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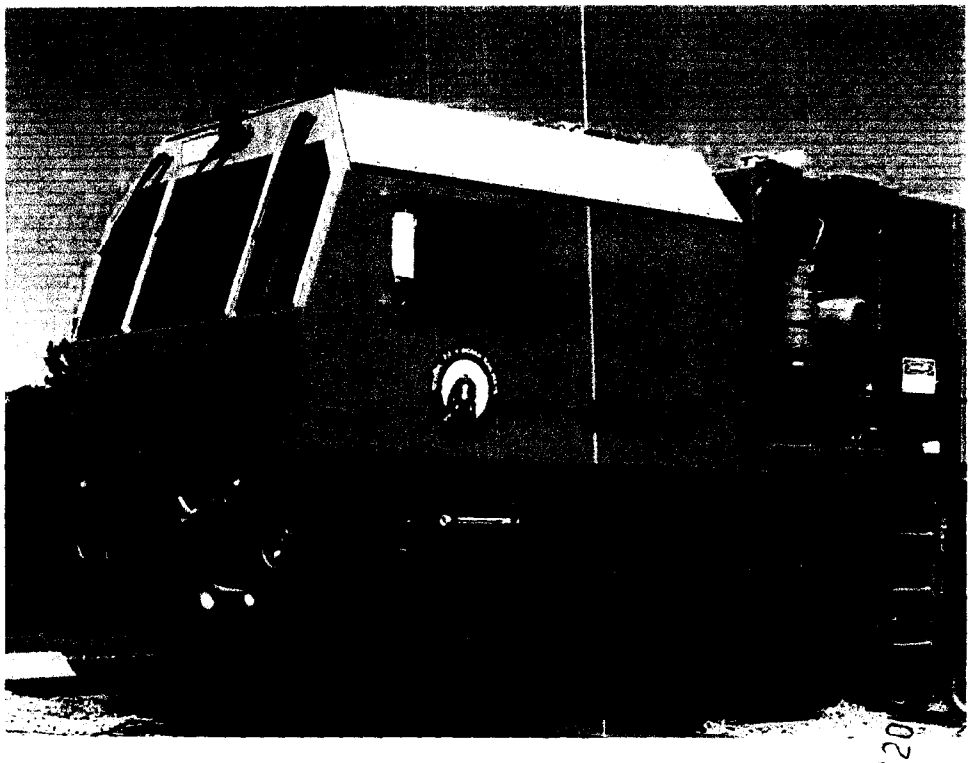
MAINTENANCE SCHEDULE FOR RAIL GRINDING MACHINE



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Report No: TM-180

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PREFACE

Maintenance of Rail Grinding Machines is a challenging task. Maintenance of these machines is being done by concerned railways with the assistance of local trade available. 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 manual of Rail Grinding Machines have been prepared on the basis of M/S Loram's Preventive Maintenance Manual, experience over the time and suggestions received from concerned Railways, where RGM is working.

There are two teams working on RGM, one team consists of operational staff who performs daily check (prior to machine operation and checks while Grinding) and operation of the machine. Another team is Maintenance team, performs scheduled maintenance of RGM.

It is hoped that this manual will be quite useful for the staff maintaining the Rail Grinding Machines in the field.

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.

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EXPLANATORY NOTES

While preparing text of Maintenance Schedules Manual for Rail Grinding Machines, 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.

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Maintenance Logs

Use a maintenance log to record the completion of maintenance procedures. Log sheets should contain the name of the procedure, scheduled interval, actual date of completion and name of the worker who performed the maintenance. Additional information may be required according to local regulations.

Example Maintenance Log

MACHINE: **PAGE** **OF**

PROCEDURE	RECOMMENDED INTERVAL	ACTUAL INTERVAL	DATE COMPLETED	COMPLETED BY

SCHEDULE – I

(TO BE DONE DAILY)
DURATION: 8 HOURS

1. ENGINE & GENERATOR

i. Inspect the engine area for leaks, spills, fuel odors, loose or damaged parts, and a change in the engine appearance.
ii. Perform engine checks
iii. Check the oil level and Check the engine coolant level and topup if required.
iv. Blow out all radiators from non fan side & oil coolers.
v. Inspect belt- guards & all belts for tightness by manually spinning the fan or cooling fan behind the alternator pulley and tighten the belt if fan slides. Replace any belt that is frayed, cracked, or has pieces of material missing.
vi. Visually inspect the air intake piping, air cleaner, air cleaner restriction, air tanks and reservoirs, and fuel-water separator.
vii. Cleaning of components
viii. Drain the water and sediment from the separator.
ix. Check fuel level of tank and top up if required.
x. Visual inspection of the cooling fan.

