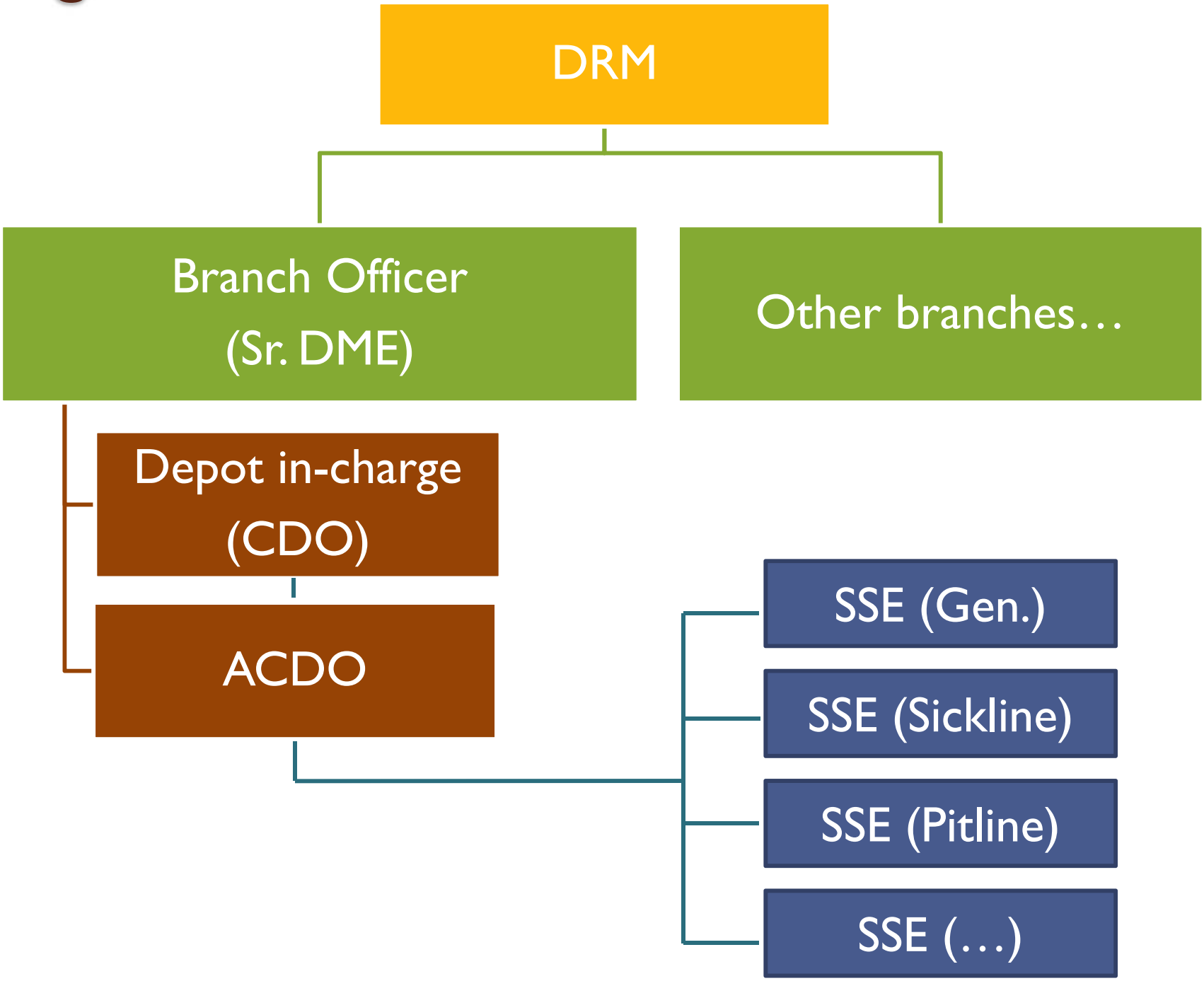
Coach Maintenance Planning
(in division)

by: J. P. Singh, Prof. / Mech.

