

The background image shows industrial machinery, possibly a power plant or refinery, with large pipes, valves, and electrical components. A semi-transparent blue filter is applied over the entire image. A network of thin, light blue lines forms a geometric pattern across the top half, while the bottom right corner features a larger, more prominent blue geometric pattern of intersecting lines forming triangles.

RISK RESILIENT

Electrical Equipment Maintenance Programs

In today's highly competitive business environment, where a single equipment failure can cause significant damage, pose serious safety risks, and bring production to a screeching halt, you can't afford the reputational risks and business interruption losses associated with electrical equipment malfunctions – especially losses that can be avoided with routine maintenance.

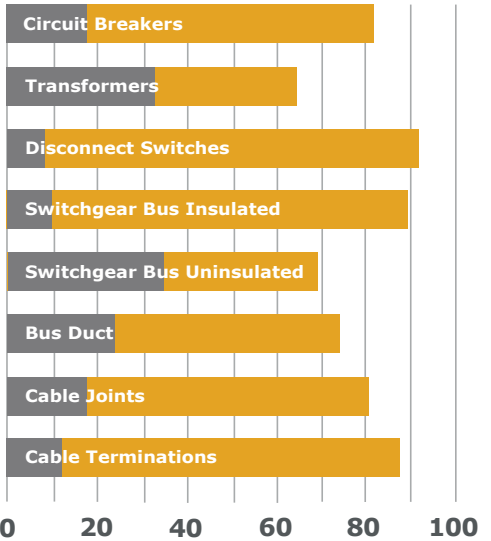
Property damage, equipment repairs, and production downtime are three common costly scenarios that every facility hopes to avoid. One way to minimize these types of issues is to implement a comprehensive Electrical Preventive Maintenance (EPM) Program at your facility.

Know the Risks

Every year, electrical fires result in hundreds of deaths, thousands of injuries, and hundreds of millions of dollars in property damage. While some fires are caused by faulty products, many more are caused by the misuse and poor maintenance of electrical equipment, incorrectly installed wiring, overloaded circuits, and misapplied extension cords. While electrical equipment deterioration is normal and equipment failure is inevitable, equipment failure can be delayed through appropriate electrical preventive maintenance.

An Electrical Preventive Maintenance (EPM) Program can help you better detect, and correct, normal equipment deterioration as well as other potential causes of equipment degradation, such as load changes or additions, circuit alterations, improperly set or improperly selected protective devices, and changing voltage conditions.

% of failures with preventive maintenance



Source: NFPA 70 B Electrical Equipment Maintenance.



Imagine a scenario where...

A transformer failure results in a total plant shutdown.

The transformer failure was caused by contamination of its insulating oil that went undetected because the oil had not been tested for several years. Fire damage and equipment replacement costs amounted to \$50,000, not including the cost of plant downtime.

In another area of the plant...

The main switchgear failed due to fouling by dirt, gummy deposits, and iron filings. This resulted in damage amounting to \$100,000 – a costly oversight that could have been avoided with proper routine maintenance.

The cost of these failures would have supported a comprehensive EPM program covering all the plant's electrical distribution systems for several years.

Be Prepared

Electrical preventive maintenance (EPM) should be carried out on a regularly scheduled basis, as determined by inspection experience and an analysis of any failures that have occurred. Procedures and practices should be initiated to ensure that electrical equipment is kept clean, dry, and with minimal friction and corrosion by visual inspection, exercising, and electrical testing.

EPM Program Elements

An EPM Program should consist of the following essential elements:

- Management commitment
- Responsible and qualified personnel – employee training
- Regularly scheduled inspections, and programmed routine inspections and suitable tests
- Survey and analysis of electrical equipment and systems to determine maintenance requirements and priorities
- Accurate analysis of the inspection so proper corrective measures can be prescribed
- Performance of necessary work
- Concise but complete records
- Evaluation of repairs and failures to predict future problem areas
- Inventory of spare parts for critical components

Steps for developing your EPM Program

The following steps should be considered when planning and developing the EPM Program:

- Compile a list of all equipment and systems
- Determine which equipment and system are most critical
- Develop a system for monitoring
- Determine the internal and/or external personnel needed to implement and maintain the EPM Program
- Develop a contingency plan to deal with outages, equipment failures, procurement of critical parts, etc.

Equipment Failure Impact

Consider the following questions to help you assess the impact of equipment failures on key areas of your business – and plan accordingly when developing your EPM Program:

- **Personnel Safety:** Will an equipment failure endanger or threaten the safety of any personnel? What can be done to ensure personnel safety?
- **Equipment Loss:** Is installed equipment — both electrical and mechanical – complex or so unique that required repairs would be unusually expensive?
- **Production Economics:** Will breakdown repairs or the replacement of failed equipment require extensive downtime? How many production dollars will be lost in the event of an equipment failure? Which equipment is most vital to production?

Key Inspection Items

An electrical distribution system is typically comprised of a network of circuits, including wiring, circuit breakers, fuses, and possibly transformers. The electrical distribution equipment should be periodically thermally imaged (infra-red scanning) as well as physically inspected. Key equipment parts that should be inspected include:

- Switchgear, switchboards, and panel boards
- Circuit breakers
- Fuses
- Disconnect switches
- Contactors and relays
- Protective relays
- Fans, motors and motor controls
- Busway and bus duct circuit breakers
- Transformers (if outdoor, it may be owned and the responsibility of the utility company)

The Importance of Good Housekeeping

When electrical distribution equipment is housed in a separate dedicated room, the room should be temperature-controlled, well ventilated, clean, and dry to prevent moisture and excessive room temperatures that can degrade electrical materials. Additionally, keeping the room properly sealed will keep it free of dirt, dust, rodents, and insects that can get into the cabinets, degrade the equipment, and potentially start a fire.

In fact, good housekeeping greatly reduces fire risks. It's very important to keep combustible material away from electrical distribution systems. Keep in mind that electricity can arc or jump through the air as a path to the ground and ignite combustible material in the vicinity.

In Summary

Implementing an effective EPM Program will provide tangible and intangible benefits including improved safety, lower repair costs, and less equipment downtime. However, for maximum benefit, it should exist alongside an established written Electrical Safety Program and Lockout/Tagout Standard Operating Procedures, which should be consistently followed by employees and contractors to help ensure personal safety. Your EPM Program should also evolve over time as any new equipment is introduced and as the experience of your facility personnel and maintenance groups grows.

An EPM Program certainly will not eliminate all failures, but an effective program will certainly help to minimize their occurrence.

Visit sovereigninsurance.ca to learn more.