Railways
- RDSO functions as the technical advisor to Railway Board Zonal Railways and Production Units
- RDSO performs the following important functions

RDSO-FUNCTIONS:

- Development of new and improved designs
- Development, adoption, absorption of new technology for use on Indian Railways

- Development of standards for materials and products specially needed by Indian Railways
- Technical investigation, statutory clearances, testing and providing consultancy services
- Inspection of critical and safety items of rolling stock, locomotives , signaling & telecommunication equipment and track components.

IRIMEE -Indian Railways Institute of Mechanical & Electrical Engineering:

- Located at Jamalpur /Munger district / Bihar
- Started in 1905 as a technical school
- Came into national prominence from 1927 Special Class Railway Apprentices
- In 1974, the school was made a Centralised Training Institute (CTI)
- Renamed as IRIMEE- under direct control of Railway Board

Training activities at IRIMEE:

- For serving officers and supervisors of Mechanical Dept
- Senior Professional Development Programme for IRSME Officers
- Refresher course for IRSME Officers
- Integrated course for recently promoted group B officers.

Special courses-IRIMEE:

- Accident management

- Breakdown cranes
- New technologies
- Diesel loco reliability
- Diesel refresher courses

Short duration Interactive workshops/Seminars-IRIMEE:

- Seminar on Information Technology
- Incentive scheme
- GM loco manufacture
- ALCO loco modifications
- Maintenance of Wheels and Roller bearings etc.

RITES-Rail India Technical and Economic Service:

- Established in 1974 by the Government of India
- company's initial charter was to provide consultancy services in rail transport management to operators in India and abroad
- RITES has since diversified into planning and consulting services for other infrastructure, including airports, ports, highways and urban planning.
- Recently on-shore WDS6 Diesel Loco Leasing service has been introduced
- A multi-disciplinary consultancy organization in the fields of transport, infrastructure and related technologies
- It provides a comprehensive array of services under a single roof and believes in transfer of technology to client organizations
- In overseas projects, RITES actively pursues and develops links with local consultants , for maximum utilization of local resources and shares its expertise
- RITES is internationally recognized as a leading consultant

- operational experience of 62 countries
- Africa, South East Asia, Middle East and Latin America. Most of RITES foreign assignments are for National Governments and other apex organizations
- RITES employs over 2000 staff
- 1200 specialists of high professional standing in the fields of engineering, management and planning
- RITES also has on its panel a large number of experts, whose services can be drawn upon at short notice.
- This provides the company unmatched strength in meeting the needs of its clients worldwide.

IRCON-Indian Railway Construction Company Limited:

- An engineering and construction company
- Specialized in transport infrastructure
- The company was established in 1976, by the Government of India
- IRCON was wholly owned entity of the Ministry of Railways
- Its primary charter was the construction of railway projects in India and abroad
- The company has since diversified into other transport and infrastructure segments and with its expanded scope of operations around the world
- The name was changed to IRCON International Limited in October 1995.
- Well known for undertaking challenging infrastructure projects
- Especially in difficult terrains in India and abroad
- IRCON has completed over 300 major infrastructure projects in India

- over 100 major projects across the globe in more than 21 countries
- The core competence of the company in order of priority are - Railways, Highways and EHT Substation Engineering and construction
- IRCON is a turnkey construction company that is specialized in railways
 - New railway lines
 - Rehabilitation/conversion of existing lines
 - Station buildings and facilities
 - Bridges
 - Tunnels
 - Signaling and tele-communication
 - Railway electrification
 - wet leasing of locomotives
 - Highways
 - EHV sub-station (engineering, procurement and construction)
 - Metro rail

CONCOR- Container Corporation of India Ltd:

- A Navratna Public sector undertaking under the Indian Ministry of Railways
- Incorporated in March 1988 under the Companies Act
- CONCOR commenced operations in November 1989 taking over an existing network of seven inland container depots (ICDs) from Indian Railways
- It now has a network of 61 ICDs/CFSs (Container Freight Stations) throughout India

