Chief Engineer (Track Machines)
CST, C R, Mumbai - 400 001.
Fairlie Place, E R, Kolkata-700 001.
Baroda House, N R, New Delhi-110 001.
Park Town, S R, Chennai -600 003.
Rail Nilayam, SCR, Secunderabad-500 371.
Garden Reach, S E R, Kolkata-700 043.
Churchgate, W R, Mumbai-400 020
N W R, Jaipur-302 001.
E C R, Hazipur-844 101
SWR, Hubli-580 023
NCR, Allahabad-211 001
East Coast Rly, Bhubaneshwar-751 001
WCR, Jabalpur-482 001
South East Central Rly, Bilaspur-495 004

Dy Chief Engineer (Track Machines)
CPOH WP Krishnapo. PO, Dhoomanganj
Allahabad-221012
CPOH WP Krishnapo. South Central Railway,
Rayanapur, Vijaywada, Dist. -
Krishna, Andhra Pradesh-521241
Principal, IRTMTC, Pipal
Gaon,, Allahabad-211001

Baleshwar Kishore Mohanty (RM-80-92U) की अनुसूचा अनुसूची।
Sub: Maintenance schedule of Ballast cleaning machine
(BCM-80-92U)

Baleshwar Kishore Mohanty (RM-80-92U) की अवधिकार अनुसूची की विवरण, रेलवे के सुधारों/ टिप्पणियों के अधार पर व्यापक गम्य है। इसकी एक अवधिकार रेलवे के ट्रेक की स्थानीय कमियों के आवश्यकताएँ हमें भेजा जा
रहा है।

उपरोक्त अवधिकार अनुसूची बनाने के लिए सभी लाभदायियों को बताते हैं कि कोई सुधार या कोई नजर
आये तो उसे व्यक्त करने के लिए इन तरह लाभदायियों को अवधिकार बनाने का

Maintenance schedule of Ballast cleaning machine (RM-80-92U) has been prepared on the basis of suggestion/ Comments obtained from different Railways. A copy of same is being sent for the guidance of railways personal working on track machine organization.

Every care have been taken during preparation of the above said Maintenance schedule. However the discrepancy noticed if any, may be brought to the knowledge of the undersigned for further improvement.

DA: As above

(ए. के. पार्डी)
कार्यकारी निदेशक / रेलपथशासी

प्रतिलिपि 1. कार्यकारी निदेशक रेलपथशासी, रेलवे बोर्ड, रेल भारत, नई दिल्ली।
2. निदेशक, इंजीनियर रेलवे इंस्टीट्यूट आफ सिबिल इनजीनियरिंग, पुणे।
MAINTENANCE SCHEDULE FOR BALLAST CLEANING MACHINE
RM-80-92U

रिपोर्ट संख्या टी.एम.–178
Report No.TM-178
FEB.-2014
PREFACE

Maintenance of On-Track Machines is a challenging task. Maintenance of these machines is being done by zonal railways with the assistance of local trade available, zonal track machine workshops, CPOH / Allahabad and RDSO / Lucknow. With experience over the years, the railway engineers have developed adequate expertise in the maintenance of these machines. However, in absence of approved maintenance instructions, different maintenance practices have come into vogue. Therefore, it has become imperative to have a uniform maintenance standard throughout the Indian Railways. Maintenance schedule manuals of CSM (09-32), BCM (RM-80), FRM-80, Unimat, Duomatic machine (DUO), Unomatic machine (UNO), Ballast Regulating Machine (BRM 66-4), Tamping Express (09-3X), Dynamic Track Stabilizer (DGS 62N), Multipurpose track tamping machine (Unimat Compact--M), Plasser’s Quick Relaying System (PQRS), T-28, Track Relaying Train (TRT), Phooltas make UTV, FRM-85F, Worksite Tamping Machine (Plasser make), Worksite Tamping Machine (Metex make), BRM (PBR-400R) and Track Laying Equipment (Simplex) have been issued by RDSO.

This Maintenance Schedule of BCM RM-80-92U have been prepared by incorporating the suggestions and feedback taken from field staff of zonal railways.

While every care has been taken to make the maintenance schedules quite exhaustive, there is always scope for further improvement. Suggestions from the railways in this regard will be welcome and may be sent to the undersigned for future improvement.

(Anil Choudhary)
Director/Track Machine
RDSO/Lucknow-226011.

FEB.-2013
EXPLANATORY NOTES

While preparing text of Provisional for Maintenance Schedules Manual for of BCM RM-80-92U, the terms used and their meanings are explained below:

CHECK - Ensure a specific condition does (or does not) exist.

INSPECT - Look for damage and defects including breakage, distortion cracks, corrosion and wear, check for leaks, security and that all items are completed.

