



**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS**

**बैलास्ट क्लीनिंग मशीन (आर.एम-80), के लिए निरीक्षण जांच सूची
INSPECTION CHECK LIST FOR BALLAST CLEANING
MACHINE (RM-80)**

**रिपोर्ट संख्या टी.एम.- 73
Report No.TM- 73**

**नवम्बर-2004
NOVEMBER-2004**

**अनुसंधान अभिकल्प और मानक संगठन
लखनऊ-226 011
RESEARCH DESIGNS & STANDARDS ORGANISATION
LUCKNOW-226011**

Name and Designation of Inspecting Officer :

Date of Inspection :

Machine No. :

Base Station :

ITEMS TO BE CHECKED

| S. No. | Item | Description | Condition |
|-----------|------|-------------|-----------|
|-----------|------|-------------|-----------|

1. Oil Levels

| | | | |
|-------|-----------------------|---------------|-----------|
| i) | Hydraulic oil in tank | HLP - 68 | Ok / Less |
| ii) | Diesel tank | HSD | Ok / Less |
| iii) | Axle gear box | HLP – 68 | Ok / Less |
| iv) | Main gear box | HLP – 68 | Ok / Less |
| v) | Engine lube oil | API CF4 15W40 | Ok / Less |
| vi) | Conveyor gear box | HLP – 68 | Ok / Less |
| vii) | Turn table container | HLP – 68 | Ok / Less |
| viii) | Turret drum container | HLP - 68 | Ok / Less |
| ix) | Vibration drum | HLP – 68 | Ok / Less |

| Sl. No. | I t e m | Condition |
|---------|---------|-----------|
|---------|---------|-----------|

2. Engines:

| | | |
|-------|--|----------------------|
| | Engine Model & No | Engine hours |
| i) | Starting problem | Yes / No |
| ii) | Condition of smoke | White/black/normal |
| iii) | Engine temperature after two hrs working | °C |
| iv) | Leakage in Head gasket | No/Yes (Head no.) |
| v) | Electrolyte level in batteries | Ok / Less |
| vi) | Specific gravity of electrolyte (min 1.24) | Ok / Less |
| vii) | Compression leakage | Yes / No |
| viii) | Belt tension (max 15 mm at mid point) | Ok / Less |
| ix) | Condition of battery terminals | Good /To be repaired |
| x) | RPM of the Engine (Rated | Actual |
| xi) | Battery charging | Ok /To be charged |
| xii) | Whether working gauges are in order: | |
| | a) RPM | Yes / No |
| | b) Oil pressure | Yes / No |
| | c) Temperature | Yes / No |
| | d) Battery charging | Yes / No |
| xiii) | Engine oil pressure | |
| | At Idle speed : 1.5 kg/sq cm | Actual |
| | On load at rated speed : 2.5 kg/sq cm | Actual |
| xiv) | Last change of Air Cleaner filters | Dated |
| | | Engine hrs |
| xv) | Last change of engine oil | Dated |
| | | Engine hrs |
| xvi) | Last change of engine oil filters | Dated |
| | | Engine hrs |
| xvii) | Last change of diesel filters | Dated |
| | | Engine hrs |

| Sl. No. | I t e m | Condition |
|---------|--|--------------------|
| xviii) | Last repair / change of batteries | Dated |
| | | Engine hrs |
| xix) | Last repair / change of Self starter | Dated |
| | | Engine hrs |
| xx) | Last repair / change of Alternator | Dated |
| | | Engine hrs |
| xxi) | Last overhauling of the Engine | Dated |
| | | Engine hrs |
| xxii) | Last calibration of fuel injection pump | Dated |
| | | Engine hrs |
| xxiii) | Last calibration of fuel Injectors | Dated |
| | | Engine hrs |
| xxiv) | Engine high temperature safety circuit | Ok / Defective |
| xxv) | Engine oil pressure safety circuit | Ok / Defective |
| xxvi) | Any abnormal sound | Yes / No |
| xxvii) | Last attention given to engine by service engineer | Dated |
| | | Engine hrs |
| xxviii) | Condition of engine hoses | Ok /To be replaced |

| Sl. No. | I t e m | Condition |
|---------|---------|-----------|
|---------|---------|-----------|