Organization chart



Planning part

- Infrastructural Requirements
- Man
- Machine
- Method
- Material

Activity wise…

- Divisional C&W control
- Provision of Infrastructure
  - Pitline
  - Sickline
  - M&P, T&P items
  - Office and stores
  - Staff amenities
- Preventive maintenance
- Availability of spare coaches
- Planning for material
- Outsourcing of non-core activities

Divisional C&W control

- C&W Control office
  - Connectivity (Landline, Railway phone, Intercom, CUG)
  - Record/Logs (Message Book, Incident log, Movement logs, wagon position)
  - Operates in all 3 shifts
  - Manned by (SSEs and Clerks)
- Coordination
  - Control board
  - Head quarters
  - Traffic, Engineering, Electrical, Commercial, S&T, RPF, GRP,

Divisional C&W control

C&W control with computerized charting and logging access

Divisional C&W control

C&W control with access to other controls

Divisional C&W control

Traffic control board

Depot control room

- C&W Control (depot)
  - Connectivity (Landline, Railway phone, Intercom, CUG)
  - Record/Logs (Message Book, Movement logs)
    - Depot holding
    - Detailed Coach/Rake position
    - Coach database
    - Position of spare coaches/workshop/Other Rly etc.
  - Operates in all 3 shifts
  - Manned by (Technical staff and Clerks)
- Coordination
  - Divisional Control
  - Head quarters
  - Shift activities, all SSEs
  - ART, ARMV, Crane

Depot holding

- Coach maintenance planning is dependent on rake links
- Total no. of coaches required for the train operation of primary trains operated from depot / division
- Total no. of trains that would be terminating at station / division
  - Secondary maintenance
  - PFTR
- Coaches that will homed in depot.

Classification of depots

Classification	No. of Coach holding
Minor	Below 100
Medium	100 to 250
Major	above 250
Mega	above 500 ??

Provisioning of Infrastructure

- Pitline
  - With/without catwalk
  - Concrete apron
  - Drainage
  - Trolley path
  - Water hydrant
  - Splash proof electrical outlets
  - Battery charging terminals
  - Illumination in pit & outside

Provisioning of Infrastructure

- Pitline
  - High pressure water outlet
  - Compressed air
  - Rake test rig
  - Lifting jacks
  - Road accessibility
  - Display boards / posters for all technical parameters
  - Pitline office with running stores
  - Set of hand tools (Standard list)
  - Power backup (Genset)

Pitlines

Pitlines: 1, 2, 3, 4 (without catwalk)

Pitlines

Pitlines: 5 & 6 (with catwalk)

Provisioning of Infrastructure

- Sickline
  - Covered shed (for berthing 4% of base holding)
  - Concrete apron, 15 meter wide bays
  - 35 meter for each coach for running out bogies
  - Only 4 coaches max on each line, Min. 50% pit
  - 20/5 T EOT crane, 3/2 T hoist
  - Sickline yard (3x stabling of sick coaches)
  - Industrial heavy duty flooring
  - Pit wheel lathe
  - Wheel stabling lines
  - Power backup (Genset)

Sickline

SCN coach in lifted condition

Sickline

Testing of ready coach with single car test rig

Provisioning of Infrastructure

- Sickline & IOH Shed
  - Whiting jacks, Trestles
  - Lathe, Vertical drill, Welding/cutting equipment, power tools
  - Air Compressor
  - Fork lifts, BOT
  - Set of standard gauges
  - Set of hand tools (standard list)
  - Washing line
  - Drainage
  - Road accessibility
  - Display boards / posters for all technical parameters

Provisioning of Infrastructure

- Office
  - CDO/ACDO's office
  - Depot control room (manned in all shifts)
  - SSE's rooms
  - Tool room
  - Main Stores
  - Section rooms & section stores
  - Staff locker/rest rooms (including toilets)
  - SSE's (Gen.) office
  - Time office
  - Conference / Training room
  - Platform service rooms
  - Contractor's office/stores rooms (x contracts)

Provisioning of Infrastructure

- Rolling in / Rolling out examination
  - Examination huts
  - Pathway and accessibility

