

Categorization of Examination / Repair facilities

Intensive Examination Points-

Criteria for Categorization-Category “A”

- (i) Having pucca pathways on more than 50% of the lines nominated for examination.
- (ii) Sufficient illumination facilities 150 lux.
- (iii) Sufficient material handling facilities.
- (iv) Sufficient welding facilities.

Category “B”- (i) Having pucca pathways on more than 50% of the lines nominated for examination.

- (ii) Sufficient illumination facilities.
- (iii) Sufficient material handling facilities.

Category “C”-(i) Having pucca pathways on more than 50% of the lines nominated for examination.

- (ii) Sufficient illumination facilities.

Category “D”(i) Having pucca pathways on more than 50% of the lines nominated for examination.

Category “E”- **No pucca pathway but some other facilities are available**

Category “F”-**No facilities available**

ROH Depots-

Category - Criteria for Categorization

- A** **Where all the infrastructural facilities are adequate.**
- B** **Where all the infrastructural facilities are available but some not adequate to match target out turn**
- C** **Where some vital infrastructural facilities like EOT crane/wheel turning lathe etc. are not available, other facilities are adequate.**
- D** **Where facilities are grossly inadequate or non-existent.**

Sicklines-Category /Criteria for Categorization

A (i) Berthing capacity under covered shed

- (ii) Heavy duty concrete flooring in working area.
- (iii) Availability of welding facility.
- (iv) Availability of Compressor/ Exhauster.
- (v) Availability of EOT crane

B (i) Berthing capacity under covered shed.

- (ii) Heavy duty concrete flooring in working area.
- (iii) Availability of welding facility.
- (iv) Availability of Compressor/ Exhauster.
- (v) Synchronized whiting jacks.

C (i) Berthing capacity under covered shed.

- (ii) Heavy duty concrete flooring in working area.
- (iii) Availability of welding facility.
- (iv) Hydraulic Jacks for lifting

D (i) Berthing capacity under covered shed.

- (ii) Heavy duty concrete flooring in working area.

INFRASTRUCTURE & FACILITIES REQUIRED IN THE YARD

- i. Centre to centre distance between tracks for nominated lines for conducting intensive examination should be minimum 7.5 meters.
- ii. Concrete pathways, material handling equipment, multi utility vehicle to facilitate movement of man and material smoothly from one end to other end.
- iii. Proper illumination, specially covering bogies and brake gear locations so that the wagons needing attention can be easily detected.
- iv. Welding grid on the entire length of train of nominated line with proper earthing arrangement so that welding can be carried out without marking the wagon sick.
- v. Enough outlets for tapping air pressure for testing of the stock.
- vi. Duty room for Section Engineer/Junior Engineer (C&W), staff room, air compressor room, store room for stocking material, tool room, welding machine room, battery charging room etc.
- vii. VHF sets / CUG phones for close monitoring and communication between supervisors, staff and Sr. Section Engineer (In-charge).
- viii. Portable LED type inspection lamps.

MACHINERY & PLANT ITEMS

The following machinery and plant are essential for train examination during yard maintenance:

Diesel and Electrically driven Compressor

Welding plants

Wagon /Rake Test rig

Hydraulic jacks of various capacities.

Lister truck for carrying material such as brake blocks etc.

DG set (Cap. 200 kva min.)

Multi utility vehicle for transportation of Men, Materials and Tools from one end of rake to other.

Gas/ Plasma cutting set .

TOOLS-

Fitters should have the following tools.