3. Power Transmission:

- | | | |
|------|------------------------------|---------------------|
| i) | Oil leakage in gear boxes | No /Yes (gear box) |
| ii) | Play in universal joint | Ok / To be attended |
| iii) | Clutch adjustment | Ok / To be adjusted |
| iv) | Abnormality in Cardon shaft | Found / Not found |
| v) | Greasing of all Cardon shaft | Ok /To be done |

4. Excavation Unit:

- | | | |
|-------|--|------------------------------|
| i) | Greasing of Ascending and Descending rollers | Ok /To be done |
| ii) | Condition of Wear plates | Satisfactory /To be replaced |
| iii) | Condition of excavating chain | Ok / To be attended |
| iv) | Condition of Cutter bar | Ok / To be reconditioned |
| v) | Last reconditioning of Cutter bar | Done on..... Engine Hrs |
| vi) | Last change of Excavating Finger | Done on..... Engine Hrs |
| vii) | Last reconditioning of Wear strips of Cutter bar | Done on..... Engine Hrs |
| viii) | Change of Ascending & Descending Wear plates | Done on..... Engine Hrs |
| ix) | Condition of Turret drum | Ok / To be attended |
| x) | Waste conveyor folding system/ Swiveling system wiring | Ok / To be attended |
| xi) | Central lubrication system | Working / Not working |

| Sl. No. | I t e m | Condition |
|---------|---------|-----------|
|---------|---------|-----------|

5. Screening Unit & Distributor:

| | | |
|------|---|-------------------------|
| i) | Working of ballast distribution chute | Ok /Unsatisfactory |
| ii) | Vibration of the screening unit | Ok / Not ok |
| iii) | Greasing of screen bearing | Ok / To be done |
| iv) | Last change of screen meshes | Done on..... Engine Hrs |
| v) | Last change of oil in screen drive drum | Done on..... Engine Hrs |
| vi) | Last change of wing plate | Done on..... Engine Hrs |
| vii) | Last change of worn out rubber pads | Done on..... Engine Hrs |

6. Track Lifting & Slewing Devices:

| | | |
|-------|--|----------------------|
| i) | Greasing of lifting unit guide column | Ok / To be done |
| ii) | Greasing of rail clamp pivot pins | Ok / To be done |
| iii) | Greasing of roller clamp housing | Ok / To be done |
| iv) | Greasing of locking devices pivots | Ok / To be done |
| v) | Tightness of roller bracket locking | Ok / To be tightened |
| vi) | Clearance of lifting roller disc below the rail head in lower conditions- | Ok / To be adjusted |
| | Rear - 5 mm | |
| | Front - 12 mm | |
| vii) | Working of slewing devices | Ok / Unsatisfactory |
| viii) | Working of lifting cylinder | Ok / Unsatisfactory |
| ix) | Greasing of lifting roller bearing | Ok / To be done |

| Sl. No. | I t e m | Condition |
|---------|---------|-----------|
|---------|---------|-----------|

7. Conveyor Belts:

- | | | |
|-------|---|-----------------------|
| i) | Condition of conveyor belts | Ok / To be replaced |
| ii) | Tension in the conveyor belts | Ok / To be adjusted |
| iii) | Hydraulic slew ability of waste conveyor belts (left & right) | Ok / Unsatisfactory |
| iv) | Hydraulic slew ability of conveyor belts for movement | Ok / Unsatisfactory |
| v) | Proper positioning of waste conveyor belts (It should be at lower position) | Ok / Unsatisfactory |
| vi) | Locking / unlocking devices of conveyor belt | Working / not working |
| vii) | Greasing of main conveyor bearing | Ok / To be done |
| viii) | Condition of idle rollers | Ok / To be replaced |

