OPERATION AND MAINTENANCE MANAGEMENT OF DIESEL LOCO

Organisation at Railway Board level

- **EDME(Traction)**
- **DME (Traction)**
- **Jt. DME(Traction)**
- **Asst. Director(Traction)**
- **Power Controllers**

Responsibility

- Allotment, distribution and adjustments of locos to zones
- Development of maintenance facility
- Daily outage – working of locos of one railway in other railway according to directive and quota
- Reliability of loco operation by monitoring punctuality of important trains
- Failure analysis with regard to performance
- Assistance of material to sheds and shops from DLW, DMW and other railway in extreme emergency
- Utilization of loco on line

Organisation at Zonal HQ level

- **CMPE**
- **Dy.CME(D)**
- **SME(D)**
- **AME(D)**
- **SSE/SEs – Procurement cell**
- **Power Control Organisation**

RESPONSIBILITY OF CMPE

- **Planning and utilization of diesel power**
- **Distribution of locos between divisions**
- **Ensuring target of sheds and distribution of locos over divisions/railways**
- **Coordination for diesel operation**
- **Watching utilization of locos**
- **Reducing detentions on line**
- **Planning of servicing requirements and maintenance facility**
- **Ensuring reliability**
- **Monitoring daily failures and their repercussions**
- **Analysis of failure and introduction of remedial measures**
- **Movement of disable locos**
- **Training of Running staff**
- **Check of drivers' link for passenger and working hours (10) for goods**
- **Provision of Fueling installation**
- **Fuel Economy**

CENTRAL POWER CONTROL

Staffed by a Chief Power Controller and Power Controller in each shift

(Responsibility)

- **Maintaining liaison between shed and division for meeting requirement and distribution of locos**
- **Monitoring availability of locos from shed on 4 hourly basis**
- **Continuous collection of factual data of power position on 4 hourly basis**
- **Maintaining position of ineffective locos in sheds**
- **Maintaining position of schedule attentions in sheds**
- **Maintaining position of scheduled forecast of locos from sheds**
- **Ensuring timely availability of locos for scheduled maintenance to avoid under utilization of shed capacity and bunching of locos. As a rule, no loco should be booked on working train after due date without prior permission of CMPE. It should relay the loco numbers with due date of scheduled inspection three days in advance.**
- **Watching and facilitating movement of disabled locos**
- **Daily utilization of locos on each division**

CENTRAL POWER CONTROL
(Facility)

- **Suitable well furnished accommodation - free from disturbances**
- **Efficient communication facility**
- **Hot line/conferencing facility to connect sheds, Divisional controls, major yards.**
- **Computerized facility for monitoring locos on line, loading and movement particulars – FOIS developed and maintained by CRIS – Rly Bd's control organization is also linked to zonal railway control organizations through this system.**

CENTRAL POWER CONTROL

(0peration activity)

- **Passenger operation**
  - allotment of loco is as per link
  - short distance goods train on fixed path to avoid long lie-over . Care should be taken to avoid delay in schedule attention and loss of link.
- **Goods operation**
  - Based on number of goods train to be run daily
  - Calculation is made on average run of 500Km per day on double line and 400Km on single line in BG.
  - Run on fixed path is desirable
  - Hourly chart of movement is to be made in Division
  - Yard detention and idle time should be clearly shown

CENTRAL POWER CONTROL

(Crew control)

- Analysis of duty with pre-departure detention, hours on road and post arrival detention
- Availability of sufficient trained drivers
- Should be called according to forecast of goods trains
- 10 hour duty should be maintained, arrangement for relief at intermediate stations
- Divisional power control should have facility of suitable accommodation of crews with effective communication facility
- Provision of adequate strength of inspector/instructor for monitoring crew working – one for 25 crews – at least one in a division
- Training of crews for trouble shooting – specially for those whose locos failed due to mismanagement of crews

- **Booking**
  - SSE(loco) working under Sr. DME/DME(Power) is responsible for close liaison with central/divisional power control

FAILURE ANALYSIS

- **Category I – Statistical failure**
  - **failure or delay 30 minutes or more due to:**
    - **defective design**
    - **defective material**
    - **bad workmanship in shop**
    - **bad workmanship in shed**
    - **mismanagement by crew**
    - **bad fuel**
    - **bad water**
- **Category II – Non-statistical failure**
  - **undergoing repair outside home shed and not available for return trip**
  - **booked on trial**
  - **overdue schedule by 24 hours or more**
  - **shortage of fuel**
  - **time loss due bad weather, overloading/heavy train, poor visibility of signal**

PREVENTIVE MAINTENANCE

Development

- **T1** 20 days
- **T2** 40 days
- **M2** 60 days/63 days
- **M4** 4 months
- **M8** M4 + small motors (dc)
- **M12** 12 months
- **M24 (old yearly)** 24 months
- **M48 (IOH)** 4 years (Shed or Shop)
- **POH** 8 years (Shop)
- **Rebuilding** 16 years (DMW) 20% of cost borne by home railway and 80% by RB

STANDARD SCHEDULES OF EXAMINATION FOR 3100 HP & 3300 HP DIESEL-ELECTRIC LOCOMOTIVES FITTED WITH ROLLER SUSPENSION BEARINGS

