Bulletin on Proper and Required Maintenance. Bulletin 002

Neglecting proper maintenance undermines the value of your investment in a generator. At Polar, our engineers work diligently to design durable products and systems capable of withstanding some level of neglect and operator error. However, the level of neglect we engineer to must be balanced against the generator's capital cost. Maintenance is a balance of capital investment, and operating costs versus optimal performance, reliability, and longevity.

1. **Diesel Fuel Maintenance:** This is a critical aspect of generator upkeep, as inadequate maintenance can lead to costly engine failure.
   a. **Cold Weather Operation:** Ensure the use of the proper grade of diesel (DF1) or additives during cold weather to prevent fuel from gelling, which can cause generator failure. If managing fuel and additives is not feasible, consider implementing a fuel heating system.
   b. **Avoid Biodiesel:** For reliable generator performance, avoid using biodiesel. It is corrosive and increases water absorption, which can lead to engine and fuel system (fuel pump, tank. hoses, level measurement) damage. Refer to Bulletin 001A for more information. Biodiesel makes cold weather starting more difficult.
   c. **Fuel Spoilage in Warm Weather:** In warm climates or when using heated fuels, the fuel is more prone to spoilage due to bacteria, mold, and algae growth, as well as increased water absorption. The UL142 safety specification exacerbates spoilage and water contamination by allowing moisture-laden air and biological contaminants to enter through large tank vents. This condition also accelerating rust and tank degradation.
   d. **Fuel Level Measurement:** Regularly inspect fuel level floats and other measurement systems for corrosion. Refer to Bulletin 001A for guidance.
   e. **Tank Replacement:** Replace fuel tanks that are excessively rusted to prevent spills and maintain system integrity. Keep tank full to reduce the exposed surfaces to rusting.
   f. **Fuel Filtering Systems:** Utilize fuel filtration systems to prevent rust, water, and contaminants from reaching the engine. Change the fuel elements base on run time per the operating manual or sooner if there are issues with the fuel quality. Further bulletins on this subject will be available.

2. **Oil and Filter Changes:** Adhere to the recommended intervals for changing both the oil and oil filter as specified in the engine/generator manual, typically ranging from 200 to 4,500 hours, depending on the generator model. Using fully synthetic oil is strongly recommended for enhanced engine longevity and improved fuel efficiency. In cold weather, synthetic oil retains its viscosity, facilitating easier starts, whereas petroleum-based oils thicken, making it more difficult for the starter motor to crank the engine. If the use of synthetic oil cannot be ensured, engine oil heaters are advised for temperatures below 0°C. For diesel engines, oil heaters are also recommended when using fully synthetic oil in environments where temperatures fall below -15°C.

Note: Always inspect for oil leaks before and after replacing the oil and oil filter.

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3. **Check Antifreeze:** It is essential to use antifreeze specifically formulated for aluminum radiators. Regularly monitor coolant levels as instructed in the generator manual. Replace the antifreeze earlier than scheduled if any of the following are observed:

    - Noticeable change in color or consistency
    - Milky appearance, oil contamination, or floating debris
    - Strong, sweet odor emanating from the engine compartment
    - Engine overheating occurred

4. **Proper Filter Replacements:** The number and type of filters required depend on the specific generator model. Ensure timely replacement of the following filters:

    a. **Air Filter:** Replace once a year, or sooner if the filter maintenance alarm is triggered.
    b. **Oil Refining Pack Filter:** This optional filter extends oil replacement intervals. It should be replaced simultaneously with the engine's oil filter. As a bypass filter, it filters at a submicron level and removes water from the oil.
    c. **Fuel Refining Filter:** Similar to the oil refining pack, it filters at a submicron level and removes water from the fuel. Replace it once a year or sooner if fuel contamination is significant.
    d. **Engine Oil Filter:** This filter is mounted on the engine and should be replaced at the same time as the oil. Either once a year, or at the engine run time interval.

5. **Maintain Painted Surfaces:** Ensure that all painted surfaces remain in good condition by addressing scratches promptly and protecting the generator from constant water exposure.
6. **Inspect and Repair Water Intrusion:** Regularly check and repair any issues related to water intrusion, including gaskets, latches, and locks. While our electronic circuits are conformally coated and housed in protective enclosures, prolonged exposure to moisture can lead to corrosion of circuit boards, resulting in generator failure.
7. **Load Bank Service:** Conduct load bank servicing every two years to reduce carbon buildup inside the engine. Many generators are oversized relative to the load, leading to wet stacking. The load bank helps burn off excess carbon accumulation.
8. **Re-torque Loose Bolts:** Check and re-torque any bolts that may have loosened during shipping, installation, or regular operation.
9. **Inspect for Loose or Damaged Components:** Regularly inspect the generator for loose or rubbing parts, wire harnesses, and connectors, and address any issues as needed.

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10. **Secure All Openings Against Animal Entry:** Ensure that all openings, especially knockout holes at the bottom of the enclosure, are sealed to prevent the following issues:

    a. High moisture and humidity inside the enclosure, leading to corrosion and oxidation of metal surfaces.
    b. Infestations of mice or large insects building nests inside the generator enclosure. Mice have been known to create nests on the exhaust manifold using plastic from the air filter and dry plant material, which can ignite once the engine heats up, posing a fire hazard.

11. **Inspect Plumbing for Leaks:** Regularly check all fuel and coolant plumbing for any signs of leakage.
12. **Check the Polar web site for Updates on Software:** Ensure the generator's software is updated every two years to maintain optimal performance and compatibility with system advancements. **Everywhere most all control systems have software updates as a part of regular operational maintenance.** Software updates are driven by customers request for enhancements, bug fixes, keeping compatibility with other software apps, etc.
13. **Check the Polar web site for Updates on Hardware:** Hardware updates are very minor typically requiring less than 15 **minutes.** Hardware upgrades are a part of preventive maintenance **to** ensure continued system reliability and prevent small issues from escalating.
14. **Keep the generator cabinet clean inside.** This facilitates maintenance and makes troubleshooting problems simpler.
15. **Inspect all hoses including oil, fuel, coolant, and air ducts.** Look for material deterioration, cracks, cuts, abrasion, etc. Play special attention to the LPG and natural gas hoses. Replace as required.
16. **Every 5 years replace the coin cell battery inside the Model 250 controller.** This cell backs up the calibration settings in the memory chip.

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