Tool Bag, Hammer, Chisel, Punch (Flat & Round End), LED head lamp, Spanners of various sizes, Pipe wrench, Wheel tyre defect gauge, Measuring foot rule, Measuring tape Non contact hot axle detector, Cord for measuring spring camber, Gauge for measuring "A" dimension, Test plate, "GO /NO GO" gauges

To be made available in Section Engineer/Junior Engineer (C&W)

office- All types of jacks, Banner flag/Tail lamp, CBC height gauge
Air pressure gauge, Chisel with wire handle, Punch with wire handle, Sledge hammer, Scale – Steel rule 6", Measuring tape – 3 m
Allen key (full set), Circlip plier (internal & external 19-60 mm)
Hacksaw with blade 12", Set of non sparking tools (for yard handling tank wagon)

LED head lamp

Helmet

Ladder with platform 10 ft. height

INFRASTRUCTURAL FACILITIES FOR FREIGHT EXAMINATION YARD

- i) The yard handling 5 to 10 rakes per day shall have two examination lines of 750 m each to facilitate creation of gap, one line for keeping sick wagons and one line for keeping fit wagons released from sickline. All the four lines should be under covered shed to facilitate all weather working.
- ii) The complete area of examination yard shall be provided with abrasion resistance granolithic concrete flooring and ballast free embedded track to ease movement of vehicles and material handling equipments.
- iii) Centre distance between the examination, sick and fit line shall be 7.5 m to ensure free movement of material handling equipments and minor attention.
- iv) No OHE wiring over the examination lines/Sick yard line /fit wagon line which shall be dealt with EOT crane.
- v) Top wiring at both the ends of the train examination line for dropping the rake and waiting for crew/loco after release.

- vi) TXR shall be provided with Industrial type Personal Digital Assistant (PDA) having pre-fed check sheets for recalling defects and examination data.
- vii) A dedicated engine for placement of rakes in examination line if the rake is received with electric locomotive.
- viii) A rail cum road shunting vehicle with capacity to haul 30 empty wagons shall be used for creating gaps between wagons. The vehicle shall also be provided with compressor and rake test rig for air brake testing of formations.
- ix) For yards handling upto 10 rakes per day, 7 EOT cranes of 30 tonnes lifting capacity, 30 mtrs. Span and 650 mtrs. travelling shall be provided. Each wagon shall be lifted with the help of EOT cranes by using specially designed slings for lifting from axle box.
- x) Major Sickline with all Infrastructural facilities would remain attached and adjacent to freight examination yard.

- xi) To expedite repairs in-situ, adequate number of material handling vehicles and multi utility vehicles shall be provided.
- xii) The covered shed shall be provided with alternate rows of metal halide lamps and set of T-5 tube light fittings. The illumination around covered shed should be provided by high intensity tower lights.
- xiii) Electric panel with junction box at a distance of 30 m shall be provided in between sick yard line and examination line.
- xiv) Effective communication system preferably CUG mobile phones or walkie talkie sets shall be provided across teams.
- xv) A comprehensive contract for day to day upkeep of the yard is recommended for major and mega yards. This contract should cover items like scrap lifting and bush cutting in the periphery of the yard.
- xvi) A running contract for petty repairs pertaining to shed and floor of the yard including civil and electrical engineering works is also recommended.

This contract will be monitored by field officer of Mechanical Department.

xvii) A running contract for maintenance of all major M&P such as EOT cranes, compressor, vehicles, welding sets, hydraulic jacks is also recommended.

INFRASTRUCTURAL FACILITIES IN AIR BRAKE ROH DEPOTS

Air brake depots have been classified based on the target capacity for ROH outturn/month as follows:

Category Targeted capacity for ROH (Average/month)