CHANGE - Remove old parts by substituting a new or overhauled reconditioned part. Fit new or overhauled / reconditioned part in place of missing part.

OVERHAUL - Dismantle, examine, recondition or renew parts as necessary against given specifications, reassemble, inspect and test.
## INDEX

<table>
<thead>
<tr>
<th>S. NO.</th>
<th>CONTENT</th>
<th>DESCRIPTION</th>
<th>PAGE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Schedule I</td>
<td>To Be Done Daily</td>
<td>1-2</td>
</tr>
<tr>
<td>2.</td>
<td>Schedule II</td>
<td>To Be Done After 50 Hours engine running</td>
<td>3-4</td>
</tr>
<tr>
<td>3.</td>
<td>Schedule III</td>
<td>To Be Done After 100 Hours engine running</td>
<td>5</td>
</tr>
<tr>
<td>4.</td>
<td>Schedule IV</td>
<td>To Be Done After 200 and 600 Hours engine running</td>
<td>6-7</td>
</tr>
<tr>
<td>5.</td>
<td>Schedule V</td>
<td>To Be Done After 1000,3000,5000 Hours engine running</td>
<td>8-9</td>
</tr>
<tr>
<td>6.</td>
<td>Schedule VI</td>
<td>To Be Done After 2000 And 4000 Hours engine running</td>
<td>10</td>
</tr>
<tr>
<td>7.</td>
<td>Schedule VII</td>
<td>To Be Done After 6000 Hours engine running (POH)</td>
<td>11-12</td>
</tr>
<tr>
<td>8.</td>
<td>Annexure-I</td>
<td>Safety</td>
<td>13-14</td>
</tr>
<tr>
<td>9.</td>
<td>Annexure-II</td>
<td>First Aid</td>
<td>15</td>
</tr>
<tr>
<td>10.</td>
<td>Annexure-III</td>
<td>Fire Protection</td>
<td>16</td>
</tr>
<tr>
<td>11.</td>
<td>Annexure-IV</td>
<td>Hazard</td>
<td>17</td>
</tr>
<tr>
<td>12.</td>
<td>Annexure-V</td>
<td>Protective Equipment</td>
<td>18</td>
</tr>
<tr>
<td>13.</td>
<td>Annexure-VI</td>
<td>Instructions For Use Of Starter Batteries</td>
<td>19</td>
</tr>
<tr>
<td>14.</td>
<td>Annexure-VII</td>
<td>Engine Oil Change</td>
<td>20</td>
</tr>
<tr>
<td>15.</td>
<td>Annexure-VIII</td>
<td>Cleaning Of Machine</td>
<td>21</td>
</tr>
<tr>
<td>16.</td>
<td>Annexure-IX</td>
<td>Lubrication</td>
<td>22</td>
</tr>
<tr>
<td>17.</td>
<td>Annexure-X</td>
<td>Original Filling Of Working Stock</td>
<td>23</td>
</tr>
<tr>
<td>18.</td>
<td></td>
<td>Acknowledgement</td>
<td>24</td>
</tr>
</tbody>
</table>
SCHEDULE - I
(TO BE DONE DAILY)

1. ENGINE MODEL NO. DEUTZ-BF 12L 513C
   i. Check level of the lube oil and top up, if required.
   ii. Visual check fuel level and top up if required.
   iii. Check for any oil leakage from the fuel pump, injectors, fuel supply, and return pipes.
   iv. Check engine oil pressure after warming up-
       (a) at idle speed  (min. 1.5 kg/sq.cm)
       (b) on rated speed  (min. 2.5 kg/sq.cm).
   v. Record the maximum engine temperature of the day.
   vi. Clean engines and their premises.
   vii. Check the functioning of engine clutch.
   viii. Drain the water separator: (drive engine 1 and drive engine 2)
   ix. Check clutch fluid level in container.
   x. Check for damage of the V-belt over its entire dimension.

2. HYDRAULIC
   i. Check hydraulic oil level in tank and top up if required.
   ii. Check hydraulic oil level in auxiliary (emergency) tank and top up if required.
   iii. Check leakage in hydraulic circuit and do needful.
   iv. Record the max. Hydraulic oil temperature of the day.
   v. Visual check filters chocking indication if provided.
   vi. Clean the slots next to the joint of the hydraulic cylinders.
   vii. Check for any rubbing of hoses & loose clamping etc. and correct it.
   viii. Check oil level in vibration screen drum.