8. Hydraulic Hoses:

- | | | |
|------|---|-------------------------|
| i) | Any rubbing in hydraulic hoses | Yes / No |
| ii) | General condition of hoses | Ok / Leaking (location) |
| iii) | Hoses required to be changed (nos. & sizes) | |
| iv) | Stock of hoses with the machine | Adequate / less |
| v) | Stock of hose fittings | Adequate / less |

9. PCBs:

- | | | |
|-----|---|---------|
| i) | Requirement of PCB if any | Part no |
| ii) | Defective / released PCB available with machine | Part no |

| Sl. No. | I t e m | Condition |
|---------|---------|-----------|
|---------|---------|-----------|

10. General:

- | | | |
|-------|---|-----------------------|
| i) | General cleanliness of the machine | Ok / To be cleaned |
| ii) | Spares available on the machine as per Annexure – I | Ok / Deficient |
| iii) | All the safety items as per Annexure - II are present | Yes / No |
| iv) | Log books & Schedule registers are filled properly | Yes / No |
| v) | Function of locking devices | Working / Not working |
| vi) | Condition of screen meshes & chute plates | Ok / To be replaced |
| vii) | Condition and clearance of brake shoes | Ok / To be attended |
| viii) | Electrical lights | Working / Not working |
| ix) | Condition of machine working tools (spanner set etc.) | Ok / To be replaced |
| x) | Hydraulic oil temperature | °C |
| xi) | Competency Certificate of Operator | Current / Expired. |

11. During Block Working:

- | | | |
|------|--|-------------|
| i) | Location of working | Km / TP |
| ii) | Pre and Post ballast cleaning operation being done | Yes / No |
| iii) | Duration of block | Hrs |
| iv) | Output of work | meter |

| Sl. No. | I t e m | Condition |
|---------|---|---|
| 12. | Staff: | |
| i) | Strength of staff | Full / deficient |
| ii) | Group Performance | Excellent / V.Good / Good / Average |
| iii) | Cost awareness amongst staff | Excellent / V.Good / Good / Average |
| iv) | Safety awareness amongst staff | Excellent / V.Good / Good / Average |
| v) | Staff due for Medical | |
| 13. | General condition of the machine. | Excellent / Very good / Good / Average |
| 14. | Control Chart of Output | Shown / Not shown |
| 15. | Pending maintenance schedules & reasons | |
| 16. | Any other remarks by Inspecting Officer | |

Signature of Inspecting Officer

Name :

Designation :

List of Spares and Tools

| S.No | Description | Part no. | Quantity |
|------|-------------|----------|----------|
|------|-------------|----------|----------|

A.

General

| | | | |
|-----|---|----------------|----------|
| 1. | Round shaft chisel | 64.08.2034.GEN | 100 nos. |
| 2. | Screw (T. bolts with D.nut and spl. washer) | | 100 nos. |
| 3. | Chain bolt | 61.04.212.GEN | 100 nos. |
| 4. | Fixing pin | 8:40DIN 1481 | 100 nos. |
| 5. | Lock washer | 64.08.2035 | 100 nos. |
| 6. | Wear arch | 62.08.1032 | 1 no |
| 7. | Wear arch | 64.08.1333 | 7 nos. |
| 8. | Strip | 64.08.1330 | 1 no. |
| 9. | Strip | 64.08.1329 | 7 nos. |
| 10. | Wear plate | 64.08.1469 | 3 nos. |
| 11. | Wear plate | 64.08.1449 | 1 no. |
| 12. | Wear plate | 64.08.1461 | 2 nos. |
| 13. | Wear plate | 64.08.1209 | 1 no. |
| 14. | Wear plate | 62.08.1217 | 1 no. |
| 15. | Wear plate | 64.08.1450 | 1 no. |
| 16. | Wear plate | 64.08.1328 | 1 no. |
| 17. | Wear plate | 64.08.1620 | 1 no. |
| 18. | Wear plate | 64.08.1623 | 1 no. |
| 19. | Wear plate | 64.08.1624 | 1 no. |
| 20. | Wear plate | 62.08.1212 | 1 no. |
| 21. | Wear plate | 62.08.1032 | 3 nos. |
| 22. | Wear plate | 62.08.1213 | 1 no. |
| 23. | Strip | 62.08.1300 | 4 nos. |
| 24. | Strip | 64.08.1299 | 4 no. |
| 25. | Strip | 64.08.1451 | 4 no. |
| 26. | Strip | 62.08.1301 | 4 no. |
| 27. | Strip | 64.08.1455 | 1 no. |
| 28. | Screen mesh | 25mm | 6 nos. |