2. HYDRAULICS SYSTEMS

i. Check the fluid level in the hydraulic tank.
ii. Inspect the hydraulic system
iii. Check & record maximum hydraulic oil temperature of the day during working
iv. Check the hydraulic system in the control car, engine room, GC1, GC2and GC3 for wear and damage.
v. Look for hydraulic fluid leaks near the fittings, and tighten any loose connections.
vi. Inspect the hydraulic hoses for wear and damage.
vii. Check all cylinders for leaks and wear.
viii. Blow out Hydraulic oil cooler fins by compressed air.
ix. Check & record Hydraulic oil pressure of the day's work.

3. GRIND SYSTEM

i. Inspect Proximity Sensor on Buggies.
ii. Check UP/ DN mechanism of grinding modules.
iii. Check grind motors by free spinning for vibration & abnormal sound.
iv. Check Motor Mounting Bolts for missing and tightness.
v. Inspect buggy wheels for wear and damage of fittings.
vi. Clean all components, module frame, grinding motors, hoses, fire guard etc.
vii. Replace spark blankets on need base.
viii. Check thickness of grinding stone & replace if less than 20mm.
ix. Replace damage/ broken stones if any.

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4. RAIL PROFILE MEASUREMENT SYSTEM (KLD)

i. Clean Sensor Head Windows
ii. Inspect Rail Profile Measurement Mounting Cable Connections and Humidity Level

5. TRACTION MOTERS

i. Blow and Clean
ii. Inspection hoses/cables and check tighten , replace if require.

6. ELECTRICAL:

i. Check charging of batteries and its voltage.
ii. Check lighting system (head lights, tail, working lights & flasher light)
iii. Visual check for cable connection between GC to GC, FCC to GC, GC to water wagon & RCC
iv. Check Hot Rail Warning Lights and Siren

7. MACHINE

i. Blow out GC1,GC2,GC3,FCC etc.
ii. Perform a Brake Test
iii. Inspect and Blow Out Air Conditioning Units
iv. Visual inspection of bogies and wheels.
v. Check hand brake application.

8. AIR SYSTEM (AIR COMPRESSOR)

i. Check level/function of air oiler
ii. Check all pipes & hoses and clamp the hoses if rubbing with each other or with metallic parts.
iii. Drain water from air reservoirs after closing the work of day.
iv. Check horn application.

9. FIRE SUPPRESSION SYSTEM (WATER SYSTEM)

i. Check water level of water tank & reserve tank.
ii. Check Water pump and Motors of FCC , grind Car and water wagon.
iii. Check tie spray and ditch spray
iv. Check water leakage.

10. DUST COLLECTION SYSTEM

i. Check Filter purging operation
ii. Check Dust auguring after closing the work
iii. Check dust blower (fan) switch (ON/ OFF) & inspect complete dust collection system in each grind car.

11. GENERAL

i. Inspect the both side cameras (travel & sequence)
ii. FCC- HMI & KLD functional check.
iii. FCC – Frequency converter, voltage regulator functional check
iv. FCC – SCR functional check
v. RCC – KLD & GDMS functional check

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SCHEDULE-II

(TO BE DONE AFTER 50 HOURS OF ENGINE RUNNING)
DURATION: 10 HOURS
(TO BE DONE IN ADDITION TO SCHEDULE-I)

1. ENGINE & GENERATOR

i. Check dust indicators (35hrs.) & clean primary air filters of engine and generator.
ii. Blow out radiator from fan side
iii. Inspect actuator rod eyes
iv. Clean the engine air filters

2. HYDRAULICS SYSTEMS

i. Provide the missing clamps.