Rolling in/out hut

Rolling-in/out examination points

RPC4 – guidelines

- Rationalized system of maintaining coaching stock in open line
- Uses distance as the primary measure of maintenance actions
- Also type of stock
  - Passenger trains with/ without toilets

RPC4

- Primary maintenance is always done by owning depot
- Cleaning is done at each end
- Distance basis differentiation at 3500 ICF / 4000 LHB kms
  - Single travel
  - Return travel
  - Sum of travels
- Max BPC validity is for 7 days

RPC4 – conditions – primary end

- Clear maintenance time of 6 hours on the pit
- Provision of proper washing cum maintenance pit line facility with adequate testing equipment and high pressure water cleaning arrangement.
- Adequate gang strength with proper supervision.

RPC4 – conditions – secondary end

- If lie-over is more than 2 hours at the platform or the rake is stabled in the yard,
  - locked and positive security

RPC4 – major implications

- 6 hours maintenance time
- 2 hours lie-over
- Watering infrastructure
- Washable aprons
- Lighting
- Staffing
- Pathways

RPC4 – infrastructure – both ends

- One storage room
- Road transportation facility
- mobile high pressure jet cleaning machines
- Washable apron with the covered drains
- Walkie-Talkie/mobile telephones
- Standard watering hydrants.
- Flood light at the platform ends for rolling-in examination at night
- 110V inspection lights along the side of the track for night examination of the under gear.

Preventive maintenance

Annexure A to RB letter No. 95/M(C)/141/1 Pt. dated: 14/06/2017

Sl.	Category of train	Preve-ntive maint.	Under gear ex. and brake sys. at Pit line	Internal cleaning, PA and watering	External cleaning on nominated line	Brake system check prior to start at platform at the other end
I	Rajdhani/ Duronto Trains	At primary end.	At both the ends.	At both the ends.	At both the ends.	Complete air brake test with fresh BPC at both ends
I A	Shatabdi Trains	At primary end.	At primary end.	At both the ends.	At primary end.	Only continuity check if stabled at PF, otherwise, brake power check with endorsement on original BPC

- Enroute examination after every 250 to 350 Km of run or next nominated TXR point at stopping station. Locations to be decided by the Railway for each train.
- Rolling in/out examination shall be conducted for each of the Durnoto trains at the respective operational halts and also at terminals (RB 2009/M(C)/141/2, dated: 25/08/2009

Preventive maintenance

Annexure A to RB letter No. 95/M(C)/141/1 Pt. dated: 14/06/2017

Sl.	Category of train	Preve-ntive maint.	Under gear ex. and brake sys. at Pit line	Internal cleaning, PA and watering	External cleaning on nominated line	Brake system check prior to start at platform at the other end
2	Mail / Exp. One way run > 3500 Kms ICF and > 4000 Kms LHB	At primary end.	At both the ends.	At both the ends.	At both the ends.	Complete air brake test with fresh BPC at both ends
3 (a) (i)	Mail / Exp. round trip up to 3500 Kms ICF and 4000 Kms LHB (excl. cat 1)		At primary end.	At both the ends.	At primary end.	Only continuity check if stabled at PF, otherwise, brake power check with endorsement on original BPC

- Enroute examination after every 250 to 350 Km of run or next nominated TXR point at stopping station. Locations to be decided by the Railway for each train.

Preventive maintenance

Sl.	Category of train	Preve-ntive maint.	Under gear ex. and brake sys. at Pit line	Internal cleaning, PA and watering	External cleaning on nominated line	Brake system check prior to start at platform at the other end
3 (a) (ii)	M/E that touch Primary station more than once within the limit of 3500 Kms ICF or 4000 Kms LHB or 96 hours whichever is earlier	At primary end.	At primary end only, once within the limit (3500 ICF / 4000 LHB Km or 96 hours, whichever is earlier)	At both the ends.	At primary end.	Only continuity check if stabled at PF, otherwise, brake power check with endorsement on original BPC
3b	Interconnected M/Exp. Round trip run up to 3500 Kms ICF or 4000 Kms LHB			At Primary end and each terminal.	At primary end once a day for shuttles.	