Super Depots Above 500

Mega Depots 250 to 500

Major Depots 125 to 250

Minor Depots Upto 125

RECOMMENDED LAYOUT

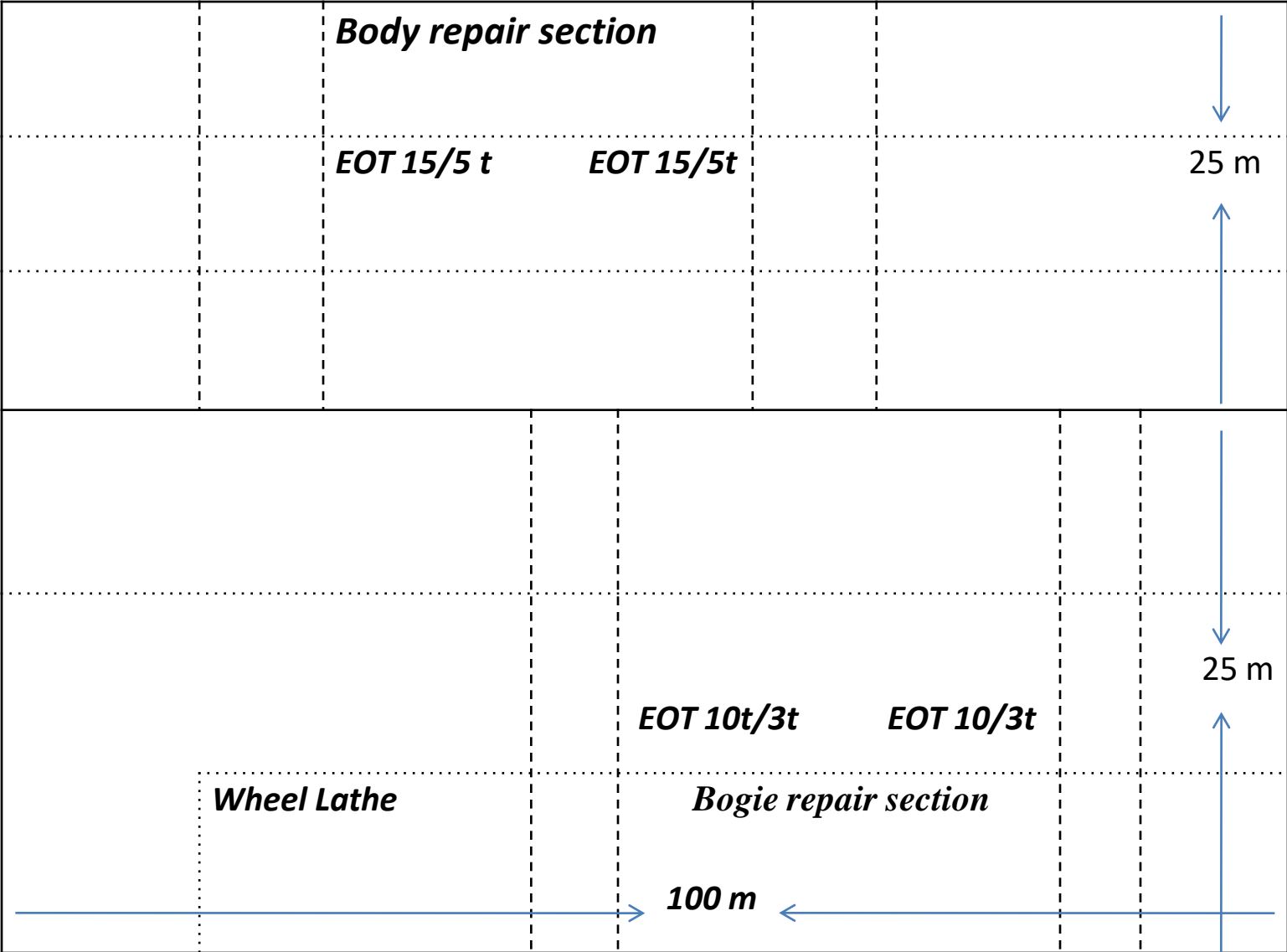
Analysis of sick marking of existing ROH depots on IR reveals that on an average each air brake wagon visits the depot thrice in 18 months, once for schedule ROH and twice for out of course repairs requiring lifting.

Therefore, an air brake depot meant for undertaking 250 ROHs/month needs to tackle another 500 wagons/month out-of-course repairs requiring lifting. Thus the layout should be spacious enough to release about 25-30 wagons/day. The ROH schedule should be completed within 24 hours including placement and withdrawal time. Thus, if the depot has to undertake 250 ROHs/month the berthing capacity for ROH wagons **on trestles should be 12 taking 20% margin for heavy repairs**. Considering a mixed ROH outturn and the working length for BOXN as 15m & BCN/BTPN as 20 m, the length of the ROH depot works out as 100 m.