- Creating the need for flexible transport solutions
- Moving cargo 'seamlessly' through sea and land arteries
- Exporting or importing goods was arduous
- Goods needed to be transported by lorry to the port, unloaded into a warehouse and then reloaded into the ship 'piece by piece'
- Malcolm McLean's idea of containerization
- Mechanizing handling of container
- Reducing their handling
- Elimination of multiple handling
- Grew by leaps and bounds the world over
- It was this idea that saw the Indian Railways entering the market for moving door-to-door domestic cargo containers starting in 1966
- In 1981 that the first ISO container was moved inland by the Indian Railways to India's first Inland Container Depot (ICD) at Bangaluru
- Expansion of the network to 7 ICDs by 1988 saw increase in the handling of containers
- Need to set up a separate pro-active organization
- Container Corporation of India Ltd. (CONCOR), was incorporated in March 1988
- It is now an undisputed market leader having the largest network of 62 ICDs/CFSs in India
- Also expanded to cover management of Ports, air cargo complexes and establishing cold-chain
- The company developed multimodal logistics support

- Providing responsive, cost effective, efficient and reliable logistics solution to its customers

CAMTECH-Centre for Advanced Maintenance Technology:

- RB decided to set up an institute in 1987
- To undertake studies and evolve strategies for maintenance of all types of assets
- CAMTECH started functioning from 1991 at Gwalior
- Under the administrative control of Director General, RDSO
- Objectives
 - ❖ Upgrading maintenance Technologies & Methodologies
 - ❖ Achieve improvement in productivity and performance of all Railway assets and Manpower
- This covers reliability, availability, utilisation and efficiency

CAMTECH-MAIN ACTIVITIES:

- Organizing seminars on technical subjects for officers and supervisors of zonal Railways
- Preparation of maintenance manuals and handbooks for maintenance staff
- Standardization of infrastructure facilities for coaching depots, freight yards and diesel/electric locomotives
- Preparation of technical pamphlet on various subjects
- Preparation of training video films

INFRASTRUCTURE & CAPABILITIES

- A LARGE 16 Hectares campus

- Conference/Seminar hall with PA system
- Classrooms for Training
- Computer centre
- Audio/visual training aids
- Hostel for visiting officials
- Recreation room and sports facilities
- Tieup with visiting faculty
- Liaison with reputed research/academic organization

CRIS-Centre for Railway Information Systems:

- CRIS designs, develops, implements and maintains most of the important information systems of IR
- The Ministry of Railways set up CRIS as a Society in July 1986
- Headquartered in New Delhi
- Regional offices in Delhi, Kolkata, Mumbai, Chennai, and Secunderabad
- Projects covers the Indian Railways functions
- Passenger ticketing
- Freight operations
- Train dispatching and control
- Crew management
- e-procurement
- Management of Railways' fixed and moving assets

- Production of rolling stock.
- ❖ CRIS information systems provide services in the remotest of locations, from Kargil to Kanniyakumari, from Tawang to the Andaman Islands
- ❖ CRIS also provides IT applications for non-Railway Government and Public Sector organizations.

CRIS-MISSION-

- Cost-effective, sustainable information systems
- Cutting edge technologies in practical ways
- Ensure workable IT solutions for the Railways in many areas.

CRIS-CURRENT PROJECTS

- To cover emerging needs of the Railways
- Protection of Railway assets
- Energy management
- Management of the OH electrification system
- Parcel management
- Employees' health management
- Comprehensive financial management system

CRIS –ON GOING PROJECTS

- Development of ticketing on mobile phones
- Linking tickets to Aadhaar
- Tracking of trains in real time through GPS
- Tracking of rolling stock using RF identification
- Setting up a geo-spatial database

- Setting up a state-of-the-art data centre to house the Railways' IT system

FOIS- Freight Operations Information System:

- Indian Railways carries nearly 1012 Million Tonnes of Freight in a year
- This translates to about 5000 freight trains daily
- Freight trains bring two thirds of the Indian Railway revenues
- Referred to as the bread earners for the Railways
- The major commodities carried by Indian Railways are
 - Coal
 - Iron Ore
 - Foodgrains
 - Iron & Steel
 - Cement
 - Petroleum products
 - Fertilizer and Containerized Traffic.
- There are specialized wagons to handle the Transportation Needs of the different types of commodities
- Freight trains do not run to a fixed schedule
- Freight Operations a highly Information Intensive activity
- Based on this information managers make Allocation Decisions continually to dynamically
- Optimize Utilization of resources like