3. GRIND SYSTEM

i. Grease Module Vertical Slide Tubes and tilting pivot pin.
ii. Calibrate the Grind Module Tilt Angle.
iii. Lubricate limit switches and cylinder pins
iv. Adjust external spark containment blankets
v. Grease module pivot bushing

4. RAIL PROFILE MEASUREMENT SYSTEM(KLD)

i. Check and clean Computer and ECU Air Filters

5. TRACTION MOTERS

i. Blow out traction motor and air blower primary filters.
ii. Check journal oil levels, add and record any fluid additions in maintenance log
iii. Clean the traction motor air filters

6. ELECTRICAL

i. Inspect cable & coupling between GC to GC, FCC to GC, GC to water wagon & RCC.
ii. Check electrolyte level, specific gravity of battery & record. Clean & tighten battery terminals & leads.
iii. Inspect & clean alternator of engine & tighten electrical connection.

7. MACHINE

i. Inspect and Blow Out Air Conditioning Units
ii. Clean FCC Operator's cabin, Air compressor compartment, SCR box and Frequency Converter
iii. Check brake shoes for wear/damage & replace if required.
iv. Lubricate all ball & socket pivot joints and bush bearing of feeler rod by oil.
v. Check draw bar pins & lubricate if required

8. AIR SYSTEM (AIR COMPRESSOR)

i. Check air brake system linkage and lubricant if required
ii. Check level/function of air oiler
iii. Blow out Air Compressor
iv. Clean air compressor filters
v. Grease air compressor motor (Bimonthly)

9. FIRE SUPPRESSION SYSTEM (WATER SYSTEM)

i. Clean the Water Strainer, Tie Sprays, and Ditch Sprays
ii. Clean Water Pump Strainer Basket
iii. Check Water pump &Strainer

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SCHEDULE-III

(TO BE DONE AFTER 250 HOURS OF ENGINE RUNNING)

DURATION: 12 HOURS

(TO BE DONE IN ADDITION TO SCHEDULE-I &-II)

1. ENGINE & GENERATOR

i. Check low oil pressure safety and high temperature safety device.
ii. Change lube oil after 100 hrs first time. (only for new engine)
iii. Change lube oil by pass filter only first time (& then condition basis)
iv. Blow out All Engine Radiators and Oil Coolers
v. Clean crank case air breather.
vi. Clean primary air filter and check dust ejectors.
vii. Grease Engine Fan Bearing and Pulley
viii. Replace lube oil.
ix. Replace lube oil filter.
x. Replace engine fuel filter
xi. Inspect engine air intakes
xii. Check tightness of "V" Belts.
xiii. Check air cooler fan for dust and debris.
xiv. Check Emergency Shutdowns
xv. Grease Engine Fan Bearings
xvi. Inspect Generator, Blower, Belts
xvii. Check for Leaks and Grease all Bearings.
xviii. Change corrosion filter (coolant)

2. HYDRAULIC SYSTEMS

i. Check pressure of all sections for rated settings and adjust if necessary.
ii. Sample the Hydraulic oil for quality check.

3. TRACTION MOTERS

i. Inspect end brass wear
ii. Inspect support bearing wicks
iii. Inspect Armature Brushes and replace if necessary
iv. Lubricate Traction Motor Bull gear (Apply 1 packet bull gear grease)

4. ELECTRICAL SYSTEM.

i. Clean alternators and check connections.
ii. Clean battery terminals and apply petroleum jelly.
iii. Clean the frequency converter box air filter

5. MACHINE

i. Calibrate the encoder if required
ii. Inspection and measurement of wheels. Record on wheel sheet and maintenance log
iii. Check Encoder Leads and Mounts
iv. Inspect Drive Trucks
v. Clean dust flame retardant.
vi. Measure buggy wheel wear and record in maintenance log.

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6. AIR SYSTEM (AIR COMPRESSOR)

i. Adjust brake pressure, if required
ii. Adjust unloader valve pressure, if required

7. GRIND SYSTEM

i. Perform idle amp calibration. Record in maintenance log.

TO BE DONE AFTER 500 HOURS OF ENGINE RUNNING
(In addition to above)

A. ENGINE& GENERATOR

i. Replace all primary & Secondary air filters of engine, write installation date on filter and record in maintenance log.
ii. Replace all primary & Secondary air filters of Generator, write installation date on filter and record in maintenance log. (750 hrs of Engine running)
iii. Grease Generator Bearing.