Preventive maintenance

Sl.	Category of train	Preve-ntive maint.	Under gear ex. and brake sys. at Pit line	Internal cleaning, PA and watering	External cleaning on nominated line	Brake system check prior to start at platform at the other end
4	Passenger trains with toilets including interconnected passenger trains / shuttles.	At primary end.	To be done after 3500 Kms or 96 hours whichever is earlier only at Primary end	At primary end and at each terminal	At primary end.	Only continuity check if stabled at platform, otherwise, brake power check with endorsement on original BPC
5	Passenger trains without toilets.		To be done after 3500 kms or 7 days whichever is earlier at Primary end			

Preventive maintenance schedules

Sl. No.	Type of coaches	Periodicity
1	Trip Schedule	At the end of each trip or as prescribed.
2	Schedule 'A' or Monthly examination	1 month ± 3 days
3	Schedule 'B' or Trimonthly examination	3 months ± 7 days
4	Schedule 'C' or IOH	9 month + 30 days
5	POH	18 month + 30 days
6	Special Schedule	As prescribed by each Railway.

Provision of spare coaches

- Railways follow percentages for maintenance spares as per letter of number 98(M)C/140/10 dated 03-05-2006.
- With the increase in POH periodicity from 12 months to 18 vide letter number 2007/M(C)141/1 dated 02-05-2008.
- The new percentage become effective from 01-01-2010 vide letter no 2008/Chg-II/26/24/Maintenance Spares Dated 19.03.2009.

Provision of spare coaches

	Coach Type	% Maintenance	% Traffic	% Total
BG	NAC	8.5	5	13.5
BG	AC Non (Rajdhani-Shatabdi)	10	6	16
BG	AC (Rajdhani-Shatabdi)	12	5	17
MG	NAC	10	5	15
MG	AC	12	3	15

- Modified vide Letter No 2008/Chg-II/26/24/Maintenance Spares Dated 30.03.2009

Planning for Coach holding

- Bare requirement, based on Rake links
- Maintenance & Traffic spares
- Total requirement
- Actual availability
- Shortage in coaches

Actual maintenance plan

Type	Place
Primary Maintenance	Pit Lines in Yard
Secondary Maintenance	Pit Lines in Yard
Platform Turn-around attention	Platforms/Nominated lines
Other End Attention	Platforms/Nominated lines
Break Down Attention & IOH Attention	Sick Lines / IOH Sheds
Maintenance of Accident Relief Trains	Yard / Pitline / Platform

Primary maintenance

Type	Place
Method	Carried out on whole train
Need	Mandatory for every train
Place	Pitline in yard
Work	Safety, Amenity, Electrical, A/C, Internal & External cleaning and Brake power testing with certification
Time taken	6 Hours.
Validity	3500 Kms.

Secondary examination

Type	Place
Method	Carried out on whole train
Need	Mandatory for every train terminating, having a round trip KM > 2500 Kms.
Place	Pitline in yard
Work	Safety, Amenity, Electrical, A/C, Internal & External cleaning and Brake power testing with certification
Time taken	6 Hours.
Validity	Return trip

Primary & Secondary examination

Under gear examination and attention at pitline

Primary & secondary examination

Under gear examination and attention at pitline

Platform turnaround (PFTR)

- Reception (all trains)
  - Rolling-in Examination
    - Visual inspection of dangling parts, hearing for any unusual sound
  - Axle Box feeling / temp measurement
    - Sensing the temperature of axle boxes by pyrometers / hand by kneeling down in the gap between platforms and coach
  - Manual releasing of brakes
    - Manually pulling of DV release valve by kneeling down in the gap between platforms and coach

Rolling in/out hut

PF staff performing rolling-in examination

Platform turnaround (PFTR)

- Attention
  - Interior cleaning
  - Amenity fittings
  - Watering
  - Continuity check

Dispatching of trains

- Rolling-out Examination (all trains)
  - Visual inspection of dangling parts, hearing for any unusual sound
  - Checking that Brakes are in released condition
  - Condition of Released/Apply indication in LHB coaches

