



ELECTRICAL PREVENTATIVE MAINTENANCE (EPM)

LOSS CONTROL BULLETIN

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According to the Institute of Electrical and Electronics Engineers (IEEE), the failure rate of electrical components is three times higher for systems where preventative maintenance is not performed.

As electrical loads cycle between high and low demand, thermal expansion and contraction cause connections to loosen. Without cleaning, electrical panels accumulate dust, creating a high resistance path on those loose connections, leading to more than 30 percent of electrical failures.

Another 17 percent of electrical failures are attributed to live electrical components being exposed to moisture. With a comprehensive (EPM) program, both of these conditions can be mitigated.

The fundamental concept of EPM is to keep it cool, clean, dry, and tight. It is cheaper to repair equipment before it fails.

CAUSES OF ELECTRICAL DISTRIBUTION SYSTEM FAILURES*

- Loose connection/part 30.3 percent
- Moisture 17.4 percent
- Line disturbance (other than lightning) 10.4 percent
- Defective/inadequate insulation 9.9 percent
- Lightning 8.1 percent
- Foreign objects/short circuiting 7.3 percent
- Collision 3.9 percent
- Overloading/inadequate capacity 2.4 percent

- Accumulation of dust, dirt and oil 2.2 percent
- All other causes 8.1 percent

*Based on Hartford Steam Boiler claims data

PREVENTING ELECTRICAL FAILURE

1. Hire qualified personnel.

Make sure the people who perform the EPM program are trained to work on the specific equipment being maintained or tested. Special training is required for high-voltage equipment and protective relay devices.

2. Schedule regular inspection, testing, and servicing of equipment.

While the time period between maintenance depends on environmental conditions, EPM should be performed at least once every three years and more often for critical components.

A thermographic inspection of all electrical equipment should be completed prior to the scheduled EPM outage. This survey is a non-invasive method that indicates potential problem areas such as loose or dirty connections, load imbalances, or improper installation of equipment. It helps determine the resources you will need during your scheduled outage to perform EPM.

Ideally, a thermographic inspection should be done during peak-load conditions by a certified, experienced thermographer.

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Plans should be made to have all circuit breakers and disconnect switches repeatedly opened and closed during the shut-down period to ensure proper operation. In addition, protective relays and circuit breaker trip devices need to be tested and calibrated on a regular basis.

Oil-filled transformers, circuit breakers, and disconnect switches should have samples of the insulating oil screen-tested as a means of identifying potential problems with those components.

Transformer oil should also undergo dissolved gas analysis to identify specific adverse conditions present inside the unit. Equipment insulated with SF6 gas should be inspected and leak-tested to ensure the integrity of the gas system.

3. Use sound judgment in evaluating results.

Make sure the person reviewing the test reports has a thorough understanding of the specific subject matter so responsible decisions can be made.

4. Perform the necessary work.

Preliminary testing and inspection help to focus your resources on the critical tasks, but ultimately you need to have scheduled outage to perform the necessary work.

5. Keep concise and complete records.

A clear record-keeping system will help keep the EPM program cost-effective by ensuring that work is done when on time. Tracking of test results over time can identify a potential failure that can be corrected before it happens.

PREVENTION IS EVERYONE'S BUSINESS. TRUST IN TOMORROW.® CONTACT YOUR AGENT TODAY TO LEARN ABOUT OUR LOSS PREVENTION PROGRAMS.

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LCB 33 (8-17)