

### Scope of work

1. **Name:** Comprehensive AMC of EOT Crane No. 454, 455, 456, 457 & 465 Qty.-05 Nos. as per scope of work for 03 year at GKPS.
2. **Quantity of work:** - 05 Nos. of EOT Crane.
3. **Period of contract:** - 36 Months from the date of issue of LOA.
4. **Place of work:** - Mechanical Workshop, Gorakhpur.
5. **Starting of work:** - Within 30 days from date of issue of LOA.
6. **Working hours:** -
  - a) The work is to be carried out between 8:00 to 16:30 (Monday to Saturday) except on Sunday and holiday. If required, contractor can work up to 10 PM duly taking the permission of administration depending upon the requirement of the work.
  - b) The work should be carried out only during working days and the contractor will not be permitted to work on Holidays and Sunday. However, if desired by the Railway administration, the contractor may be asked to carry out the work on Holidays and Sundays as well, depending upon the requirement of work.
  - c) The working time may be altered as per the need of the Railway and any such changes in timings shall be binding on the contractor. The contractor shall have to be prepared for managing his workforce according to such alteration in working time.
7. **Inspection:** - The inspection shall be carried out by SSE/MTS.

Sr. No.	Description			Maker's Name	Date of Commissioning
	CraneNo.	Location	Capacity		
1	454	New LHB Shed	30/7.5 Ton	M/s AMT RSA JV, Lucknow	14.06.2023
2	455	New LHB Shed	30/7.5 Ton	M/s AMT RSA JV, Lucknow	14.06.2023
3	456	New LHB Shed	30/7.5 Ton	M/s AMT RSA JV, Lucknow	31.07.2023
4	457	New LHB Shed	30/7.5 Ton	M/s AMT RSA JV, Lucknow	31.07.2023
5	465	Old Sawmill	05 Ton	M/s AMT RSA JV, Lucknow	31.07.2023

The following works to be carried out by the firm during Comprehensive AMC Contract of Cranes.

8. All the spares (Mechanical & Electrical) required for the purpose of Breakdown & Schedule maintenance of EOT Cranes are in the scope of maintenance contract and will be responsibility of the firm undertaking the above maintenance contract and will be arranged by the firm, free of cost itself, except lubricants. The firm executing the above maintenance contract will need to stock sufficient Mechanical and Electrical spares.
9. **Following should always be ensured (Daily checking):** -
  1. Functioning of limit switches in the-cranes.
  2. Functioning of thruster's brakes.
  3. Oil level in thruster's brakes.
  4. Functioning of brakes of all type of motions (LT/CT/Main Hoist/Auxiliary hoist).
  5. Functioning of bridge lights.
  6. Checking of wire rope, wire rope drum and ensure that wire rope is properly fitted/tightening in rope drum.
  7. Proper locking & free rotation of hook and pulleys of Snatch Block.
  8. Functioning of Hooter.

#### **10. Schedule Maintenance: –**

- a) The contractor will do the monthly maintenance schedule as per **Annexure-A (down time allowed 01 day)**, Quarterly maintenance schedule as per **Annexure-B (down time allowed 02 day)**, Half yearly maintenance schedule as per **Annexure-C (down time allowed 02 day)** and Yearly maintenance schedule as per **Annexure-D (down time allowed 03 day)** of each EOT Crane. However, in case of any major breakdown occur, the duration of maintenance period will be extended. The matter will be decided by Firm and Railway.
- b) The contractor will maintain the EOT Crane with expert hand and shall not disturb the manufacturing accuracies of Crane. The schedule maintenance regime offered must be aimed at achieving minimum breakdown.

#### **11. Breakdown Maintenance-**

- a) Whenever a breakdown of EOT crane occurs, the same will be intimated to the person nominated by the contractor by the SSE/MTS through Fax/Phone/SMS/WhatsApp/Email.
- b) The time of intimation will be recorded in a register maintained by SSE/MTS and will be countersigned by the person nominated by the contractor. For each crane there will be a separate register. The person who will be nominated by the contractor for the work, will remain in the working place during working hours or as decided by railway in the contract period to look after the work.
- c) When the repair has been done then the contractor will intimate the time of repairing which again will be recorded in the same register and countersigned by both SSE/MTS and contractor.
- d) In case of breakdown/any failure of the EOT Crane contractor shall have to attend within 12hrs. from the time of information, given by the railway through Fax/Phone/SMS/WhatsApp/Email. For first breakdown in a quarter 03 days grace period is provided and only 02 days grace period will be provided in 2<sup>nd</sup> breakdown in a quarter. No grace period will be provided beyond 2 breakdowns in a quarter.

