

SCOPE OF WORK

Name of the work :- Preventive & Breakdown Maintenance (Electrical and Mechanical) of Critical Machines (10 Nos.) in STM division.

Preventive Maintenance : Preventive Maintenance means scheduled preventive maintenance of machines (Sl. No. 1 to 10 of list of machines – ANNEXURE-C) and accessories as per check list handed over by Engineer-in-Charge. This maintenance work will generally include

1. Checking and ensuring proper lubrication of the machines guide-ways and other machine elements requiring lubrication either manually or through automatic lubrication system.
 2. Upkeep of hydraulic oil and lubrication oil.
 3. Checking/replacement of Filters.
 4. Checking of electrical connections for loose wiring and other abnormality.
- These are the generalized check points. However, machine specific tickets shall be handed over by Engineer-in-Charge at the time of execution.

Breakdown Maintenance : Breakdown means stoppage of machine due to some fault as a result of breakage of parts or malfunctioning of some elements of machines and it is not possible to run the machine. The work of breakdown maintenance will be to restore the machine to its existing original working condition for 10 No. machines (Sl.No. 1 to 10 of list of machines - ANNEXURE-C). The contractor has to attend day to day machine breakdown promptly and efficiently so as to keep the breakdown time minimum. Generalized list of mechanical and electrical work is given below. However, any other activity required to restore the machine in desired state will be carried out by the manpower deputed by the contractor. Any guidance, drawing or machine manual can be sought from Maintenance Department. But the responsibility to restore the machine to normal will rest with the contractor. All the spares and consumables will be supplied by BHEL, Bhopal.

A.1	MECHANICAL :
1	Check oil level in hydraulic & lubrication tanks in frequency (once in a week/machine), in case of low level, top up oil.
2	Clean air filters/oil filters by kerosene, compressed air.
3	Clean Telescopic covers, provide on column guide-ways. Table guide ways and bed guide ways.
4	Check for oil leakages on machine arrest oil leakage, if any
5	Clean coolant tank surface, coolant filter etc.
6	To inspect parts of the disassembled units. To make out the defect list.
7	Clean machine guide-ways of ram & spindle by marking cloth and apply low viscosity oil by oil can.
8	Clean air filters pad, provided on oil chilling AC units & panels AC with compressed air.
9	Clean cable trenches and remove oil/coolant from cable trenches of machines
10	Remove rain water /seepage water from machine pits.
11	Maintenance of all chip conveyors
12	Repair and maintenance of drag chain, telescopic covers
13	Preventive and repair of all attachment.
14	Dismantling of Rotary Table, Headstock Assembly, pendant or any other sub-assembly if need be
15	To replace all worn out bushes and damaged bearings.