B. AIR SYSTEM (AIR COMPRESSOR)

i. Inspect the air compressor air filter
ii. Replace air filters (750 hrs of Engine running)

C. MACHINE

i. Grease articulated joints and draw bars
ii. Inspect wheel flange.

D. DUST COLLECTION SYSTEM

i. Grease anti-friction bearings

E. FIRE SUPPRESSION SYSTEM (WATER SYSTEM)

i. Grease water pump motors

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SCHEDULE-IV

TO BE DONE AFTER 1000 HRS. OF ENGINE RUNNING

DURATION: 3 Days

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

1. ENGINE& GENERATOR

i. Inspect Generator, Blower, Belts, Check for leaks and Grease all the Bearings.
ii. Check / Change worn out water hoses on condition basis.
iii. Check / Change bearings and shaft of radiator fan drive on condition basis.
iv. Clean the engine radiator.
v. Grease anti friction bearing of blower.
vi. Clean diesel tank.
vii. Check RPM of engine radiator fan.
viii. Grease engine fan bearing and pullies where needed. Record in maintenance log
ix. Replace Fuel Tank Breather filters.
x. Check Generator windings and record reading in maintenance log.

Following items to be done after 1500 engine hours (In addition to above)

a. Overhaul/ replace the fuel injectors if required.
b. Adjust fuel injection pump and valve clearance.
c. Drain and replace actuator oil

2. HYDRAULIC SYSTEMS

i. Check accumulator pre-charge (Gas pressure)

3. GRIND SYSTEM

i. Grease the grind motors

4. TRACTION MOTERS

i. Replace primary and secondary air filters. Write installation date on filter and record in maintenance log.

5. AIR SYSTEM (AIR COMPRESSOR)

i. Replace compressor lubricant filter
ii. Inspect compressor filter,fan and pulley.
iii. Replace coalescing filter

6. DUST COLLECTION SYSTEM

i. Replace Dust flame retardant. (if required)
ii. Replace auger gearbox oil

7. FIRE SUPPRESSION SYSTEM (WATER SYSTEM)

i. Check / change wornout water hoses on condition basis.

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SCHEDULE-V

(TO BE DONE AFTER 2000 HRS. OF ENGINE RUNNING)

(IOH OF ENGINE)

DURATION: 10 DAYS

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

1. ENGINE & GENERATOR

i. Carry out engine service by Autherised service engineers.
ii. Check Tightness of Mounting Bolts.
iii. Change the engine mounting pads on condition basis.
iv. Clean engine safely by suitable means.
v. Check all hoses for crack, cuts etc replace if required.
vi. Inspect all rubber cushioning mounts for crack and damages replace if require.
vii. Inspect all mounting brackets for cracks or damaged bolt holes.

2. HYDRAULIC SYSTEMS

i. Grease the Hydraulic Pump/ Drive Motors. – once a year
ii. Replace hydraulic pressure filters. Record date in maintenance log- once a year
iii. Replace hydraulic in-tank return filters. Record in maintenance log – once a year
iv. Replace hydraulic tank breathers. Record in maintenance log – once a year

3. RAIL PROFILE MEASUREMENT SYSTEM (KLD)

i. Calibrate sensor heads, Record in maintenance log

4. TRACTION MOTERS

i.. Check Traction motor Bearing and shaft.

5. ELECTRICAL SYSTEM

i. Thoroughly clean all panel boxes.
ii. Provide missing thimbles.
iii. Replace defective switches and potentiometers on condition basis.
iv. Replace defective indicative instruments.
v. Replace the missing or defective light.
vi. Grease Frequency Converter Motor
vii. Check tightness of 120 V,480 V AC system

6. GRIND SYSTEM

i. Inspect carriage slide tubes

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7. AIR SYSTEM (AIR COMPRESSOR)

i. Replace air dryer filters.
ii. Check air compressor discharge lines.
iii. Change compressor oil Pallub-32P
iv. Replace desiccant canister and dryer valves
v. Replace Air /Oil separator filters (elements)
vi. Overhaul air compressor.

8. FIRE SUPPRESSION SYSTEM (WATER SYSTEM)

i. . Check Water pumps and motors and repair if required

9. DUST COLLECTION SYSTEM

i. Grease dust blower (fan) motor and shaft.