#### **12. General Terms & Condition**

- a) The Comprehensive AMC shall be valid for 03 (Three) year.
- b) The Comprehensive AMC work is to be started within 30 days after receipt of letter of acceptance issued by railway. Within 30 days of issuing LOA, the contractor shall visit the EOT Cranes to ensure the necessary spares required for Comprehensive AMC work before starting Comprehensive AMC.
- c) Skilled worker required for maintenance shall be provided by the contractor and it will ensure that the skilled worker will present at the working place regularly at Gorakhpur Workshop in view of use of EOT Crane.
- d) Mechanical workshop GKP shall provide only space for storage of spares, compressed air, water, electricity, DA and Oxygen free of cost to the contractor. Material handling facilities like forklift, road crane, battery operated platform truck etc. shall be provided by Railway depending on the availability, however if material handling facilities are not available from Railway side firm shall arrange its own facilities to avoid any delay in work.
- e) The old components released on replacement shall be handed over to SSE/MTS and shall be property of Railway.
- f) The components to be repaired by contractor outside the working place shall be transported at his own cost and means.
- g) Attending of day to day Electrical & Mechanical breakdown of EOT cranes along with all the required material and contractor has to keep the down time as minimum as possible.
- h) Contractor will be fully responsible for the Safety of their staff. The competent experienced staff who is capable to work on EOT Crane should be deputed and all the safety precautions, personal safety equipment's (like Safety Helmet, Safety Shoes and Hand gloves etc. commensurate with the severity of work area) must be used by the contractor staff while working on crane. (Railway will not be responsible for anything goes wrong with contractor's staff during working. It will be the responsibility of contractor only.)
- i) To Ensure proper working of the crane after each Schedule maintenance/Breakdown Maintenance, Schedule maintenance proforma is to be signed by contractor representative.
- j) Contractor should nominate sufficient electrical staffs & mechanical staffs to attend the daily break down of crane as well as Comprehensive AMC schedule of the cranes.
- k) Contractor should plan the material required for day-to-day maintenance, Monthly/Quarterly/half yearly/yearly preventive maintenance to avoid delay to keep the crane in working order.
- l) All the system of EOT cranes shall be monitored regularly for any abnormality noticed or reported, it shall be corrected immediately.

- m) The firm should use quality spares only. These should be of the same make or similar of same capacity as originally provided in the crane. In case of wire rope replacement, load test certificate must be submitted by the contractor, which is issued by Government Approved Agency.
- n) During breakdown maintenance and schedule maintenance, if one or more parts are found defective, it will be responsibility of the firm that the same would be replace/repair. All spares shall be deemed to be necessary for the execution of work will be in the in the scope of Contractor for which no extra payment shall be made to the contractor.
- o) In case of any dispute, decision of Railway Administration shall be final. The decision regarding whether an item/spare is to be replaced/reconditioned shall be decided by SSE/MTS with approval of concerning railway officer.
- p) Any repair/work which are not specifically mentioned in the scope of work but required or otherwise are necessary for proper function/safety of the EOT Crane shall be considered to be included in the scope of Contractor.
- q) In case of failure or part of failure occurs while carrying out the Comprehensive AMC of the EOT Crane during the Comprehensive AMC period or violation of any terms & conditions of the contract by the firm, the railway administration reserves it's right to terminate the contract without assigning any reason and the railway administration shall neither to be liable nor shall compensate if any firm sustains any financial loss for the same.
- r) No transportation/travelling charge/railway pass etc. will be allowed to the firm for sending their service engineers, material etc. to carry out the above said contract.

