Electrical System Preventive Maintenance

Risk management tips for commercial property owners
Your facility’s electrical distribution system is at the heart of your business operations—and an electrical preventive maintenance (EPM) program can help reduce downtime and prevent injury and economic loss.

What’s the problem?
A power failure could be catastrophic to your plant’s production line, data center, distribution center and other processes that rely on your facility’s electrical distribution system to operate safely and efficiently.

Your partner’s advice to stay safe!
An electrical preventive maintenance (EPM) program can pay for itself many times over. In addition to normal deterioration, an EPM can identify and address load changes, circuit alterations, improper protective devices, and changing voltage conditions. Both direct and indirect benefits are derived from lower repair costs, reduced equipment downtime, greater energy efficiency and improved safety of personnel and operations.

A key element of your EPM is to retain the services of a properly trained, licensed and insured professional electrician—knowledgeable of state and local electrical codes—to perform an inspection of your facility’s electrical distribution system. In selecting an electrician, you should perform the following checks:
- Ask for licenses to ensure they are current.
- Obtain certificates of insurance and check certificate dates.
- Ensure your electrician understands the level of inspection to be conducted, including the potential use of emerging technologies such as thermal imaging and ultrasonic testing.

National Fire Protection Association (NFPA) guideline 70B “Recommended Practice for Electrical Equipment Maintenance” applies to the preventive maintenance for electrical, electronic and communication systems and equipment installed in industrial plants, institutional and commercial buildings, and large multi-family residential complexes. An effective EPM program consists of specific inspection and testing procedures.

Other elements of an effective EPM program include:
- Training
- Routinely scheduled inspection, testing and servicing of equipment
- Priority determination and planning
- Safety program compliance including lockout/tagout, arc flash injury prevention, personal protective equipment and emergency response procedures
- Scheduled maintenance
- Documentation and periodic audit review
Creating a six-step EPM program for your facility

Step 1—Plan
The success of your EPM depends on good planning—especially when performing emergency repair work. To create your plan:

- **Identify the personnel and resources needed** to perform specific tasks and appoint an EPM supervisor to oversee your facility’s program.
- **Verify you have all necessary wiring diagrams, schematics and manuals** needed for troubleshooting your facility’s electrical distribution system.
- **Develop detailed safety and work procedures** to carry out your plan.

Step 2—Inspect
The inspection phase of your EPM should include the following steps:

- **Assess all electrical equipment**—including motors, transformers, circuit breakers and controls—to enable the EPM supervisor to prioritize each plan component.
- **Check the condition of electrical protective devices** such as fuses, circuit breakers, protective relays and motor overload relays to ensure each component is in good physical condition and is operating within its load level rating.
- **Identify environmental or operating conditions** which may impact maintenance frequency.
- **Determine if inspections will require instruments such as infrared viewers and ultrasound transducers.** NFPA 70E and B guidance should be followed for safe work practices and personal protective equipment selection and use.

Important note: Infrared scans of your power system are a cost-effective means to discover potential problems within your electrical distribution system and should be performed at least annually. (Harleysville Insurance will provide this service to you free of charge.)

Step 3—Maintain
Testing, cleaning, tightening and lubricating are all important maintenance elements that the qualified professional electrician performs. Be sure to consult manufacturer’s literature before attempting to maintain electrical components.
Step 4—Record
Recording test and other data can help set maintenance intervals, isolate troublesome equipment, and provide a baseline for predicting when insulation or other components are starting to fail. Test result records should always include the date, identification of equipment tested and pertinent data about any problems discovered. System conditions such as load current, voltage, temperature and other related information can help determine how close components are to being overloaded. Test and record forms should be developed and tailored to your company’s specific needs. (For ideas and examples of forms, see the back of NFPA 70B.)

Step 5—Evaluate
An accurate evaluation of test results is the most important step in the EPM process! Analysis records will allow you to determine if additional maintenance needs to be performed and to pinpoint problems which might otherwise go unobserved.

Step 6—Determine maintenance frequency
Many recommended maintenance intervals are annual, but specific components or conditions may require greater frequency. NFPA 70B, Table L provides you with guidance on maintenance and testing intervals.

Questions to ask before work begins!
The following “checklist questions” should be asked before any electrical work begins:

- Has the proper training and licensing check been conducted for “qualified person” status? (See section: “Your partner’s advice to stay safe!”)
- Does your facility have a formal electrical maintenance and safety program that meets NFPA guidelines 70B and 70E?
- Have you established a program to ensure electrically-safe working conditions? Do you have a formal lockout/tagout program in place?
- Is electrical equipment labeled with power- and safe work practices-related information per NFPA 70E?
- Does your business have an energized electrical work permit program?
- Are hazard identification/risk assessment and controls for potential electrical hazards and arc flash boundaries in place per NFPA 70E?
- Have job briefings been conducted before beginning the electrical work?

The Harleysville Risk Services team is available to answer any questions you may have about these procedures. Call us at 800.523.6344, ext. 8100.