Casnub bogies require extensive repairs of bogie components. These bogies need to be tackled on bogie manipulators to ensure down hand welding. All wearing surfaces need to be built up to original (new) sizes.

Further, all modifications issued by RDSO need to be implemented to ensure adequate safety. The bogie section is required to supply 20 bogies/day for undertaking 250 ROHs/month apart from repairing bogies required for out-of-course repairs. For this purpose, adequate work stations need to be set in a crange area of about 2500 sq.m. (including wheel lathe area).

Recommended layout of bogie and body repair section for a Major depot undertaking 250 ROHs per month along with sick line work of out-of-course repairs is as follow.



The above layout has to be supplemented with facilities for Stores, machine shop, smithy shop, air brake equipment overhauling sections, model room, compressor room, canteen, hostel, etc. which will largely depend on the existing layout. Covered area under cranes i.e. cranage area for a fixed ROH outturn is a function of placement/withdrawal and number of working shifts. The recommended cranage area for depots undertaking 250 to 500 ROHs per month is given below:-

For ROH depots with Sick-line attention		
250	ROHs/month + sick line repairs with double shift.	5000 sq. m including wheel lathe shed.
300		5600
350		6200
400		6800
450		7400
500		8000

2. For ROH depots WITHOUT Sick-line attention

Depots undertaking only ROH workload and no out-of-course repairs can manage the outturn of 250 ROHs/month in about 3000 sq. m. crange area working in double shifts.

REQUIREMENT OF MACHINERY AND PLANTS

M&P requirement is closely linked with the Depot layout and the system of working. Certain M&Ps are directly related to outturn of depot (e.g. welding machines) but certain M&Ps are related to depot layout, especially material handling equipment. Various repair centres/sections in a depot are as follows:

1. Body shop
2. Bogie shop
3. Air brake equipment
4. Wheel reconditioning
5. Machine shop & material reclamation
6. Stores
7. Black smithy shop
8. Training equipment
9. Canteen & Staff amenities
10. Management information system
11. Office equipment
12. CMT laboratory
13. Miscellaneous.

Recommended list of M&P for a unit depot i.e. handling 250 ROH per month is given below. For a depot handling more than 250 ROH per month, the requirement has to be scaled up depending on depot layout and facilities created. Requirement of M&P for each section is given below:

1. Body section

Sr. No. M&P Quantity

- 1 EOT cranes 15t/5t 2 Nos.
- 2 Welding machines 4 Nos.
- 3 Portable hydraulic rivetter 1 Nos.
- 4 Trestles 12 sets
- 5 Winches As per layout
- 6 Portable Grit Blasting Machine 1 No.
- 7 Lock bolting machine 02 Nos.
8. MIG welding sets 02 Nos.
9. Plasma /Gas cutting 04 Nos.

Bogie section

- 1 EOT crane 10t / 3t 2 Nos.
- 2 Welding machines 6 Nos.
- 3 Portable hydraulic riveter 1 Nos.
- 4 Stores bin 50 Nos.
- 5 Portable electric grinders 3 Nos.
- 6 Jib crane 2.5t 10 Nos.
- 7 Fixture for rivetting spring plank 2 Nos.
- 8 Work station for bogie repair 10 Nos.
- 9 Turn table for wheel sets As per layout.
- 10 Road crane 10t capacity 1 No.
- 11 Bogie manipulators 3 Nos.
- 12 Roller bearing diagnostic equipment 2 Nos.
- 13 Magnetic flaw detector 2 Nos.
- 14 CO2 welding machine 2 Nos.

Air brake equipment

- 1 Elec. Stationery screw air compressor completes with air receiver 15 m³/min (This is for depot only. Additional compressors will be required for yard). 1 No.
- 2 Portable diesel compressor 1 No.
- 3 Single Wagon test rig 2 Nos.
- 4 DV test stand 1 No.
- 5 Hydraulic pipe bending machine 1 No.
- 6 Air conditioners with voltage stabilizer 2 Nos.
- 7 Torque wrench with various sizes of sockets less than 1 inch.
4 set.
- 8 Ultrasonic cleaning table for DV components 1 Nos.