**13. Warranty-** The warranty of replaced items should be one year from the date of commissioning.

**14. FIRE SAFETY COMPLIANCE IN WORKSHOP PREMISES (WHEREVER APPLICABLE): -**

- a) The contractor must conduct a fire risk assessment before starting any work involving heat, flammable materials, or electrical tools, taking into consideration the watch time for any hot work.
- b) All the engaged workforce should be well versed with the use of firefighting equipment like extinguishers, fire balls, sand buckets etc. and shall have complete information about the placement/location of their availability for prompt usage at the time of need.
- c) Storage and use of flammable items in use of contract (paints, diesel, LPG, oxygen acetylene) must be in designated, ventilated areas only.
- d) The contractor must ensure use of fire-resistant PPE and deploy a trained fire watcher during welding, cutting, or grinding, wherever required.
- e) All temporary electrical connections must be taken only by certified electricians and removed after job completion. No cut wires will be allowed.
- f) Strict No Smoking compliance in all workshop areas and near flammable storage zones.
- g) Contractor staff must participate in fire drills, maintain good housekeeping, and ensure that cotton waste/oily rags are disposed of in metal bins.
- h) Hot work must not start without a valid hot work permit, and the fire watcher must stay 30 minutes after completion of work.
- i) The contractor must keep updated records of PPE issue and hot work permits
- j) Non-compliance with fire safety instructions may result in work stoppage or penalty, as decided by the railway. Damage if any to railway property due to lapse of fire safety by contractor will be recovered from contractor as decided by railway.

**15. Penalty clause-**

- a) If contractor fails to start the AMC within 30 days of issuing LOA, a penalty of Rs. 500/- per day will be imposed. However, no penalty will be imposed if delay is on account of railway.
- b) Penalty shall be levied on the contractor for Machine breakdown beyond specified limits after discounting the grace period and schedule maintenance period. A part from the grace period for each additional working day lost, a penalty @ 0.1% of annual charges of Comprehensive AMC shall be levied and deducted from firm's bill.
- c) If the Contractor fails to attend any monthly preventive maintenance schedule the monthly charge of Comprehensive AMC calculated as 1/12th of annual charges of Comprehensive AMC shall not be paid to contractor and an additional penalty of 0.5 % of annual charges of Comprehensive AMC will be levied as penalty from contractor's running bill.

- d) If the total cumulative breakdown period exceeds 48 days in an AMC year the contract will be terminated and PG and SD will be forfeited. Total cumulative breakdown period will be counted after discounting the grace period.
- e) If the Contractor's staffs fail to wear personnel protective equipment before entry in the workshop and work place penalty 200/- per day per staff will be imposed.
- f) If any pending work will not be completed within 07 days, then a penalty imposed @ 1000/- per day.
- g) If daily checking work not done by contractor, then a penalty imposed @ 500/- per day.

**16. Payment-**

- a. No advance payment will be made by the Railway.
- b. Payment will be release only after successful completion of quarterly quarter @ 25% of annual charges of Comprehensive AMC counted from the date of commencement of AMC maintenance of Cranes.
- c. The payment of CAMC service charge will be released at the end of each quarter counted from the date of commencement of CAMC for which the firm will have to submit the invoice/bill along with photo copy (duly attested) of current ITCC, other tax payment (if any). The bill duly accepted and allocated by concerning SSE Countersigned by controlling officer will be forwarded to Account Department.
- d. Deduction as applicable and as mentioned in this contract will be made from the payment to the contractor by the Railway as per the rules. All the legally applicable taxes shall be deducted at source from the amount payable to the contractor.
- e. While processing payment of any 'On Account Bill' or 'Final bill' or release of 'Advances' or 'Performance guarantee/Security Deposit', contractor shall submit a certificate to the Engineer or Engineer's representative that "I have uploaded the correct details of contract labors engaged in connection with this contract and payment made to them during the wage period in Railway's Shramikkalyan portal at 'www.shramikkalyan.indianrailways.gov.in' -----Month,-----Year."

**17. Bill passing Officer:** Dy.CME/Repair, Mechanical Workshop, Gorakhpur.

**18. Bill Paying Authority:** Sr.AFA, Mechanical Workshop, Gorakhpur.

Monthly Schedule Maintenance (Mechanical & Electrical)**MECHANICAL**

Sr. No.	Activities of Preventive Schedule	Work done	Work not done	Remarks
1	Checking of gap of brake shoe and brake drum and adjust brake spring manually if required.			
2	Checking of all motions brake system. Repair/Replace if found any defects.			
3	Visual checking of wire rope, if any defect, replace it.			
4	Checking tightness of all nut bolt and studs i.e. motor foundation, gear box, coupling etc. if found loose, tightening them.			
5	Checking of gear box oil level, if required top-up.			
6	Checking of limit switch & hooter, repair/replace if found defective.			
7	Checking of proper locking & free rotation of hook and pulley of snatch block.			
8	Lubrication of wire rope.			
9	Checking bearings of all motion gear boxes and wheels, if found defective replace it.			
10	Checking of wire rope and ensure that wire rope is properly fitted/tightening in drum.			
11	Cleaning of cranes.			