| S.No | Description | Part no. | Quantity |
|-------------|--|-----------------|-----------------|
| 29. | Screen mesh | 50 mm | 6 nos. |
| 30. | Screen mesh | 80mm | 6 nos. |
| 31. | U Clamp with spare nut | | 20 nos. |
| 32. | Counter sunk screw with nut and spl washer | 12 x 50 mm | 20 nos. |
| 33. | Counter sunk screw with nut and spl washer | 12 x 60 mm | 20 nos |
| 34. | Counter sunk screw with nut and Spl washer | 12 x 50 mm | 10 nos. |
| 35. | Counter sunk screw with nut & spl washer | 16 x 65 mm | 20 nos. |
| 36. | Counter sunk screw with nut & spl. Washer | 20 x 50 mm | 20 nos. |
| 37. | Counter sunk screw with nut & spl. Washer | 20 x 65 mm | 20 nos. |
| 38. | Counter sunk screw with nut & spl. Washer | 20 x 90 mmm | 5 nos. |
| 39. | Corner roller assembly | 64.08.500021 | 2 nos. |
| 40. | Conveyer rear scrapping pad (distributing) | | 2 nos. |
| 41. | Conveyer rear scrapping pad (main waste) | | 1 no. |
| 42. | Main scooper with intermediate Link and sub components | | 6 sets |
| 43. | Turret drum sprocket | | 1 no. |
| 44. | HTS. Bolts with nuts | 24 x 130 mm | 2 nos. |
| 45. | Roller | 62.11.7000.09 | 2 nos. |
| 46. | Roller | 62.11.7000.10 | 1 no. |
| 47. | Roller | 62.11.7000.23 | 2 nos. |
| 48. | Roller | 62.11.7000.24 | 2 nos. |
| 49. | Roller | 62.11.7000.11 | 2 nos. |
| 50. | Roller | 62.11.7000.25 | 1 no. |
| 51. | Cutter bar | | 1 no. |

| S.No | Description | Part no. | Quantity |
|----------------------|--|--|--|
| 52. | Cardon shaft (engine to main gear box) | | 1 set |
| 53. | U.J. kit for cardon shaft | | 1 set |
| 54. | H.T.S. hex. Bolts | 6x20, 8x50, 10x25, 10x65, 12x50, 12x90, 16x60, 16x120, 20x90 | 8x25, 25 nos. each. 8x75, 10x40, 10x80, 12x60, 16x50, 16x90, 20x50, |
| 55. | Allen cap screw | 4x20, 10x50, 16x60 | 12x60, 10 nos. each. |
| B. Electrical | | | |
| 1. | Self starter (Bosch type) | | 1 no. |
| 2. | Battery | +ve connector terminal | 2 nos. |
| 3. | Battery | -ve connector terminal | 2 nos. |
| 4. | Battery cable. | | 2 nos. |
| 5. | Pilot lamps | | 5 nos. |
| 6. | Working light & head light bulbs | | 5 sets |
| 7. | Time relay for engine | | 2 sets |
| 8. | 8 Pin relay | | 2 nos. |
| 9. | Fuses | | 1set |
| 10. | Ignition switch | | 1 no. |
| 11. | Shut down valve | | 1 no. |
| 12. | Thimbles off sizes | | 10 each |
| 13. | Distilled water | | 1 lit. |
| 14. | Petroleum jelly | | 1 kg. |

| S.No | Description | Part no. | Quantity |
|------|-------------|----------|----------|
|------|-------------|----------|----------|

