

STANDARD MAINTENANCE PROCEDURE FOR DIESEL GENERATOR

Objective :- The Objective of this SOP is to describe the procedure for preventive maintenance of Diesel Generator (DG) Set.

Scope :- This SOP is applicable for the preventive maintenance of Diesel Generator installed in Utility Block.

Responsibility :-

The Maintenance Operator shall be responsible:

- To carry out preventive maintenance of equipment.
- To report any deviation and/or deficiency observed during preventive maintenance.
- To maintain the record of all checks.
- The Maintenance Engineer shall be responsible:
- To get the preventive maintenance done as per annual maintenance planner.
- To check the preventive maintenance activity is carried out and deviations and/or deficiencies are complied as per requirement.

Procedure :-

PRIMARY CHECKS:

- Check the tightness of battery connection.
- Check the specific gravity of the individual cell.
- Check the battery voltage.

CAUTION:

- Before carrying out preventive maintenance, switch 'off' the mains, remove fuses and display the 'Under Maintenance' board.

MONTHLY PREVENTIVE MAINTENANCE ACTIVITIES:

- Clean the aluminum fins of radiator, using fresh water.
- Check the condition of oil filter. Replace it if required.
- Change the engine oil (15W40). If required, replaced it.
- Check all electrical connections for tightness and insulation damage. Rectify it, if required.
- Check the alignment of Dynamo motor. Rectify it, if required.
- Check the belt condition. Replace it, if required.
- Check all the nuts and bolts for tightness and damages. Rectify it, if required.
- Take a running trail and check for any abnormal noise and vibrations. Rectify it, if required.
- Maintain the record of all checks in checklist.

Monthly Preventive Maintenance Checklist for DG Set

S. No.	DESCRIPTION	OBSERVATIONS/ REMARKS
1.	Clean the aluminum fins of radiator, using fresh water.	
2.	Check the condition of oil filter. Replace it if required.	
3.	Change the engine oil (15W40). If required, replaced it.	
4.	Check all electrical connections for tightness and insulation damage. Rectify it, if required.	
5.	Check the alignment of Dynamo motor. Rectify it, if required.	
6.	Check the belt condition. Replace it, if required.	
7.	Check all the nuts and bolts for tightness and damages. Rectify it, if required.	
8.	Take a running trail and check for any abnormal noise and vibrations. Rectify it, if required.	

SIX MONTHLY PREVENTIVE MAINTENANCE ACTIVITIES:

- Clean the aluminum fins of radiator, using fresh water.
- Ensure the connection of Automatic Voltage Regulator (AVR).
- Check the condition of gasket. Replace it, if required.
- Check all bus bar joints for tightness. Rectify it, if required.
- Maintain the record of all checks in checklist.

Six Monthly Preventive Maintenance Checklist for DG Set

S. No.	DESCRIPTION	OBSERVATIONS/ REMARKS
1.	Clean the aluminum fins of radiator, using fresh water.	
2.	Ensure the connection of Automatic Voltage Regulator (AVR).	
3.	Check the condition of gasket. Replace it, if required.	
4.	Check all bus bar joints for tightness. Rectify it, if required.	

MAINTENANCE PROCEDURE FOR TURBINE & MIV

- Opening of inspection window of draft tube cone and manhole of spiral casing. Dismantling of pipelines of TGB oil header. Removal of instruments in Turbine Pit.
- Cleaning of Cover area with water in all respect.
- Dismantling of TGB housing cover, draining of oil, measurement of pre-dismantling TGB pad clearance.
- Cleaning and checking the surface of babbit metal of TGB pads for scouring hard spots & cracks.
- Scraping, Blue Matching, and polishing of TGB Pads if required. Replacement of TGB pads, if required.
- Cleaning of TGB Housing. Attending of oil leakages of TGB housing, if any. Inspection of TGB Oil Cooler and its cleaning.
- Cleaning/replacement of Governor and MIV oil filters if required, draining & purification of oil and cleaning of the respective sump tanks.
- Checking of dry Stroking of Guide vane mechanism and its adjustment.
- Checking/inspection of the condition of runner blade and recording of thickness of runner blades and recording of clearances of all labyrinths and guide vanes (Top, Bottom, bedding gap). Accordingly, adjustment as per drawing, if required.
- Dismantling of DT Cones, Discharge ring, Runner, and Runner cone, if required.
- Replacement of Labyrinths, if required.
- Replacement of Bottom Guide Vanes Bush if required.
- Dismantling, Checking, and overhauling of Air release valve, if required.
- Inspection of MIV Service Seal, all rubber sealing's of expansion joint of MIV & service seal of MIV and followed by replacement of MIV service seal and rubber sealing's if found damaged or eroded.
- Complete Bearing setting and assembly of Miscpipe lines.
- Assembly of turbine housing cover and filling of oil.
- Boxing Up & Instrumentation of Turbine.