3. MECHANICAL
   i. Inspect wear plates on ascending & descending side and change badly worn-out plates.
   ii. Check and lubricate the corner roller of excavation chain lubrication.
   iii. Check proper locking of all units.
   iv. Check the function and condition of conveyor belt, belt tension, scraper fingers of conveyors and look out for damages.
   v. Check wear on ballast distribution chutes.
   vi. Check locking screws, round shaft chisel and do needful.
   vii. Ballast distributing chutes: visual check and control.
   viii. Excavation chain guide:
       - check for wear, check the wear strips.
       - Visual check of the entire chain suspension.
       - check all locking devices for their.
       Operability - check all screws for tightness.
   ix. Check the connection between connecting elbow and cutter bar.
4. **POWER TRANSMISSION AND GEAR BOX**
   
i. Check up oil level of both main gear boxes and top up, if required.
   
ii. Check oil level of axle gear boxes and top up, if required.
   
iii. Check for proper axle clutch pressure.
   
iv. Check the filter cartridge contamination indication.

5. **PNEUMATIC**
   
i. Check air brake system pressure.
   
ii. Check for any air leakage.
   
iii. Drain air reservoirs after the day’s work
   
iv. Drain all drip cups.
   
v. Check the contamination indicators (pilot lamps) for dry type air filter
   
vi. Check brake parts of idling bogie and powered bogie.

6. **GENERAL**
   
i. Check for any unusual sound from machine.
   
ii. Check safety items, emergency tools & spares.
SCHEDULE-II
(TO BE DONE AFTER 50 HOURS OF ENGINE RUNNING)
(TO BE DONE IN ADDITION TO SCHEDULE-I)

1. ENGINE
   ii. Change oil in the wet type air filter.
   iii. Clean the fins of engines and air charge cooler.
   iv. Clean battery plugs connections and applies petroleum jelly.
   v. Check and adjust V-belt for tension & slackness if any, over entire dimension is noticed.
   vi. Check electrolyte level in batteries and specific gravity [Minimum specific gravity=1.24].

2. HYDRAULIC
   i. Check function of hydraulic valve for track lifting and do needful.
   ii. Lubricate rail clamp pivot pins with grease.
   iii. Lubricate track lifting cylinder pivots with grease.

3. MECHANICAL
   i. Check clearance of lifting roller disc below the rail head in lowered condition.
   ii. Lubricate screen guide plates with grease.
   iii. Lubricate lifting unit guide columns with grease.
   iv. Lubricate roller clamp housing with grease.
   v. Lubricate locking device pivots with grease.
   vi. Lubricate bearings for main conveyor with grease.
   vii. Lubricate bearing for main and distributing conveyor chain and adjust if required.
   viii. Check the wear of the turret drum area.
   ix. Check guide rollers of conveyor belts.
   x. Excavation chain – check and lubricate central and upper corner rollers.
   xi. Check and lubricate screen unit, guide plates.
   xii. Visual check of tensioning cylinder piston rod; cleaning and lubrication.
   xiii. Inspect wear plates of chain trough.
   xiv. Clean excavating conveyor sliding frame.
   xv. Check the tension of excavating conveyor chain and adjust if required.
   xvi. Check brake shoe clearance and adjust if required.
   xvii. Check, cleaning & oiling of Piston rod, joints.
   xviii. Check and top up bottle for lubricating conveyor chain and ensure that lubrication system is working properly.
   xix. Check anti collision devise of waste conveyors.

4. POWER TRANSMISSION AND GEAR BOX
   i. Lubricate all carden shafts with grease.
   ii. Check the pressure gauges of dredger drum and screen drive while working.
   iii. Check the oil level of conveyor belt gear box A1 and B1.
   iv. Check and top up the lubrication of all conveyor belt system.
5. **ELECTRICAL & ELECTRONICS**
   i. Check all working lights and do needful.

6. **PNEUMATICS**
   i. Clean water separator.
   ii. Clean wet type air filter.

7. **GENERAL:**
   i. Clean complete machine.
1. ENGINE
   i. Clean fuel pre-filter (wire mesh).
   ii. Change the twin stage fuel filter element.

2. POWER TRANSMISSION AND GEAR BOX
   i. Check oil level in turret dredger drum gear box.

Following items to be attended after 500 Engine Running HRS
   i. Change oil in the main gear box.
   ii. Lubricate axle gear box flange cover of driving bogie with grease.

3. MECHANICAL
   i. Check all the idler rollers of conveyor for free rotation.
   ii. Check movement of sliding plate of chain trough.
   iii. Check guide rollers and bushes of cutter chain.
   iv. Check the functioning of emergency backup system.
   v. Check the condition of torque arm bearing.
SCHEDULE-IV  
(TO BE DONE AFTER 200 HRS. OF ENGINE RUNNING)  
(TO BE DONE IN ADDITION TO SCHEDULE- I, II AND III)

1. ENGINE

i. Change engine oil.
ii. Change lub oil filters or whenever changing engine oil.
iii. Check engine hoses for leakage and condition and do needful.
iv. Clean air cleaner element (outer and inner).
v. Drain the fuel tank and cleaning.

