

INFRASTRUCTURE FACILITIES

(For Freight yard, Sick line and ROH Depots)

STC/SPJ

Introduction:

To achieve best performance of freight stock it is necessary that these stocks are maintained properly. However, despite of best practices and trained manpower, proper maintenance, availability and reliability of assets cannot be achieved if adequate infrastructure is not available.

Categorization of Examination / Repair facilities

I. Intensive Examination Points

| Category | Criteria for Categorization |
|----------|--|
| 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. |
| B | (i) Having pucca pathways on more than 50% of the lines nominated for examination. |
| | (ii) Sufficient illumination facilities. |
| | (iii) Sufficient material handling facilities. |

Categorization of Examination / Repair facilities

I. Intensive Examination Points

| Category | Criteria for Categorization |
|----------|--|
| C | (i) Having pucca pathways on more than 50% of the lines nominated for examination. |
| | (ii) Sufficient illumination facilities. |
| D | Having pucca pathways on more than 50% of the lines nominated for examination. |
| E | No pucca pathway but some other facilities are available |
| F | No facilities available. |

Categorization of Examination / Repair facilities

II. 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. |

Categorization of Examination / Repair facilities

III. 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. |

Categorization of Examination / Repair facilities

III. Sicklines

| Category | Criteria for Categorization |
|----------|--|
| 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. |
| E | Berthing capacity under covered shed. |
| F | Without any Berthing capacity under covered shed. |

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.

INFRASTRUCTURE & FACILITIES REQUIRED IN THE YARD

- 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 SSE/J E (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 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 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.

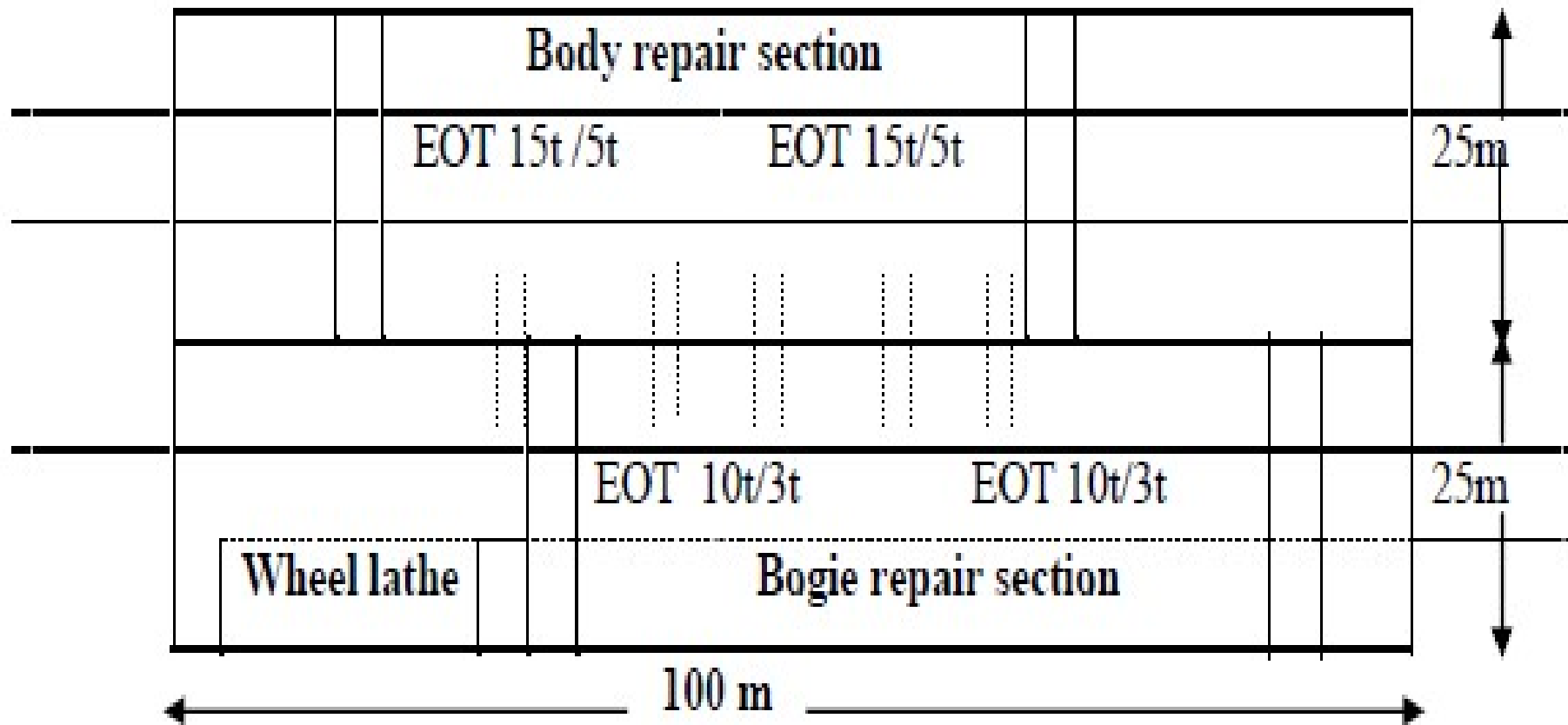
Therefore, an air brake depot meant for undertaking 250 ROHs/month needs to tackle another 500 wagons/month out-of-course repairs requiring lifting. Thus the layout should be spacious enough to release about 25-30 wagons/day.

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.

RECOMMENDED LAYOUT

Casnub bogies require extensive repairs of bogie components. 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 crane area of about 2500 sq.m. (including wheel lathe area).

Layout of bogie and body repair section for a Major depot undertaking 250 ROHs per month along with sick line work



For ROH depots with sickline attention

| ROHs/month + sick line repairs with double shift. | Area in sq. m including wheel lathe shed. |
|---|---|
| 250 | 5000 |
| 300 | 5600 |
| 350 | 6200 |
| 400 | 6800 |
| 450 | 7400 |
| 500 | 8000 |

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. cranage area working in double shifts.

REQUIREMENT OF MACHINERY AND PLANTS

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.

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 | CO ₂ welding machine | 2 Nos. |

Air brake equipment

| | | |
|---|--|--------|
| 1 | Elec. Stationery screw air compressor completes with air receiver 15 m ³ /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 |

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. |

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. |

THANKS