**ELECTRICAL**

<b>Sr. No.</b>	<b>Activities of Preventive Schedule</b>	<b>Items to be checked</b>	<b>Items of Replacement</b>
1	Check all motors for any abnormality.	All motors (Slip ring & squirrel cage etc.) (IR value of stator, rotor, No load current to be measured.)	If abnormal noise observed power circuit to be checked and rectification to be done accordingly, Bearing/Slip rings to be replaced if found defective. If Motor Stator/rotor winding found defective, rewinding of the same to be done, if rewinding is not possible than the complete motor should be replaced by the new one.
2	Check the Carbon Brush & Brush Holder of all Motor.	All Motors (Slip Ring).	If Carbon brush found worn out, same to be replaced. If Brush holder found defective, same to be replaced.
3	Check all Contactors.	Main Control Panel, Hoist/LT/CT Control Panel	If Contact tips (Fix and moving), operating coil Mechanism, found defective, same to be replaced accordingly, if complete assembly of contactor working properly, same to be replaced with new one contractor.
4	Check all timers.	Main Control Panel, Hoist/LT/CT Control Panel.	To be replaced if not functioning properly.
5	Check all Overload Relays.	Main Control Panel, Hoist/LT/CT Control Panel.	To be replaced if not functioning properly.
6	Check operations of all limit switches.	All Limit Switches (Hoist LT & CT Control including Gravity Limit Switch).	If not functioning properly than setting is to be done, if again not functioning than it should be replaced by new one.
7	Check all Resistance boxes and their connections.	Resistance box grid tightness, connection, resistance value, IR Value.	If grid/insulating tube found defective, same to be replaced. If not possible than resistance box to be replaced by the new one.
8	Check VVVF Drive	Complete VVVF Drive unit.	If VVVF Drive not working properly same to be repaired/ replaced as per site requirement
9	Check Main current Collector.	Current Collectors.	If Current Collector pad found worn out, same to be replaced.
10	Check DSL/Shrouded Bus Bar.	Complete DSL/Shrouded Bus Bar Circuit	If any abnormalities found in DSL/Shrouded Bus Bar circuit same to be rectified/repared/replaced accordingly. If insulator found broken or damaged the same to be replaced accordingly.
11	Check all master controllers/Pendant/Push button stations of all operations.	All master controller in control cabin/floor operated pendant push button station	Repair/Replace the master controller if not working properly. Pendant, Push button to be replaced if found defective.
12	Check working of all Thruster.	Thruster motor operations of all brake assembly.	If oil leakage from the thruster motor assembly, seals to be replaced, If thrust from motor is not sufficient to lift the brake assembly mechanism thruster assembly to be replaced by new. No repairing permitted except replacement of oil seals.
13	Cables to be checked.	Capillary/festoon cable, Power & Control Cables.	Festoon cable trolleys to be replaced if found defective. If require, additional trolleys to be provided. All defective cables to be replaced by suitable size of FRLS cables.
14	Check terminal tightness of all connections	Main Control Panel, Hoist /LT/CT Control Panel.	If Clip on terminals found defective, same to be replaced. If Junction box found defective or damaged, same to be Replaced accordingly.
15	Check Fuses/Fittings for proper rating and their condition.	Main Control Panel, Hoist/LT/CT Control Panel.	Proper size/rating of HRC fuses to be provided in place of re-wirable fuses. If fuses carrier/base found over heated, same to be replaced.
16	Check Isolating Switches	Main switch, Control isolating switches.	If operation and function of any Isolating Switch found defective, same to be replaced.
17	Other Electrical Accessories.	Control transformer, light, Cabin fan, hooter, Anti-collision device, etc.	All other electrical items to be replaced with new one.