10. GENERAL

i. Check expiry date of Fire Extinguisher

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SCHEDULE- VI

(IOH OF MACHINE AND POH OF ENGINE)

(TO BE DONE AFTER 6000 HRS. OF ENGINE RUNNING)

DURATION: 20 DAYS

(IOH of MACHINE)

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

MACHINE IOH

1. HYDRAULIC SYSTEMS

i. Replace all hydraulic hoses
ii. Flush the complete system.

2. GRIND SYSTEM

i. Replacement of Grind Buggy wheels
ii. Replace hoses of all module and Grind Buggy
iii. Replace all lower module pivot bushings

3. MACHINE

i. Complete inspection of the undercarriage including all wheels, axles and bogies.
ii. Turning of wheels/ replacement of wheels as per requirement based on local inspection of the equipment

4. ELECTRICAL SYSTEM

i. Overhaul the engine alternators.
ii. Overhaul self starter on condition basis.
iii. Change batteries on condition basis.

5. AIR SYSTEM

i. Replace Air Compressor Air/Oil Separator Element

6. GENERAL

i. Complete machine may be painted

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ENGINE POH

(TO BE DONE AFTER 6000 HRS. OF ENGINE RUNNING)

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

7. ENGINE& GENERATOR

i. Overhaul or replace the engine.
ii. Overhaul the injectors.
iii. Overhaul the fuel injection pump.
iv. Change engine mounting pads.
v. Change water hoses.
vi. Change engine air cleaner elements.
vii. Change all engine filters along with lube oil.
viii. Check the RPM of Engine radiator fan, if found less than the rated RPM, take corrective measures.
ix. Clean the diesel tank.
x. Checks cooling system. It must be clean to work correctly and to eliminate buildup of harmful chemicals.
xi. Checks for coolant leaks.
xii. Test function of thermostat.
xiii. Check the thermostat for wear or damage. If the barrel of the thermostat is worout or fretted, it must be discarded.
xiv. Check water pump, replace it if required.
xv. Inspect turbo charger function. (Look for damaged or cracked compressor or turbine blades)
xvi. Check the vibration damper for evidence of fluid loss, dents and wobbles etc.

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SCHEDULE-VII

MACHINE POH
& (Engine IOH)
(TO BE DONE AFTER 15000 HRS. OF ENGINE RUNNING)
OR 60 MONTHS
(Whichever is earlier)
DURATION: 1st POH-45 DAYS, 2nd POH-60 DAYS
(TO BE DONE IN ADDITION TO SCHEDULE- I, II, III, IV, V AND VI)

1. HYDRAULIC SYSTEM

i. Change all Hydraulic pumps and motors on need basis
ii. Replace/overhaul all Hydraulic cylinders on condition basis
iii. Clean the Hydraulic tank, inside to be painted with approved quality of paint.
iv. Fill new oil after replacing return line and suction filters
v. Clean Hydraulic oil cooler. If it is blocked more than 20% during service or badly Leaking, then replace it.
vi. Change all the valves on condition basis.
vii. Change all 'O' rings and oil seals.

2. MACHINE

i.. De-scaling of all pipes/ replacement of the same

3. RAIL PROFILE MEASUREMENT SYSTEM (KLD)

i.. Overhaul/ service of optical Rail Profile Measuring system/ KLD

4. TRACTION MOTORS

i. Complete inspection of the traction system and traction motor / replace if needed

5. ELECTRICAL SYSTEM

i. Replace or repair the defective PCBs. Condition basis
ii. Replace the limit switches. Condition basis
iii. Overhaul the panel boxes.
iv. Defective switches and indicative lights may be replaced.
v. Check the LED of all the solenoids & replace if required
vi. Check the calibration of digital potentiometers and replace the defective ones.
vii. Reconditioning/ replace batteries.

6. AIR SYSTEM

i. Replace water separator and air oiler. Condition basis
ii. Change all pneumatic hoses.
iii. Change all pneumatic valves.
iv. Overhaul/ Change all pneumatic cylinders on condition basis.
v. Change brake cylinders on condition basis.
vi. Change all the brake shoes
vii. Replace cooling coil.
viii. Replace air unloader.
ix. Clean and test air tanks.

7. FIRE SUPPRESSION SYSTEM (WATER SYSTEM)

i. Clean out rust, corrosion and de-scale from water tanks and plumbing circuit.
ii. Replace/ overhaul water pump and motors.
iii. Change water hoses.