2. HYDRAULIC

i. Check all pressure controls for rated settings.
ii. Inspect cooling coil for any breakage or leakage.
iii. Clean fins of hydraulic oil cooler.
iv. Change oil in the oil chamber of tension cylinder.
v. Check breathing filter of hydraulic tank.
vi. Clean the filler ventilation filter of the hydraulic oil tank.
vii. Clean breather filter of hydraulic oil tank.

Following items to be attended after 600 Engine Running HRS

i. Check the hydraulic hoses.
ii. Automatic slewing device: visual check and lubrication of the adjustment area.
iii. Replace all fuel filters.
iv. Visual check and lubricate the bearings of lifting cylinder.
v. Visual check and cleaning of ventilation filter of the screen drive.
vi. Change oil of tensioning cylinder.

3. POWER TRANSMISSION AND GEAR BOX

1. Clean gear oil cooler.
2. Lubricate hand brake gear with grease.
3. Change oil in the axle gear boxes and replace clutch filter.
4. Change oil in the main waste conveyor gear box.
5. Clean the filters of axle gear box clutch.
6. Clean filter elements of main gear box.
7. Remove bushes of axle gear box and check the condition of the piston ring groove.
8. Replace scraper shovel and intermediate links, if required.

Following items to be attended after 600 Engine Running HRS

i. Ballast distributing conveyors swivel arm bearing: visual check, lubrication.
ii. Slewing conveyor belt live ring: oil level check.
iii. Lifting roller bearings: visual check, lubrication.
iv. Visual check and lubricate slewing arm bearing of ballast distributing conveyor belts.
v. Visual check and lubricate Drag bearing of slewing conveyor belt.
vi. Visual check and lubricate hydraulic cylinder of slewing conveyor belt.
vii. Dredger drum gearbox: oil change
viii. Clean the through suction filter of the dredger drum gearbox.
ix. Change the main gearbox filter element.

4. MECHANICAL

i. Check the excavation chain sprocket and change if required.
ii. Recondition/Replace the cutter bar.
iii. Replace excavating fingers if required.
iv. Repair ballast screens.
v. Actuate the clutch, check the fluid level.
vi. Check the brake lining and brake block play.
vii. Screen drive ventilation filter: visual check and cleaning.
viii. Check the clutch pressure and adjust if required.
ix. Check of the conveyor belt suspensions.
x. Check rubber bearing fitted under screen meshes and change if broken.

Following items to be attended after 600 Engine Running HRS

i. Visual check and cleaning of screen drive.
ii. Check and lubricate the brake lever bearing and the brake rods.
iii. Lifting clamp bearings and bolts: - visual check, lubrication.
iv. Visual check and lubricate of drag bearing screen unit.
v. Oil level check with the help of the level plug.
vi. Visual check and lubricate Lifting roller bearings.
vii. Visual check and lubricate Lifting clamps bearings and bolts.
viii. Lubricate the bogie axle bearings.
ix. Replace the built-in filter of the Clutch thrust block.
x. Screen drum: oil change.

5. ELECTRICAL & ELECTRONICS

i. Check function of all limits switches.
ii. Clean alternator and check connections.
iii. Check condition of the battery and cable connections.
iv. Check acid level, the fluid level.
v. Check the main supply cable.

6. PNEUMATIC

i. Clean filter element of pneumatic system.
ii. Check tightness of foundation bolts of brake cylinders.
iii. Check oil level of pneumatic lubricator (air oiler)

Following items to be attended after 600 Engine Running HRS

i. Replace the filter cartridge and granule element of air dryer.
**SCHEDULE-V**

*(TO BE DONE AFTER 1000, 3000 and 5000 Hrs. OF ENGINE RUNNING)*

*(TO BE DONE IN ADDITION TO SCHEDULE- I, II, III AND IV)*

1. **ENGINE**
   i. Lubricate the accelerating mechanism with oil.
   ii. Check high pressure fuel pipes clamps.
   iii. Clean the diesel tanks.
   iv. Decarbonizes cooling coil and check the fittings.
   v. Replace the crank case breather element.
   vi. Change dry type air filter element.
   vii. Test engine temperature indicator.
   viii. Change batteries, if required.

2. **HYDRAULIC**
   i. Check the cover plate bolts of all hydraulic cylinders.
   ii. Change oil in screen drive drum and replace filter element.
   iii. Replace the oil of turn table.
   iv. Clean the hydraulic tank before changing hyd. Oil if required.
   v. Change hydraulic oil on condition basis after chemical testing.
   vi. Check the action of float switch in the hydraulic oil tank.
   vii. Check condition of hydraulic hoses and replace as required.
   viii. Change the hydraulic oil return filter.
   ix. Change the hydraulic oil suction filter of the feed pump.
   x. Change the through hydraulic filter of the control pressure pump.
   xi. Check all pressure settings.
   xii. Change hydraulic suction and return filters.
   xiii. Test hydraulic oil for quality check.
   xiv. Clean the hydraulic oil cooler.
   xv. Clean the main gearbox oil cooler.
   xvi. Remove sediments in the return line filter housing.