C. Engine

| | | | |
|-----|---|---------------------------|--------------|
| 1. | Fuel filter (paper) | | 6 nos. |
| 2. | Fuel filter (cloth) | | 6 nos. |
| 3. | Lub oil filter | 4006104000 | 4 nos. |
| 4. | High pressure fuel pipes | | 1 set |
| 5. | V. belt | KHD2421916(A4 2) | 2 sets |
| 6. | Air filter cartridge (dry type) | KHD2165059 (C/24650/1) | 2 nos. |
| 7. | Fuel filter flat rings and copper washers | | 4 sets |
| 8. | Rubber hoses for air passage | | 1 set |
| 9. | Turbo charger repair kit | | 1 set |
| 10. | Flexible fuel pipes | | 1 set |
| 11. | Brake fluid | | 1 lit. |
| 12. | O-ring for centrifugal filter inner bowl | | 2 nos. |
| 13. | O-ring for centrifugal filter outer bowl. | | 2 nos. |
| 14. | Rocker arm cum gasket | | 12 nos. |
| 15. | Rocker lever assembly | | 2 sets |
| 16. | Push rod. | | 2 sets. |
| 17. | Inlet, Exhaust springs | | 2 nos. each. |

D. Hydraulics

| | | | |
|----|-------------------------------|------------------|--------|
| 1. | Filter element | 62, 05, 1000,113 | 4 nos. |
| 2. | Filter element | 62,05,1000,256 | 4 nos. |
| 3. | Filter element | 62,05,1000,272 | 2 no. |
| 4. | Diff. Pressure filter element | 62,05.1000,293 | 6 no. |
| 5. | Return filter element | 62,05,1000,270 | 1 no. |
| 6. | Return filter element | 62,05,1000,273 | 2 no. |
| 7. | Filter element | 64,08,4000,247,0 | 2 no. |

| S.No | Description | Part no. | Quantity |
|-------------|---|---------------------------|-----------------|
| 8. | Seal set for all hyd. Cylinders | | 1 set |
| 9. | Driving motor shaft seal | 827 Sk 60-80- 7GOET ZE | 2 nos. |
| 10. | Bush (axle gear box) | 64,02,2107,00 | 4 nos. |
| 11. | Piston ring (axle gear box) | 64,02,2000,87 | 12 nos. |
| 12. | Dummy and adopters of all sizes | | 10 nos. |
| 13 | Driving directional valve | | 1 no. |
| 14. | Buffer valve for extra lifting | | 1 no. |
| 15. | Pressure switch for driving | | 1 no. |
| 16. | Hose no.16 h.p. for driving circuit | | 1 no |
| 17. | Hose no20 for excavating circuit | | 1 no. |
| 18. | Hose no24 return hose excavation system | | 1 no. |
| 19. | Hose no.12 for screen vibration circuit | | 1 no. |
| 20. | Hose no.8 h.p. with end fittings (5 mtrs.) | | 1 no. |
| 21. | Hose no.6 h.p. with end fitting (5 mtrs) | | 1 no. |
| 22. | Hose no.4 h.p. with end fitting (5 mtre) | | 1 no. |
| 23. | Main gear box flange oil seal | | 1 set |
| 24. | Turret drum gear box shaft seal | | 1 no. |
| 25. | Hand control valve | | 1 no. |