**Quarterly Schedule Maintenance (Mechanical & Electrical)****MECHANICAL**

<b>Sr. No.</b>	<b>Activities of Preventive Schedule</b>	<b>Work done</b>	<b>Work not done</b>	<b>Remarks</b>
1.	Checking of gap of brake shoe and brake drum and adjust brake spring manually if required.			
2.	Checking of all motions brake system. Repair/Replace if found any defects.			
3.	Visual checking of wire rope, if any defect, replace it.			
4.	Checking tightness of all nut bolt and studs i.e. motor foundation, gear box, coupling etc. if found loose, tightening them.			
5.	Checking of gear box oil level, if required top-up.			
6.	Checking of limit switch & hooter, repair/replace if found defective.			
7.	Checking of proper locking & free rotation of hook and pulley of snatch block.			
8.	Lubrication of wire rope.			
9.	Checking bearings of all motion gear boxes and wheels, if found defective replace it.			
10.	Checking of wire rope and ensure that wire rope is properly fitted/tightening in drum.			
11.	Checking of brake liner, replace if found worn out.			
12.	Checking of hoist gear box, brake drum, wire rope drum and drum lock plate, if any defect repair/replace it			
13.	Checking of LT, CT wheels & Axle, ensure wheels are same diameter, replace if required.			
14.	Check of leakage, if found leakage replace oil seal & packing.			
15.	Checking of snatch block assembly (hook, pulleys, bearing etc.) of main hoist and Auxiliary hoist. If found any defect repair/replace it.			
16.	Repair/welding of safety guard and platform, foundation/structure of gear box, motor or any part of Crane if found defective.			
17.	Checking of end carriage/chassis nut bolt, tight the loose nut bolt and replace the damage nut bolts.			
18.	Checking of wire rope and wire rope drum and it will ensure that wire rope is tightly/properly fitted in rope drum.			
19.	Cleaning of cranes.			
20.	Checking of crane gantry track line for any defect/misalignment and take corrective action.			

**ELECTRICAL**

<b>Sr. No.</b>	<b>Activities of Preventive Schedule</b>	<b>Items to be checked</b>	<b>Items of Replacement</b>
1	Check all motors for any abnormality.	All motors (Slip ring & squirrel cage etc.) (IR value of stator, rotor, No load current to be measured.)	If abnormal noise observed power circuit to be checked and rectification to be done accordingly, Bearing/Slip rings to be replaced if found defective. If Motor Stator/rotor winding found defective, rewinding of the same to be done, if rewinding is not possible than the complete motor should be replaced by the new one.
2	Check the Carbon Brush & Brush Holder of all Motor.	All Motors (Slip Ring).	If Carbon brush found worn out, same to be replaced. If Brush holder found defective, same to be replaced.
3	Check all Contactors.	Main Control Panel, Hoist/LT/CT Control Panel	If Contact tips (Fix and moving), operating coil Mechanism, found defective, same to be replaced accordingly, if complete assembly of contactor working properly, same to be replaced with new one contractor.
4	Check all timers.	Main Control Panel, Hoist/LT/CT Control Panel.	To be replaced if not functioning properly.
5	Check all Overload Relays.	Main Control Panel, Hoist/LT/CT Control Panel.	To be replaced if not functioning properly.
6	Check operations of all limit switches.	All Limit Switches (Hoist LT & CT Control including Gravity Limit Switch).	If not functioning properly than setting is to be done, if again not functioning than it should be replaced by new one.
7	Check all Resistance boxes and their connections.	Resistance box grid tightness, connection, resistance value, IR Value.	If grid/insulating tube found defective, same to be replaced. If not possible than resistance box to be replaced by the new one.
8	Check VVVF Drive	Complete VVVF Drive unit.	If VVVF Drive not working properly same to be repaired/ replaced as per site requirement
9	Check Main current Collector.	Current Collectors.	If Current Collector pad found worn out, same to be replaced.
10	Check DSL/Shrouded Bus Bar.	Complete DSL/Shrouded Bus Bar Circuit	If any abnormalities found in DSL/Shrouded Bus Bar circuit same to be rectified/repared/replaced accordingly. If insulator found broken or damaged the same to be replaced accordingly.
11	Check all master controllers/Pendant/Push button stations of all operations.	All master controller in control cabin/floor operated pendant push button station	Repair/Replace the master controller if not working properly. Pendant, Push button to be replaced if found defective.
12	Check working of all Thruster.	Thruster motor operations of all brake assembly.	If oil leakage from the thruster motor assembly, seals to be replaced, if thrust from motor is not sufficient to lift the brake assembly mechanism thruster assembly to be replaced by new. No repairing permitted except replacement of oil seals.
13	Cables to be checked.	Capillary/festoon cable, Power & Control Cables.	Festoon cable trolleys to be replaced if found defective. If require, additional trolleys to be provided. All defective cables to be replaced by suitable size of FRLS cables.
14	Check terminal tightness of all connections	Main Control Panel, Hoist /LT/CT Control Panel.	If Clip on terminals found defective, same to be replaced. If Junction box found defective or damaged, same to be Replaced accordingly.
15	Check Fuses/Fittings for proper rating and their condition.	Main Control Panel, Hoist/LT/CT Control Panel.	Proper size/rating of HRC fuses to be provided in place of re-wirable fuses. If fuses carrier/base found over heated, same to be replaced.
16	Check Isolating Switches	Main switch, Control isolating switches.	If operation and function of any Isolating Switch found defective, same to be replaced.
17	Other Electrical Accessories.	Control transformer, light, Cabin fan, hooter, Anti-collision device, etc.	All other electrical items to be replaced with new one.