3. **POWER TRANSMISSION AND GEAR BOX**
   i. Change oil in the turret gear box.
   ii. Change the pipe-mounted filter of the conveyor belt drive.
   iii. Oil change in the slewing conveyor Belt live ring.
   iv. Replace all conveyor belts and overhaul the driving stations.
   v. Replace the axle gearbox lubrication filter.
   vi. Lubricate the spherical roller bearing of the driving station of main conveyor belt.
   vii. Lubricate the drag bearing of the driving station of main conveyor belt.
   viii. Lubricate the spherical roller bearing of the driving station of slewing conveyor belt.
   ix. Lubricate the drag bearing of the driving station of slewing conveyor belt.
x. Lubricate the spherical roller bearings of the driving station of distributing
    conveyor belts.
xi. Lubricate the drag bearing of the driving station of distributing conveyor belts.
  xii. Re-tension the main conveyor belt, if necessary.
  xiii. Re-tension the slewing conveyor belt, if necessary.
  xiv. Re-tension the distributing conveyor belt, if necessary.
  xv. Visual and physical inspection of wheels shall be done once in a year or once
      after every 1000 engine running hours whichever is earlier.
  xvi. Ultrasonic examination of axle shall be between 40,000 to 45,000 kms of running
      or three years, whichever is earlier.

4. MECHANICAL

  i. Change hood area wear plates.
  ii. Check the functioning of pressure switch of axle clutch and adjust if required.
  iii. Lubricate the axle bearings of the bogies with grease.
  iv. Lubricate swiveling bearings with grease.
  v. Clean and lubricate sliding surfaces and bolts of torque supports with oil.
  vi. Change the chute wear plates.
  vii. Change worn out screen meshes and chute plates, if required.
  viii. Check shock absorber for proper functioning and do needful.
  ix. Check wear of brake shoes change if it cross the minimum limit.
  x. Check and adjust the gap between brake shoe and wheel.
  xi. Check universal joints for play and replace if required.
  xii. Overhaul the complete plow.
  xiii. Replace the worn out broom sticks, if required.
 xiv. Change the worn out rubber pads.
  xv. Check condition of trough plates and replace if required.
  xvi. Replace distributing conveyors and waste conveyor.
  xvii. Replace main conveyor and scrapper rubber.
  xviii. Check condition of roller disc clamp for lifting device and do needful.
  xix. Lubricate chain trough bearings with grease.
  xx. Lifting column, guiding slide ways, guide column: visual check, cleaning, oiling.
  xxi. Check the function of the lifting device, Clean and lubricate.
  xxii. Check foundation and bracket bolts of compressor.
  xxiii. Check up rubber element of torque plate suspension and do needful.

5. ELECTRICAL & ELECTRONICS

  i. Check temperature switch.

6. PNEUMATIC

  i. Check condition of pneumatic hoses and replace as required.

7. GENERAL

  i. Repair the missing and defective hand tools.
  ii. Paint the screen area and chain trough.
SCHEDULE- VI
(IIH)
(TO BE DONE AFTER 2000 and 4000 Hrs. OF ENGINE RUNNING)
(TO BE DONE IN ADDITION TO SCHEDULE- I, II,III,IV AND V)

1. ENGINE

i. Check engine timing and do needful
ii. Check and clean air reservoir.
iii. Check the air compressor. Overhaul if necessary.
iv. Replace V-belts on condition basis.
v. Overhaul the alternator and starter.
vi. Clean turbocharger and do needful.
vii. Check anti vibration mountings of the engine and change, if required.
viii. Calibrate the fuel injection pump.
ix. Calibrate the fuel injectors.

2. MECHANICAL

i. Overhauling of screen vibration unit on need basis.
ii. Overhauling of wear plate need basis.
iii. Overhauling/replacement conveyer belt/chain guide.

3. GENERAL

i. Paint the screen area & chain trough.

Note: Final decision of repairing / replacement of each unit/ parts to be decided after joint inspection of machine in charge and workshop in charge of Zonal Railways.
SCHEDULE-VII
(POH)
(TO BE DONE AFTER 6000 Hrs. OF ENGINE RUNNING)
(TO BE DONE IN ADDITION TO SCHEDULE- I, II,III,IV,V AND VI)

1. ENGINE

i. De-carbonise the engine heads.
ii. Check crank shaft and cam shaft end play.
iii. Overhaul the air compressor.
iv. Change air inlet hoses.
v. Overhaul blower assembly.
vi. Change all the high pressure fuel pipes, pipe clamp, flexible fuel hoses and rubber hoses.
vii. Overhaul turbocharger.
viii. Change shaft seals and bearings of the clutch drive shaft assembly.
ix. Check the exhaust manifold for any defect and clean the same.
x. Change shut down valve on condition basis.
xi. Replace twin filter body.
xii. Replace cooling coil.
xiii. Change anti-vibration mountings of the engine.
xiv. Renew the engine wiring with temperature proof wires.
xv. Change engine safety system, if required.