MAINTENANCE PROCEDURE FOR SHAFT SEAL SYSTEM

- Dismantling of Shaft Seal system & accessories followed by Repair/replacement of Rotating Shaft Sleeve, shaft sealing system and related accessories as per the site requirements and the instructions of Engineer-In-Charge.
- Cleaning and preservation of all the dismantled accessories of shaft seal system.
- Repair by welding, grinding and replacement of accessories if required as per instructions.
- Assembly of the shaft seal system

MAINTENANCE PROCEDURE FOR GENERATOR & THRUST BEARING

- Dismantling of Speed sensing device, brush gear assembly and chequered plates. Dismantling of Air head assembly if required.
- Measurement of vapour seal gaps. Dismantling of vapour seal, draining of oil from both housing & cleaning.
- Dismantling of air guide & baffle plate assembly followed by dismantling of shrouds covers and their cleaning.
- Checking of bolts & dowels of stator, bottom bracket and top bracket.
- Dismantling of LGB and UGB Pads from housing except four locked at LGB. Cleaning and checking the surface of babbit metal of LGB and UGB pads for scouring hard spots, cracks, and surface contacts with journal etc. Scraping, Blue Matching, and polishing of LGB, UGB pads and replacement of the same by spare set if required. Cleaning of LGB coolers & UGB Coolers.
- Cleaning and checking of Journals and bearing housings (LGB & UGB), polishing of journal and arresting the oil leakages from oil retaining sleeve of LGB by opening it & in-situ repair with replacement of requisite 'O' ring cord if required. Check the condition of the welding seam of oil baths (LGB & UGB) for leakage and rectification if required. Inspection of Mirror Disc and checking the condition of thrust Pads of Thrust bearing. Polishing of mirror disc and replacement of thrust bearing pads if required after scraping and blue matching with universal surface plate.
- Checking of Rotor level & Unit Alignment, stator & rotor form by taking manual rotation and its correction if required. Centring of the unit w.r.t. runner labyrinth gaps.
- Checking for sludge/clogging/leakage of filter/pipeline of HS lube system and clean it. Checking of oil pressure during operation and oil leakage if any from coupling.
- Shaft locking & Guide Bearings (UGB & LGB) gap Setting.
- Boxing up & filling of oil in all housing as well as MIV & Governor OPU sump the unit and Spinning.

MAINTENANCE PROCEDURE FOR GENERATOR & THRUST BEARING

- Dismantling of Lower DT Cone & shifted to service bay. Installation of bulk head. Dismantling of Upper DT Cone & shifted to service bay.
- Dismantling of Discharge ring & shifted to service bay.
- Dismantling of runner cone and Runner & shifted to service bay.
- Identification marking on all facing plates of Top cover and Pivot ring with position wise & unit wise.
- Dismantling of all facing plates of Top cover and Pivot ring.
- Dismantled facing plates matched with new facing plates and mark holes position accordingly.
- Making of total 960 No's Holes through drilling & Counter boring for Fixing bolt(M24) of Facing plates per unit.
- Fixing of all new facing plates.
- Final boring on Guide vane collar Holes on facing plates as per dimension of guide vanes/drawing through portable boring machine. Portable boring machine and drill machine in the scope of contractor.
- Pre checking of all Guide vanes collar Holes on facing plates through fixing of Guide vane.
- Assembly of runner, runner cone, Discharge ring, Upper DT Cone and removal of bulkhead and assembly of upper & lower DT Cone.

MAINTENANCE PROCEDURE FOR GUIDE VANE REPLACEMENT

- Dismantling of Lower & Upper Bush Housing , its cleaning and replacement of self-lubricated Bushes, if required
- Dismantling of Servo motor link rod and regulating ring and its cleaning.
- Dismantling of GV lever, Strap and Upper Bush. Cleaning of all the dismantled items, repair if any required and replacement of self-lubricated bushes.
- Dismantling of Pivot Ring and Guide Vane. Complete cleaning of Pivot ring and repair if required. Lifting of guide vanes to service bay.
- Cleaning of dismantled fasteners and items.
- Final assembly of all dismantled items dismantled for replacement of Guide Vanes.