| S.No | Description | Part no. | Quantity |
|--------------------------|---|---------------------|------------|
| E. Tools: | | | |
| 1. | Standard tools provided with the machine | | 1 set |
| 2. | Digital multimeter | | 1 no. |
| 3. | Heavy duty ratchet spanner for tightening of cutter bar | | 2 nos. |
| 4. | Hook spanner for rail clamp roller sleeve | | 1 no. |
| F. Special tools: | | | |
| 1. | Jack (5 tonnes with foot lifting arrangement) | | 1 no. |
| 2. | Cutter bar lifting bracket | | 2 nos. |
| 3. | Wire rope with closed loops at both ends (10 mm dia) | 2 metres & 9 metres | 1 no. each |

List of Safety Tools

| S.No. | Description | Quantity |
|-------|---|----------|
| 1. | Detonators | 1 box |
| 2. | H.S. flag red | 2 |
| 3. | H.S. flag green | 1 |
| 4. | H.S. lamps | 2 |
| 5. | Chain & Pad lock | 1 set |
| 6. | Terfor (2 t capacity) | 1 |
| 7. | 50 t jack with traverser | 2 |
| 8. | Wooden blocks off sizes | 10 |
| 9. | Rail temperature thermometer (dial type) | 1 |
| 10. | Flasher light | 1 |
| 11. | Hooter | 1 |
| 12. | Walki -Talki set | 1 |
| 13. | First Aid box | 1 |
| 14. | Banner flag | 2 |
| 15. | Portable telephone | 1 |
| 16. | Skids | 4 |

SOME IMPORTANT ITEMS FOR BCM

1. Longer blocks should be stressed for effective working.
2. Track should be surveyed thoroughly for broken sleepers & rail pieces etc., which may obstruct the working.
3. Cables of S&T deptt. and rods passing under the track must be attended by S&T deptt at site.
4. Track fastenings should be tightened before cleaning work and replace missing fastenings to avoid hanging of sleepers during cleaning operation.
5. Muck wagon to be arranged on through ballasted bridges, station yard and cuttings where disposal is not possible on sides.
6. Ballast train should be available immediately after cleaning the ballast, to relax speed restriction in shortest period.
7. TTM & DGS should follow BCM working.
8. Level Crossings should be opened in advance of deploying BCM for continuous working.
9. Frequent shifting of BCM from one location to another should be avoided to achieve good work and adequate progress.
10. Normally, BCM should be deployed on concrete sleepers.
11. Adequate stock of cutter chain, wear plates and other fast wearing parts should be procured in advance.
12. The cutter bar, which is being left in the track, should be properly covered in order to avoid any entanglement with any traffic.
13. No body should be allowed to stand on the other adjacent track, while BCM is working.
14. Availability of ballast cushion upto 250 - 270 mm should be ensured.
15. Ensure that there must not be any obstruction in a width of 4100mm i.e. 2050 mm on either side of the centre of track, to avoid infringement to the cutter chain

PRECAUTIONS TO BE OBSERVED DURING MOVEMENT OF THE MACHINE FROM ONE PLACE TO ANOTHER.

1. All parts, which are not connected to the machine, must be secured against tilting and shifting.
2. Waste conveyor belt should be secured in central position against tilting.
3. Upper part of waste conveyor should be secured in lower position.
4. Both chain troughs are to be completely lifted and secured with chain.
5. Piston of Chain tensioning cylinder should not be extended by more than 25 cm.
6. Excavation chain must be secured against sliding down the chain troughs.
7. The lifting beam for cutter bar and the hook must be secured in upper position.
8. Ballast distributing conveyor should be secured by chains.
9. A set of gas cutting machine should be readily available with the machine.

ACKNOWLEDGEMENT

Following officers and staff have made their valuable contribution in preparation of Inspection Check List of Ballast Cleaning Machine (RM-80)

Railway

- | | | |
|----|----------------------|-----------------------|
| 1. | S/Shri P.K.Dewakaran | Sr. XEN TT NCR Jhansi |
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RDSO

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