**Half Yearly Schedule Maintenance (Mechanical & Electrical)****MECHANICAL**

Sr. No.	Activities of Preventive Schedule	Work done	Work not done	Remarks
1.	Checking of gap of brake shoe and brake drum and adjust brake spring manually if required.			
2.	Checking of all motions brake system. Repair/Replace if found any defects.			
3.	Visual checking of wire rope, if any defect, replace it.			
4.	Checking tightness of all nut bolt and studs i.e. motor foundation, gear box, coupling etc. if found loose, tightening them.			
5.	Checking of gear box oil level, if required top-up.			
6.	Checking of limit switch & hooter, repair/replace if found defective.			
7.	Checking of proper locking & free rotation of hook and pulley of snatch block.			
8.	Lubrication of wire rope.			
9.	Checking bearings of all motion gear boxes and wheels, if found defective replace it.			
10.	Checking of wire rope and ensure that wire rope is properly fitted/tightening in drum.			
11.	Checking of brake liner, replace if found worn out.			
12.	Checking of hoist gear box, brake drum, wire rope drum and drum lock plate, if any defect repair/replace it			
13.	Checking of LT, CT wheels & Axle, ensure wheels are same diameter, replace if required.			
14.	Check of leakage, if found leakage replace oil seal & packing.			
15.	Checking of snatch block assembly (hook, pulleys, bearing etc.) of main hoist and Auxiliary hoist. If found any defect repair/replace it.			
16.	Repair/welding of safety guard and platform, foundation/structure of gear box, motor or any part of Crane if found defective.			
17.	Checking of end carriage/chassis nut bolt, tight the loose nut bolt and replace the damage nut bolts.			
18.	Checking of wire rope and wire rope drum and it will ensure that wire rope is tightly/properly fitted in rope drum.			
19.	Checking of all motion gear shaft, Gears, Shaft, Coupling & Bearings it found defective repair/replace it.			
20.	Replacement of Lubricants.			
21.	Checking of nuts for proper locking,			
22.	Checking of nuts bolts and washer for wear, lubricate teeth of geared coupling, repair/replace if required.			
23.	Ensure proper alignment of driving wheel axle and gear box and motor.			
24.	Cleaning of cranes.			
25.	Checking of crane gantry track line for any defect/ misalignment and take corrective action.			