- Wagons
- Locomotives
- Crew
- Paths on the network
- Real time information allows good decision making and thus ensures high levels of mobility within the system
- This realisation has led to the development of FOIS
- FOIS was the first project which CRIS embarked upon
- Creation of CRIS is a by product of this effort
- FOIS began as an application to track and monitor the movement of wagons, locomotives and unit trains
- Now it is a complete management module for freight handling ,billing and revenue collections as well
- It has played a major role in the improved wagon productivity on Indian Railways
- The objective is to use the information to further improve productivity, customer service

ROLE OF SUPERVISORS IN INDIAN RAILWAYS:

- ✓ Supervisor should watch the employees' job performance to ensure that all necessary tasks are completed in accordance with specifications and deadlines.
- ✓ Supervisor is responsible for seeing that the work of your staff meets established performance standards.
- ✓ When an employee begins to show a consistent pattern of problem behavior, Supervisor must take action.
- ✓ Maintain a safe, secure and productive environment for employees
- ✓ Evaluate and discuss performance with employees
- ✓ Treat all employees fairly
- ✓ Act in a manner that does not demean or label people
- ✓ Supervisor must work to create and maintain a work environment that is free from discrimination, workplace harassment and sexual harassment.
- ✓ Educate and Counsel the staff and Organise meetings in order to improve the work environment.
- ✓ Supervisor should ensure that, Time to time, the staff should be booked for attending different training courses.
- ✓ Ensure required material is available at the site of work place and it should also be planned for future requirements.
- ✓ Distribution of work to staff should be according to their ability.
- ✓ All instructions related to safety should be followed.
- ✓ To avoid re-occurrence of any failure, failure analysis should be carried out.
- ✓ Better co-ordination should be maintained with sister departments.

Role in Accidents Prevention:

- Training the team
- Communicating with it
- Role Modeling

- Enforcing the rules
- Coaching the team
- Conducting hazard assessments
- Conducting accident investigations

Immediate Role in case Accident Occurs:

- Understand the nature of the accident by listening to the siren-And decide whether ART or MRT or Both are required. Try to collect more and more information in regard to the nature of accident, No of vehicles involved and any casualties etc.
- Mobilize the staff specifically skilled staff, Crane operator,& ensure their attendance personally
- Ensure electrical S&T other departmental staff have reported.
- Ensure that the ART (or) MRT is started within the target time.
- Communicate to the control about Officers senior subordinates &No of staff dept-wise on board.
- Start the power packs and warm-up IC engines.
- Clear-cut instructions to the staff for their location at accident spot and their role of play.
- Depute sufficient staff for kitchen & protocol activities.
- Gas &cutting equipment to be checked for their proper working.
- Ensure that staff is available on BD (Break down) crane when the crane is on run.
- Plan for removal of match-truck if crane is to be used for restoration work.
- Take instruction from the higher officers ON –Board and comply with the same.
- Plan for the items which are to be unloaded from the BD special at the site of accident.

- Survey the accident spot, No of vehicle/wagon Derailed/capsized etc to be noted and whether the situation can be handled only with HRE (or) crane is required.
- Estimate the probable restoration time and convey the same to the control.
- Depute staff according to the quantum of work and commission the rescue.
- Record joint observation of track, Rolling stock, wagon, loco along with other Sr subordinates.
- A rough sketch of accident site to be prepared
- After re-railment , ensure the movement of damaged vehicle to the nearest station from the site with extreme care, duly imposing speed restriction if required.
- All the items which were un loaded at the site of accident to be loaded back to the BD special.
- Assist the officers at site to arrive at the PRIME-FACIE cause of the accident.

Role in Accident Investigation:

- Arrangement to be made to record the vehicle/wagon reading at the earliest.
- Sufficient copies of “readings” of the vehicle to be prepared and submitted to the inquiry committee.
- Prepare cost of damage of vehicle/wagon and submit to the inquiry committee.
- Assist in recording of joint observation/measurement of track, S&T gears, points & crossings etc.
- Preserve all clues of accident.
- Attend the accident inquiry.