SCHEDULE CODE	PERIODICITY	OLD/LAST EQUIVALENT
T-20	20 Days	Trip (T1)
T-40*	40 Days	Trip (T2*)
M -2	60 Days	Ist Monthly
T- 20	80 Days	Trip (T1)
T- 40*	100 Days	Trip (T2*)
M - 4	4 Months	I Quarterly
M - 8	8 Months	II Quarterly
M - 12	12 Months	I Half Yearly
M - 16	16 Months	III Quarterly
M - 20	20 Months	IV Quarterly
M - 24	24 Months	I Yearly
M - 48	48 Months	Three Yearly
M - 72	72 Months	II Yearly
M - 96	96 Months	POH

MODIFIED PROPOSED SCHEDULES OF EXAMINATION FOR 3100 HP, 3300 HP & 36OO HP DIESEL-ELECTRIC LOCOMOTIVES FITTED WITH ROLLER SUSPENSION BEARINGS, MICROPROCESSOR CONTROLLED LOCO WITH MCBG AND AIR BRAKE

SCHEDULE CODE	PERIODICITY
T-40	40 Days
T- 80	80 Days
M - 4	4 Months
M - 8	8 Months
M - 12	12 Months
M - 16	16 Months
M - 20	20 Months
M - 24	24 Months
M - 48	48 Months
M - 72	72 Months
M - 96	96 Months

PREVENTIVE MAINTENANCE

➢Authorization

- Schedule of attention of various items and the frequency of attention will be issued by RDSO
- CME is authorized to change with immediate effect
- Final adoption of changes will be decided in DMG

➢Special Repair

- Major out of course repairs due to accident or otherwise – separate estimate/PU

PREVENTIVE MAINTENANCE

- **Unit exchange**
  - **Defective unit/assembly/sub-assembly is replaced by good ones kept ready for use in a pool**
  - **Defective one is then repaired/overhauled and kept in the pool**
  - **Procedure is same during schedule maintenance**
  - **Spares available should be as per loco holding**
  - **Recommendation of Maintenance Manual (White Manual) may be a guideline**

  Calculation - an alternative approach

  Unit Exchange = (Working days required for OVH – Days available for OVH) X Days between successive arrival of loco.

HOME SHED

- Undertakes all repair work and schedule maintenance attention except POH and Re-building
- Proper layout and facility
- Infrastructure and staff strength should be as per holding. Maintenance Manual (White manual) can be considered as guideline
- Provision of special tools
- Provision of general purpose tools – preferably with all technicians
- Adequate machinery and plants
- Adequate supply of spares – overstocking should be avoided
- Maximum stock items should be stocked for 12 months for A&B category items and 24 to 36 months for C category items having no self life.

Shed outage:

- **The no. of locos available for traffic use pertaining to a diesel loco shed from 0.00 hrs. to 0.00 hrs. on a date.**

ex.

Total holding of a shed	**=**	**100 Locos.**	
Less accident locos		**=**	**02**
Effective holding	**=**	**98**	
Ineffective (@10%)		**=**	**9.8**
Remaining Locos	**=**	**88.2**	
Link Locos (suppose)		**=**	**20.0**
Net Locos for goods		**=**	**68.2**
Heavy repairs (10%)		**=**	**6.82**
She outage		**=**	**61.38**

Daily Outage

H = (X+Y/0.9) / 0.9

H = Holding, X = Pass Outage, Y= Goods outage

- **10% ineffective percentage on all locos**
- **10% repair allowance on goods locos**

(Locos undergoing Special repair and Rebuilding are excluded for calculation)

STAFF – direct maintenance

- Artisan (skilled) — 3.5 per loco
- Unskilled (Gr-D) — 2.75 per loco
- Supervisor — 0.8 per loco
- Ancillary (skilled) — 22% of artisan
- Laboratory — 1 CMS/CMA per 10 loco
- 1 helper per 1 CMS/CMA
- Separate CMS and staff for Spectrometer
- 1 ACMT/CMT in a shed

STAFF - ancillary

- **Booking office** - Call man for each shift
  - Porter for each shift
  - Shunter for each shift
- **Inspectors** 1 SLI/LI and 1 SFI/JFI per 50 loco
- **Engineering** Nominated IOW exclusively for shed
- **Millwright & Electrical** Sheds should have own organization headed by a supervisor
- **Tool room** Tool checker with rest giver assisted by Group-D staff

MINISTRIAL STAFF

- **Sr.DME/DME's office for dealing with budget, establishment, D&AR, M&P Programme, Works Programme, Technical correspondences, staff grievances and welfare, stationary and computer cell/record cell.**
- **SSE(IC)'s office — Establishment, Pass/PTO, Time keeping, Salary Bill preparation, D&AR, Typing/general correspondence**
- **Statistics — Records for Fuel consumption/ economy, operating statistics**
- **Booking office — Booking clerk for each shift**

SATELITE INSPECTION/REPAIR DEPOT

- **Functions under a home shed**
- **Staffed with artisan (Mech & Elect) and supervisor**
- **Adequate facility of tools should be ensured. Composition of tools can be as per guideline of white manual**
- **Helps in improving availability of loco for traffic**
- **Helps in minimizing movement of failed dead loco to home shed**
- **Defects developed in the locos running in the area are attended**
- **Minor schedule attentions of the locos available in the area are given**