16	To replace worn out gears and worm / worm wheels.
17	To restore / replace worn out lead screws and nuts of longitudinal and transverse feeds.
18	To replace worn out fasteners and clean the remaining ones.
19	To replace / restore and scrape regulating wedges and clamping plates.
20	To restore accuracy of lead screws by machining threads (machining by BHEL).
21	To check and clean unworn-out parts left out in the mechanism of the machine.
22	To repair coolant pumps and pipe fittings
23	To repair oil pumps and lubricating / hydraulic systems. To replace oil.
24	Check & rectify complete gear box of the machine
25	To replace damaged pipes and fittings.
26	To scrape guide surfaces of slides, carriages, traverses, slide blocks etc. (if the wear exceeds the permissible limits).
27	To repair / replace guards and fencing (provided for proper safety) and also the arrangements for protecting the machine parts from metal chips and abrasive dust (covers on belt drive, casings, shields, screens).
28	To assemble the repaired units, check proper inter-operation of the units and all the mechanisms of the machine.
29	To run the machine on no-load at all speeds and feeds. To check for noise and heating.
30	To check for accuracy of repaired unit.
A.2 ELECTRICAL :	
B.2.1 A.C. & D.C. ELECTRIC MOTORS :	
1	To disassemble the motor completely and to rectify the winding damages or replace with new motor (Winding and New motor in BHEL scope)
2	To clean units and parts of the electric motor and to change the defective insulating bushes.
3	To wash and grease the ball / roller bearings and change the damaged ones.
4	To wash the bush bearings and if necessary, metalize the same.
5	To weld and machine the end covers, if necessary.
6	To change the ventilation fan and the flanges.
7	To repair brush mechanisms and commutator.
8	To assemble and check the motor on no-load and also on load after repair.
B.2.2 ELECTRO MAGNETIC FRICTION COUPLINGS :	
1	To disassemble the coupling, to clean and wipe out the parts, to change the ferodo lining, to check for the discs wear and if necessary, replace the same.
2	To check the gap between the guiding bush of the armature and the shaft and, if necessary, change the bushes.
3	To grind the slip rings.
4	To change the seals.
5	To check for normal functioning of the coupling
B.2.3 ELECTRO MAGNETS :	
1	To completely disassemble the electro magnet.
2	To check the various parts and change, if necessary.
3	To coat the coils with varnish.
4	To check the insulation and the proper movement of the core.
B.2.4 STARTER AND CONTACTORS:	
1	To check and adjust the motion of the moving contacts.
2	To adjust the simultaneous switching off of the 3-phases.
3	To check the action and adjustment of thermal overload relay.
4	To adjust the gap between fixed and the moving contacts and to check the withdrawal of the armature while switching off the magnetic coil
5	To change the defective parts.
B.2.5 END LIMIT SWITCHES :	
1	To completely disassemble the switch.
2	To clean and check all the parts and to change the worn out ones.

3	To adjust the lever with respect to the fixator.
B.2.6	KNIFE SWITCHES OF ALL TYPES :
1	To rectify the distortion of the knives and the pincers of the switch.
2	To file and clean the contact surfaces of the knives and the pincers.
3	To change the defective parts.
B.2.7	ELECTRIC PANEL BOXES :
1	To check and adjust the movement and the pressure of the moving contacts.
2	To check the working of the thermal overload protection relay and test the same.
3	To change the electrical conductors (cables) wherever necessary.
4	To replace the defective apparatus.
B.2.8	ELECTRICAL APPARATUS AND ELECTRIC WIRING ON THE MACHINES :
	Check the electrical motor surface temperature and check for abnormal sound from motor if any
	Check cables of machines, check cable drag chain
	To replace the defective section of the wiring.
	Check electrical control panel and tighten loose connection /wiring if any in electrical control panel. Clean electrical contactors with contact cleaner.
	To replace the defective apparatus.
A.3	OTHER RELATED WORKS
A3.1	Cleaning of Machine Oil Return Pockets & Coolant.
A3.2	Cleaning of Machine & Telescopic Bed Cover
A3.3	Removal of Chips from conveyor and telescopic bed cover.
A3.4	Electronics & CNC related breakdown will be done by BHEL EMX department.

WORKING HOURS :

1. Party has to deploy man power in two shift i.e. First Shift (7:00 AM to 4:00 PM), Second Shift(4:00 PM to 1:00 AM) during all working days. Working in third shift (1:00 AM to 7:00 AM) & General shift on Sundays/Holiday (8:00 AM to 5:00 PM) will be on need basis.
2. No. of 1st shifts : 303 , No. of second shifts : 303, Expected no. of third shift (on need basis) : 150, Sundays and holidays (on need basis): 62
3. Payment to the contractor shall be made on actual number of man hour of Skilled and Un Skilled workman worked.
4. The manpower deployed by the contractor has to work off-machine on accessories and attachments not in use at that particular moment with the consent of Engineer-in Charge. This will include deferred maintenance work which can be carried out while the machine is in operation.
5. Fitter and Electrician should be ITI passed /or having adequate experience.
6. The person deployed shall wear shoes, uniform and helmet.
7. The deployment of manpower in First Shift/ Second Shift/Third Shift can be vary depending up breakdown requirement. Tentative deployment of 20 workers on a day, however actual deployment will be as per BHEL requirements.
8. The deployment of manpower on Sunday / Holidays can be vary depending up on Requirement.
9. The manpower deployed in third shift can be engaged in First Shift/ Second Shift when machine is not running in third shift.