Sickline Maintenance

- Carrying out break-down maintenance (to maintain the prescribed ineffective percentage of 1.5 / 2 % of total coach holding)
- Wheel turning
- IOH attention
- Any other special works nominated by authorities

IOH shed

LHB coach in lifted condition (SS-1)

IOH shed

IOH shed, coaches in lifted condition on jacks

Manpower planning

- RB. 2000/MC/143/5, dated: 24/12/01

Sl. No.	Type of coaches	Benchmark
1.	Primary coaches (superfast/Long distance)	1.1
2.	Primary coaches (mail & Exp.)	0.9
3.	Secondary coaches (superfast/Long distance)	0.55
4.	Primary coaches (passenger)	0.75
5.	PFTR (superfast/Long distance)	0.26
6.	PFTR (Mail & Exp.)	0.23
7.	PFTR (Passenger)	0.18
8.	Pass through (Superfast/Long distance)	0.26
9.	Pass through (Mail & Exp.)	0.23
10.	Pass through (Passenger)	0.18

Additional manpower required for…

- Material storage and accountal: **26 men for coach depot holding 150 or more coaches**.
- Linen management: **0.22 men per AC coach holding**
- Train escorting staff for Shatabdi and Rajdhani Exp. Vide RB. 2000/MC/143/5, dated 24/12/01& 99/TG.V/12/2, dated 13/09/99: **1 supervisor, 1 technician, and 2 helpers**, for Shatabdi (all), and Rajdhani (18 coach) trains
- Pest control, waste disposal, pitline sweeping, and drain cleaning: **"based on local condition"**
- Bio-Toilet: **1 supervisor per shift and 1 skilled and 1 semi-skilled staff every 30 Bio-toilet** (CAMTECH)
- ART, ARMV, Crane, Millwright activities, Ancillary, Drivers: **"based on local condition"**

Additional manpower required for…

- Statistical work: **8 men for depot holding 150 or more coaches**
- Staff training, Running refresher, Induction and Pre-promotional trainings: **"need based"**
- Maintaining inspection carriages: **1.76 men per Inspection Carriage**
- Sickline maintenance: **0.14 men per coach holding**
- Manpower for OBHS:
- Contract management:
- General Section, Time office, CDO office:
- **Leave Reserve: 15%**

Machinery and Plant

Description	Minor Depot	Medium Depot	Major Depot
U/floor wheel Lathe	-	-	1
Whiting Jacks (5 Nos)	-	1 Set	1 Set
EOT Crane 20t	-	-	1
Coach Shunter	-	1	2
Welding Plant	1	2	4

Machinery and Plant

Description	Minor Depot	Medium Depot	Major Depot
Gas cutting equipment	1	2	2
Vacuum Exhauster	1	2	2
Air Compressor 30 CFM	1	2	2
Portable Vacuum Testing Equipment	-	1	1
Portable Air Compressor	-	-	1

Machinery and Plant

Description	Minor Depot	Medium Depot	Major Depot
2T Tram beam hoist	1	1	2
Sewing Machine	-	1	1
Truck 10T	-	-	1
Light Coml. Vehicle	1	1	1
Fork lift truck	-	-	1
BOT	1	1	2

Machinery and Plant

Pit wheel lathe

Machinery and Plant

Compressor room, Fork lift, BOT

Materials management

- List of stock items
  - Safety items
  - Amenity items
- Compliance of stores imprest schedule
- Important item out of stock / in shot supply
- Non-moving items / correctness of imprest sanction
- Scrap return
- Proper storing of rubber item
- High value item analysis

Mechanical Stores depot

Stores building and stacking facility

Wheel parking / storing

Wheel parking arrangements

Outsourcing of non-core activities

- Mechanized Coach Cleaning activities
- Linen management
- Pest & Rodent control
- OBHS
- Maintenance of Bio-toilets
- Overhauling of Air-brake components (LHB)
- Office and Yard cleaning
- Bogie transportation contract for IOH

Important parameters/requirements…

- Ineffective percentage
- Yard Stick
- Working Time table
- Rake link
- RPC-4
- Brake Van Equipment
- Connectivity and alignment
- Shunting neck
- Yard stabling lines

Thank You