**ELECTRICAL**

<b>Sr. No.</b>	<b>Activities of Preventive Schedule</b>	<b>Items to be checked</b>	<b>Items of Replacement</b>
1	Check all motors for any abnormality.	All motors (Slip ring & squirrel cage etc.) (IR value of stator, rotor, No load current to be measured.)	If abnormal noise observed power circuit to be checked and rectification to be done accordingly, Bearing/Slip rings to be replaced if found defective. If Motor Stator/rotor winding found defective, rewinding of the same to be done, if rewinding is not possible than the complete motor should be replaced by the new one.
2	Check the Carbon Brush & Brush Holder of all Motor.	All Motors (Slip Ring).	If Carbon brush found worn out, same to be replaced. If Brush holder found defective, same to be replaced.
3	Check all Contactors.	Main Control Panel, Hoist/LT/CT Control Panel	If Contact tips (Fix and moving), operating coil Mechanism, found defective, same to be replaced accordingly, if complete assembly of contactor working properly, same to be replaced with new one contractor.
4	Check all timers.	Main Control Panel, Hoist/LT/CT Control Panel.	To be replaced if not functioning properly.
5	Check all Overload Relays.	Main Control Panel, Hoist/LT/CT Control Panel.	To be replaced if not functioning properly.
6	Check operations of all limit switches.	All Limit Switches (Hoist LT & CT Control including Gravity Limit Switch).	If not functioning properly than setting is to be done, if again not functioning than it should be replaced by new one.
7	Check all Resistance boxes and their connections.	Resistance box grid tightness, connection, resistance value, IR Value.	If grid/insulating tube found defective, same to be replaced. If not possible than resistance box to be replaced by the new one.
8	Check VVVF Drive	Complete VVVF Drive unit.	If VVVF Drive not working properly same to be repaired/ replaced as per site requirement
9	Check Main current Collector.	Current Collectors.	If Current Collector pad found worn out, same to be replaced.
10	Check DSL/Shrouded Bus Bar.	Complete DSL/Shrouded Bus Bar Circuit	If any abnormalities found in DSL/Shrouded Bus Bar circuit same to be rectified/repared/replaced accordingly. If insulator found broken or damaged the same to be replaced accordingly.
11	Check all master controllers/Pendant/Push button stations of all operations.	All master controller in control cabin/floor operated pendant push button station	Repair/Replace the master controller if not working properly. Pendant, Push button to be replaced if found defective.
12	Check working of all Thruster.	Thruster motor operations of all brake assembly.	If oil leakage from the thruster motor assembly, seals to replaced, if thrust from motor is not sufficient to lift the brake assembly mechanism thruster assembly to be replaced by new. No repairing permitted except replacement of oil seals.
13	Cables to be checked.	Capillary/festoon cable, Power & Control Cables.	Festoon cable trolleys to be replaced if found defective. If require, additional trolleys to be provided. All defective cables to be replaced by suitable size of FRLS cables.
14	Check terminal tightness of all connections	Main Control Panel, Hoist /LT/CT Control Panel.	If Clip on terminals found defective, same to be replaced. If Junction box found defective or damaged, same to be Replaced accordingly.
15	Check Fuses/Fittings for proper rating and their condition.	Main Control Panel, Hoist/LT/CT Control Panel.	Proper size/rating of HRC fuses to be provided in place of re-wirable fuses. If fuses carrier/base found over heated, same to be replaced.
16	Check Isolating Switches	Main switch, Control isolating switches.	If operation and function of any Isolating Switch found defective, same to be replaced.
17	Other Electrical Accessories.	Control transformer, light, Cabin fan, hooter, Anti-collision device, etc.	All other electrical items to be replaced with new one.

**Yearly Schedule Maintenance (Mechanical & Electrical)****MECHANICAL**

Sr. No.	Activities of Preventive Schedule	Work done	Work not done	Remarks
1.	Checking of gap of brake shoe and brake drum and adjust brake spring manually if required.			
2.	Checking of all motions brake system. Repair/Replace if found any defects.			
3.	Visual checking of wire rope, if any defect, replace it.			
4.	Checking tightness of all nut bolt and studs i.e. motor foundation, gear box, coupling etc. if found loose, tightening them.			
5.	Checking of gear box oil level, if required top-up.			
6.	Checking of limit switch & hooter, repair/replace if found defective.			
7.	Checking of proper locking & free rotation of hook and pulley of snatch block.			
8.	Lubrication of wire rope.			
9.	Checking bearings of all motion gear boxes and wheels, if found defective replace it.			
10.	Checking of wire rope and ensure that wire rope is properly fitted/tightening in drum.			
11.	Checking of brake liner, replace if found worn out.			
12.	Checking of hoist gear box, brake drum, wire rope drum and drum lock plate, if any defect repair/replace it			
13.	Checking of LT, CT wheels & Axle, ensure wheels are same diameter, replace if required.			
14.	Check of leakage, if found leakage replace oil seal & packing			
15.	Checking of snatch block assembly (hook, pulleys, bearing etc.) of main hoist and Auxiliary hoist. If found any defect repair/replace it.			
16.	Repair/welding of safety guard and platform, foundation/structure of gear box, motor or any part of Crane if found defective.			
17.	Checking of end carriage/chassis nut bolt, tight the loose nut bolt and replace the damage nut bolts.			
18.	Checking of wire rope and wire rope drum and it will ensure that wire rope is tightly/properly fitted in rope drum.			
19.	Checking of all motion gear shaft, Gears, Shaft, Coupling & Bearings if found defective repair/replace it.			
20.	Replacement of Lubricants.			
21.	Checking of nuts for proper locking,			
22.	Checking of nuts bolts and washer for wear, lubricate teeth of geared coupling, repair/replace if required.			
23.	Ensure proper alignment of driving wheel axle and gear box and motor.			
24.	Checking of LT & CT end buffer, repair/replace if required.			
25.	Checking welding of all structural connection and joints, if found defective weld it.			
26.	Checking of wire rope grooves in rope drum.			
27.	Lubrication of all LT & CT wheel bearings.			
28.	Cleaning of cranes.			
29.	Checking of crane gantry track line for any defect/misalignment and take corrective action.			