2. HYDRAULIC

i. Check hydraulic pumps, valves, motors in the test bench for rated output and replace if necessary.
ii. Clean the hydraulic oil tank. Paint the surface of tank with approved quality of paint and fill new oil.
iii. Check all the direct acting and pilot operated direction valves and change if necessary
iv. Check all the pressure control valves and change/overhaul if necessary.
v. Check all the stop cocks and flow control valves and change if required.
vi. Replace all the hydraulic hoses along-with clamps as required.
vii. Check all hydraulic cylinders, change/repair, need basis.
viii. Replace return filter and suction filters.

3. POWER TRANSMISSION AND GEAR BOX

i. Replace the shaft of gear boxes for which splines have twisted or worn out.
ii. Change mounting pad of all gear boxes.
iii. Overhaul the gear boxes.
iv. Replace bearing of cutting chain drive gearbox if required.

4. MECHANICAL

i. Change the wing plate of ballast guide.
ii. Check the wheel tyre profile & reprofile, if required.
iii. Replace the shaft coupling and holding nuts & bolts.
iv. Check shock absorber and replace / repair as necessary.

v. Change the rear frame, chute box and wing frame.

vi. Check the bogie pivot for wear and attend as necessary.

vii. Change the scraper pads and skirt rubbers of all conveyors.

viii. Change all the brake shoes.

ix. Check the axle bearing and grease them. Change if required.

x. Replace the propeller shaft, if required.

xi. Overhaul the complete ascending and descending chain trough.

xii. Provide missing thimbles.

xiii. Overhaul the lifting unit.

xiv. Strengthen the machine frame where cracks have developed.

xv. Check the brake system.

xvi. Repair/replace screen frame.

xvii. Overhaul screen vibration drum and replace bearings.

xviii. Replace bearing of excavating unit.

xix. Overhaul the cutting unit.

5. ELECTRICAL & ELECTRONICS

i. Replace all the limits switches on condition basis.

ii. Check the LED of all solenoids & replace if required.

iii. Overhaul all the panel boxes.

iv. Arrange insulation test of main cables and replace the defective ones.

v. Replace the defective PCBs.

vi. Check emergency backup system.


viii. Replace defective switches and potentiometers.

6. PNEUMATIC

i. Replace pneumatic cylinder seals or cylinders as required.

ii. Clean air tank.

iii. Check all pneumatic valves and change if necessary.

iv. All pneumatic pipes to be replaced.

v. Replace/overhaul air unloader, need basis.

7. GENERAL

i. Overhaul the bogies.

ii. Check the calibration of all the indicative instruments and replace the defective ones.

iii. Flush the complete system.

iv. Check the function of all assemblies.

v. Test the machine for one week before it is put for actual working in section on regular basis.

Note: Final decision of repairing / replacement of each units/ parts to be decided after joint inspection with machine in charge and CPOH in charge.
SAFETY

- Maintenance works in principle have to be carried out when the vehicle is stationary and secured against breaking away.

- It is strictly prohibited to climb on the vehicle roof under catenary. Before beginning repair and maintenance works it must be ensured that the catenary is switched off and earthed. These safety measures have to be carried out and supervised by the responsible safety officers!

- Always pay attention to trains passing on adjacent tracks.

- Use skid-pans when parking the vehicle on gradients.

- If a check of certain structural elements might entail danger, these elements may be checked only when the machine is stationary or after work.

- Before starting maintenance works the parking brake has to be applied (with few exceptions), the engine has to be turned off and the main switch must be switched off.

- Never change the settings of safety valves.

- Before disassembling hydraulic system elements make sure that the equipment is unpressurized. Hydraulic oil coming out under pressure may penetrate skin and cause serious injuries.

- When draining engine oil or hydraulic oil at working temperature you might scald yourself.

- Always ensure that on or in the vehicle nobody works with naked flames.

- Do not smoke when re fuelling the vehicle or checking the acid level of the batteries.

- Never check the acid level of the battery or the fuel level in the tank with a naked flame.

- Before beginning welding works (electric arc welding) particularly make sure that:
  - the machine has been secured against breaking away (parking brake, skid-pans etc.);
  - the engine has been switched off;
  - the main switched has been switched „OFF“;
  - the program control switch has been switched „OFF, if existing;
• the battery sets have been entirely disconnected.