Wheel Reconditioning Equipment

- 1 Surface wheel lathe with Servo controlled voltage stabilizer
1 No.
- 2 Pneumatic torque wrench with sockets 1" to 2" 4 sets
- 3 Pressure grease drum with guns 15t capacity. 2 Nos.
- 4 Ultrasonic flaw detector 2 Nos.
- 5 Bearing marking gadget 1 set
- 6 Mono-rail for handling swarf (detail plan will depend on layout) 1 set
- 7 Bins for storing bearings As per requirement
- 8 Fork lifter 2.5t 1 No.
- 9 P.C. Terminal 1 No.
- 10 Wheel diameter measuring gauge 2 Nos.

Machine shop & material reclamation

- 1 Heavy duty shaping machine 1 No.
- 2 Jib crane 2.5t 1 No.
- 3 Centre lathe 12 ½" cap. 1 No.
- 4 Radial drilling machine 1 No.
- 5 Centre lathe 6" cap 1 No.
- 6 Bench drilling machine 1 No.
- 7 Heavy duty pedestal grinder double ended 1 No.
- 8 Shearing machine 6 mm 1 No.

Stores

- 1 Truck 10t capacity 1 No. 2 Tractor with hydraulic lifting machine and 3 trolleys (trailers) 1 No.
- 3 Fork lift 2t 2 No. 4 Platform truck 2t 2 Nos.
- 5 Battery charger 2 No. 6 Weighing machine 500 kg 1 No.
- 7 Light store vehicle 1 No.
- 8 Hand trolleys with rubber wheels 10 Nos.
- 9 Storage racks As per layout

10 Computer terminal with printer 1 No.

11 Furniture As per layout

7. Training equipment

1 Cut models of DV, SAB, Angle cock. 1 set (each)

2 Television /DVD player 1 set

3 Furniture As per reqt.

4 Hostel along with kitchen equipment As per requirement

5 LCD projector 1 No.

6 PC 02 Nos.

8. Canteen & staff amenities

1 Water cooler 3 Nos.

2 Stainless steel tables & chairs As per reqt.

3 Kitchen equipment, cooking gas, utensils As per reqt.

4 Fitter's lockers As per reqt.

Office Equipment

- 1 PC terminal As per reqt. 2 Printer As per reqt.
- 3 Furniture As per reqt.
- 4 Air conditioner & computer room. As per reqt.
- 5 Intercom 10 lines 1 No. 6 Fax with P&T line 1 No.
- 7 First aid equipment 4 set 8 Photocopier 1 No.
- 9 V.H.F. / CUG phones As per reqt.

Miscellaneous

- 1 Gas cutting equipment 4 Nos. 2 Hydraulic jacks As per reqt.
- 3 SAB test bench 1 No.
- 4 CBC and draft gear replacement equipment 2 sets
- 5 DG set 350/500 KVA 1 No.
- 6 Electric and pneumatic tools As per reqt.
- 7 Rivetting equipment As per reqt.
- 7 Fitter's hand tools. As per reqt.
- 8 Gauges & instruments. As per reqt.
- 9 Wheel flat detector system (*) As per reqt.

MINIMUM INFRASTRUCTURE REQUIRED FOR PREMIUM & CC EXAMINATION-

The following infrastructural facilities are considered essential to carry out premium examination in less than 03 hrs.

Dedicated two or more examination lines with pathways (depending upon nos. of rakes examined)

Embedded track/ Pucca pathway of 02 m width as per layout

Welding facilities and Portable welding set .

Adequate illumination .

Pallets for material storage/dispensing.

Road between office/store and examination yard .

Connectivity with FOIS. Walkie Talkie sets.

Provision of MUV (e.g.Tata Ace truck) for transportation of staff and materials/equipments to examination point .

Rechargeable LED head lamp.