**ELECTRICAL**

<b>Sr. No.</b>	<b>Activities of Preventive Schedule</b>	<b>Items to be checked</b>	<b>Items of Replacement</b>
1	Check all motors for any abnormality.	All motors (Slip ring & squirrel cage etc.) (IR value of stator, rotor, No load current to be measured.)	If abnormal noise observed power circuit to be checked and rectification to be done accordingly, Bearing/Slip rings to be replaced if found defective. If Motor Stator/rotor winding found defective, rewinding of the same to be done, If rewinding is not possible than the complete motor should be replaced by the new one.
2	Check the Carbon Brush & Brush Holder of all Motor.	All Motors (Slip Ring).	If Carbon brush found worn out, same to be replaced. If Brush holder found defective, same to be replaced.
3	Check all Contactors.	Main Control Panel, Hoist/LT/CT Control Panel	If Contact tips (Fix and moving), operating coil Mechanism, found defective, same to be replaced accordingly, if complete assembly of contactor working properly, same to be replaced with new one contractor.
4	Check all timers.	Main Control Panel, Hoist/LT/CT Control Panel.	To be replaced if not functioning properly.
5	Check all Overload Relays.	Main Control Panel, Hoist/LT/CT Control Panel.	To be replaced if not functioning properly.
6	Check operations of all limit switches.	All Limit Switches (Hoist LT & CT Control including Gravity Limit Switch).	If not functioning properly than setting is to be done, if again not functioning than it should be replaced by new one.
7	Check all Resistance boxes and their connections.	Resistance box grid tightness, connection, resistance value, IR Value.	If grid/insulating tube found defective, same to be replaced. If not possible than resistance box to be replaced by the new one.
8	Check VVVF Drive	Complete VVVF Drive unit.	If VVVF Drive not working properly same to be repaired/ replaced as per site requirement
9	Check Main current Collector.	Current Collectors.	If Current Collector pad found worn out, same to be replaced.
10	Check DSL/Shrouded Bus Bar.	Complete DSL/Shrouded Bus Bar Circuit	If any abnormalities found in DSL/Shrouded Bus Bar circuit same to be rectified/repared/replaced accordingly. If insulator found broken or damaged the same to be replaced accordingly.
11	Check all master controllers/Pendant/Push button stations of all operations.	All master controller in control cabin/floor operated pendant push button station	Repair/Replace the master controller if not working properly. Pendant, Push button to be replaced if found defective.
12	Check working of all Thruster.	Thruster motor operations of all brake assembly.	If oil leakage from the thruster motor assembly, seals to replaced, If thrust from motor is not sufficient to lift the brake assembly mechanism thruster assembly to be replaced by new. No repairing permitted except replacement of oil seals.
13	Cables to be checked.	Capillary/festoon cable, Power & Control Cables.	Festoon cable trolleys to be replaced if found defective. If require, additional trolleys to be provided. All defective cables to be replaced by suitable size of FRLS cables.
14	Check terminal tightness of all connections	Main Control Panel, Hoist /LT/CT Control Panel.	If Clip on terminals found defective, same to be replaced. If Junction box found defective or damaged, same to be Replaced accordingly.
15	Check Fuses/Fittings for proper rating and their condition.	Main Control Panel, Hoist/LT/CT Control Panel.	Proper size/rating of HRC fuses to be provided in place of re-wirable fuses. If fuses carrier/base found over heated, same to be replaced.
16	Check Isolating Switches	Main switch, Control isolating switches.	If operation and function of any Isolating Switch found defective, same to be replaced.
17	Other Electrical Accessories.	Control transformer, light, Cabin fan, hooter, Anti-collision device, etc.	All other electrical items to be replaced with new one.