• the earth electrode fastened at the vehicle has been connected as close to the weld as possible.

• The earth electrode must never be mounted on the rail.

• Never connect the earth electrode to cylinder piston rods, hydraulic accumulators, hydraulic pumps, batteries, earth cable, loose connections, such as bearings or similar, or to hydraulic oil or fuel tanks.

• Do not direct any high-pressure cleaning and lubricating devices to man or animal.

• Do not use any easily flammable fluids or caustic cleansing agents to clean the machine.
FIRST AID
Always ensure that the first aid kit is in a proper, complete and neat condition. Immediately refill the used up material.

- **Procedure for first aid measures**

  - **In the case of burning**
    - ✓ Extinguish the burning person with water, fire extinguisher, blankets or through rolling.

  - **In the case of eye contact with hazardous materials**
    - ✓ Rinse out several times with spray bottle or beverage and subsequently consult a doctor.

  - **In the case of skin contact with hazardous materials**
    - ✓ Thoroughly wash with soap under running water and subsequently consult a doctor.

  - **When inhaling hazardous materials**
    - ✓ When inhaling higher concentration, take person into the fresh air and subsequently consult a doctor.

  - **After ingesting**
    - ✓ Do not induce vomiting and immediately consult a doctor.

  - **After intensive contact with clothing**
    - Immediately change saturated clothing, shower and subsequently consult doctor.
FIRE PROTECTION

- Everybody is responsible to refrain from everything that may result in a fire or favor the spreading of a fire. In addition to this, all measures to prevent the development or spreading of fires must be taken in individual cases.
- Oily or greasy rags saturated in solvent must be kept in a fire-protected place since they could cause fires through self-ignition.
- In order to avoid the development of fires, the following parts, must be kept free of deposits.
  - Drives
  - Heaters
  - Belts
  - Gears
  - Control cabinets
  - Power distribution boards etc.
- The fire extinguishers must always be ready for operation, freely accessible, periodically tested and equipped with test plaques.
- The date of expiry must be checked by the responsible fire protection representative.
- The in charge of the machine will immediately make the arrangement for the filling of used fire extinguishers and in the mean time he will also inform the concern controlling officer for the replacement of fire extinguishers.
- The use of open flames and easily flammable agents on the vehicle and in immediate vicinity is strictly prohibited.
- The diesel fuel tanks may only be filled with the engine switched off and cooled off.
- Smoking is strictly prohibited in the vicinity of the machine.
HAZARD

Service life and the operational safety is increased by virtue of carefully performed maintenance, which will be reflected in a clear reduction of working accidents and resultant damage to persons.

- GENERAL

- The instructions of the machine in charge must be followed under any circumstances.
- Entering the machine is only permitted by way of the steps provided for this purpose, which should be kept free of grease, oil, fuel, dirt, snow and ice.
- Climbing onto machine parts during loading, unloading and repair operations located in the hazard area of the overhead line is always prohibited unless the overhead line has been switched off.
- Crossing underneath the machine during operation or working is strictly prohibited.
- If problems are encountered while work in progress, activate the emergency engine stop as required. Based on the type of the fault it must be decided how it should be rectified most effectively. Instinctive reactions for rectifying the fault during working operation may result in serious injury to body and even death.
- Touching the exhaust system may result in burns.
PROTECTIVE EQUIPMENT

In order to keep hazards and their consequences to health as low as possible it is imperative to ensure suitable protective equipment while doing maintenance and working.

- Head protection........Safety helmet
- Hand protection.........Leather and cotton gloves
- Foot protection......... Leather safety boots and shoes
- Warning clothing...... High visibility warning cloth.
- Breathing protection... Dust mask
INSTRUCTIONS FOR USE OF STARTER BATTERIES
INSTALLATION IN THE VEHICLE

- Before removing and installing the battery, switch off the engine and all power consumers.
- Avoid short-circuits through tools.
- When removing the battery, first disconnect the negative terminal (-), then the positive terminal (+).
- Prior to installing the battery, clean the standing area in the vehicle.
- Clean battery terminals and terminal clamps and lightly lubricate with acid-free grease.
- On installation, first connect positive terminal (+), then negative terminal (-). Ensure terminal clamps are tightened securely.

