Maintenance Guidelines for Emergency Generators

In the event of a utility interruption, emergency generators are often relied upon to provide critical backup power. To help ensure your emergency generator is ready when it is needed, it is important to complete required maintenance. Overlooking this required maintenance could limit your ability to maintain business continuity and critical support systems during a utility interruption.

The following guidelines are recommended to help ensure proper emergency generator operations.

Recommended Protection Devices for Emergency Generators

- Voltage restrained overcurrent relay, one per phase to provide overcurrent protection
- Reverse power relay to prevent backflow of electricity into generator
- Overspeed trip
- Low oil pressure trip
- High oil temperature alarm and trip
- High exhaust temperature alarm and trip
- High jacket temperature trip

Preventive and Predictive Maintenance

Emergency generators are expected to transition from a cold start to full load in a matter of seconds. This type of operation can be physically demanding for any type of equipment. Establishing a formal preventive and predictive maintenance program can help identify potential problems and reduce the risk of a generator breakdown.

The following practices should be included in your regular maintenance program. Only a qualified operator or technician should perform these tasks. For further guidance, consult the original equipment manufacturer.

- Visual inspections should include, but are not limited to, the following:
  - Inspect the physical integrity of the housing, foundation and mounting bolts, and to verify the equipment is secured in place.
  - Inspect moving parts for abnormal conditions, such as wear, dirt, debris, improper lubrication and fluid leaks.
  - While the equipment is running, listen for sounds that could indicate there are internal problems, such as grinding or excessive vibrations.
  - Inspect common wear items, such as hoses, belts, filters, gaskets and seals.
  - Verify proper fluid levels, such as oil and coolant.
  - Inspect starting batteries and cables for damage and terminal connections for corrosion buildup.
  - Inspect fuel supply lines, connections and supporting equipment for physical integrity, leaks and corrosion.
- Grease and lubricate bearings and other moving parts according to manufacturer guidelines.
- Engine oil and filter replacement should be scheduled according to manufacturer guidelines.
- Since emergency generators don't run continuously, an oil sampling and analysis program should be established. This can help assess the internal condition of the engine and the remaining oil life. .

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- Establish an engine coolant testing and treatment program. Engine coolant that is not properly treated can contribute to corrosion within the engine and growth of microbes, both of which can inhibit adequate heat transfer and lead to engine damage. It is a best practice to periodically test coolant quality and apply treatment as recommended by the equipment manufacturer.
- Engine run tests and load tests should be performed as part of regular maintenance program. This can help verify proper startup operations, functionality of electrical transfer sequence, and confirm the generator can assume the required load.
  - Run tests without load are recommend monthly.
  - Load tests assuming required load are recommended at least annually.
  - When performing a load test, verify that proper electrical transfer sequence occurs, such as transfer switches, breaker operations, and correct electrical lineup.
  - In addition to regular load tests, the generator should be load bank tested at least annually. Load bank testing is performed at full kilowatt output rating to help verify that the generator can actually produce the horsepower that may be required while maintaining proper temperature and pressure required for continued operations.
- Safety devices should be routinely tested and calibrated, as recommended by the manufacturer. These tests can help identify faulty or out-of-calibration safeguards and controls that can increase the risk of equipment failure.
- Generator winding resistance testing, as recommend by the manufacturer.

With the many different configurations and features of emergency generators, each system can have different parameters for required maintenance. Most equipment manufactures offer service contracts to perform regular scheduled maintenance. Consult the equipment manufacturer or a certified third-party contractor when establishing a preventive and predictive maintenance program.