8. DUST COLLECTION SYSTEM

i. Replace/ overhaul blower motors and blower assembly.
ii. Replace/ overhaul complete auger system.

9. GRIND SYSTEM

i. Replace buggy wheels including bearings and shaft.
ii. Replace all module guide tube/rod.
iii. Check complete buggy frame and repair/ strengthen as required.
iv. Replace all bearings and bushes of tilt cylinders and module.
v. Calibrate all modules.
vi. Overhaul / Replace the buggies, wheels & feeler rollers.

10.. GENERAL

i. Review computer upgrade for touchscreen HMI, GDMS and KLD
ii. Complete and thorough cleaning of the BTPN
iii. Strengthen machine frame where cracks have developed.
iv. Recondition worn-out wheels of all sensing trollies.
v. Repair/ replace all bushes and bearing of sensing bogies.
vi. Pre- inspection of complete machine by Machine supervisor / senior official of Indian Railway to estimate a complete list of parts to be repaired / replaced.
vii. Inspect and repair of bogies and machine frame of FCC and RCC.

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DAILY CHECK LIST

Perform these checks daily, prior to machine operation.

ACTIVITY	COMMENTS
Check overhead line protection and decals	
Check running line	
Conduct safety briefing	
Check all engines	
Check engine oil levels	
Check engine coolant levels	
Check fuel level	
Check radiator cap	
Check air compressors	
Check all belts for wear	
Blow down entire machine	
Inspect crank case breather tube	
Remove slag	
inspect cooling fan	
Inspect and grease carriages	
Inspect hoses for wear	
Inspect for hydraulic leaks	
Inspect orange fire wrap	
Check engine mounts	
Inspect fuel tanks	
Check air systems	
Restock machine with stones	
Drain reservoirs	
Clean cabs	
Check fire extinguishers	
Fill water tanks	
Inspect spark guards	
Inspect KLD	
Inspect RCA	
Free spin check	
Check underframes	
Check bogies	
Check brake system	
Check wheels and axles	
Check buffers, drawgear, or couplings	
Check floors, body, doors and roof	
Check electrical connections	
Check electrical wires	
Check painting and lettering	
Check carriages	
Check buggy wheels	
Grind carriage retainers	
Verify securing devices indicators	
Verify fire detection system	

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Clean railroad area	
Charge radio batteries	
Review work done	
Record information	
Record engine hours	

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DAILY CHECK LIST

Perform these checks While Grinding.

ACTIVITY	COMMENTS
Check oil temperature	
Check oil level	
Check tank return filter indicator LHS	
Check tank return filter indicator RHS	
Check high pressure bypass	
Check servo pressure bypass	
Check low pressure bypass	
Check high pressure manifold gauge	
Check low pressure manifold gauge	
Check servo pressure manifold gauge	
Check high pressure accumulator gauge	
Check low pressure accumulator gauge	
Check for hydraulic system leaks	
Check compressors	
Check for compressors leaks	
Check traction motor blower	
Check spark control LHS	
Check spark control RHS	
Check dust systems	
Check engine oil pressure	
Check engine water temperature	
Check engine battery voltage	
Check engine fuel pressure	
Check engine air filter indicators	
Check generator air filter indicators	
Check blowers	
Check engines	
Check for hydraulic leaks	
Weekly hydraulic inspection	

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Note : For safety Guide Lines, First Aid, Fire Protection and Hazard, please follow the manual of 'SEFETY GUIDE LINES FOR RAIL GRINDING MACHINE' issued by RDSO vide letter no. TM/HM/RGM/pt.IV dated 05.08.2013

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.

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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.

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ACKNOWLEDGEMENT

Following officers and staff have made their valuable contributions in finalization of the Maintenance Schedule for RAIL GRINDING MACHINES

RAILWAYS

1. S/SRI Murli Krishna Gudimetla — Dy CE/TM/SCR/BZA
2. '' '' J.S.Yadav — AXEN/TMC/L/ALD

RDSO

1. S/SRI Anil Choudhary — DTM-III.
2. " " Gaurav Verma — JDTM-I
3. " " M. P. Pandey — ARE/TM
4. " " Dilip Kumar — SSE/TM
5. " " R. S. Bharti — SSRE/TM
6. " " Prince Kumar — JRE/TM

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