MAINTENANCE

- In order to achieve a long service life for the battery, the following instructions should be observed.
  ✓ Keep the surface of the battery clean and dry.
  ✓ Regularly check the acid level and, if necessary, replenish with desalinated or distilled water. Never add acid.
  ✓ If the acid density is below 1.21 kg/l (or 1.18 kg/l) recharge the battery.
  ✓ Check the fluid level. It should be at least 2-3 mm and maximum 10 mm above the top of the battery plate; if necessary, add distilled water.
  ✓ Measure the acid number of the individual cells with a battery tester.
ENGINE OIL CHANGE

PROCEDURE OF OIL CHANGE

- Heat up the engine at approx. 80°C.
- Ensure level position of the vehicle.
- Turn off the engine.
- Clean the surrounding area of the oil drain plug.
- Open the oil drain plug and collect the oil.
- Do not let oil get into the soil.
- Beware the danger of scalding yourself by the used oil.
- Insert the oil drain plug with a new sealing ring, tighten it.
- Fill the engine crank case with new oil as per the capacity of the engine.
- Wait for 5 minutes, then check the oil level; if it is correct, close the oil drain plug.
- Make sure that the washer of drain plug is correctly seated.
- Replace the filter cartridge whenever changing oil.
- After replacing the filter cartridge, again check the oil level. If it is beyond the limits then do as required.
CLEANING OF MACHINE

- If the machine is soiled to such an extent that maintenance works would be impeded, it is necessary to clean the machine before starting the working.
- Cleaning is the best opportunity to check an element visually.
- Additionally, periodical cleaning is prescribed for certain structural elements.
- It is of particular importance to clean the coolers in time.
- Do not direct any high-pressure cleaning devices against thin covers.
- Do not use any easily flammable or caustic cleansing agents.
- Clean underside at least once a year.
LUBRICATION

- For greasing and oiling, remove any dirt or gummy grease and oil and lubricate the respective part.
- Furthermore, all hydraulic cylinder bearings (even if not listed in the maintenance instruction) have to be checked visually every 50 hours of operation and, if necessary, must be lubricated.
- All movable parts not mentioned in the maintenance instruction, such as piston rods, cylinder fastenings, guide bushes, spindles, slide faces etc., have to be lubricated every 50 hours of operation with oil / grease.
- For lubrication never use a grease gun generating pressure of more than 15 bar.
- Grease and grease gun must be free of dirt and foreign bodies.
- Clean the lubricating nipples of the bearings before and after lubricating them.
- Continue to lubricate until evenly distributed fresh (clean) grease will come out the bearings. Then remove excess quantities of grease.
## ORIGINAL FILLING OF WORKING STOCK

<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>WORKING STOCK</th>
<th>LUBRICANTS</th>
<th>QUANTITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>engine oil, 2x</td>
<td>Rimula Super 15 W-40 (Shell)/equivalent*</td>
<td>40 litres</td>
</tr>
<tr>
<td>2.</td>
<td>main gear box, 2x</td>
<td>Tellus Oil –T 68 (Shell)/equivalent*</td>
<td>20 litres</td>
</tr>
<tr>
<td>3.</td>
<td>axle gearbox, axle 1-4</td>
<td>Tellus Oil –T 68 (Shell) /equivalent*</td>
<td>a`54 litres</td>
</tr>
<tr>
<td>4.</td>
<td>hydraulic oil</td>
<td>Tellus Oil –T 68 (Shell)/equivalent*</td>
<td>2000 litres</td>
</tr>
<tr>
<td>5.</td>
<td>hydraulic oil, auxiliary tank</td>
<td>Tellus Oil –T 68 (Shell)/equivalent*</td>
<td>100 litres</td>
</tr>
<tr>
<td>6.</td>
<td>grease</td>
<td>Grease RETINAX - RL2 (Shell)/equivalent*</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>live ring</td>
<td>Alvania GL 00 (Shell)/equivalent*</td>
<td>10 KG</td>
</tr>
<tr>
<td>8.</td>
<td>tumbl er gear</td>
<td>Tellus Oil –T 68 (Shell)/equivalent*</td>
<td>25 litres</td>
</tr>
<tr>
<td>9.</td>
<td>screen drive</td>
<td>Omala 68 (Shell)/equivalent*</td>
<td>65 litres</td>
</tr>
<tr>
<td>10.</td>
<td>tensioning piston rods</td>
<td>Tellus Oil –T 68 (Shell)/equivalent*</td>
<td>1.5 litres</td>
</tr>
</tbody>
</table>

* Approved by RDSO

Note: The above working stock filling quantities are original filling by manufacturer. In any case, the oil level gauge, the inspection glass and the oil level glass or the level plug mark will be decisive.
ACKNOWLEDGEMENT

Following officers and staff have made their valuable contributions in finalization of the Maintenance Schedule Manual for Ballast cleaning machine BCM-RM-80-92U).

RAILWAYS

1. S/SRI RAJEEV PRASAD SSE/TM/ NR
2. “ “ DHANJAY SHAHI SSE/TM/ NER

RDSO

1. S/SRI Anil Choudhary DTM-III
2. “ “ Muslim Ahmad ARE/TM
3. “ “ Surendra Kumar JRE/TM