Preventive Maintenance: Electrical Preventive Maintenance and the PM Checklist.

"The article below; "**Electrical Preventive Maintenance Will Keep You Safe and Warm**" was written for us by Stuart Smith, MBA, MS. He is an avid writer about CMMS and EAM software solutions for Mintek Mobile Data Solutions. Stuart has over 25 years experience running operations in multiple industries."

Electrical Preventive Maintenance Will Keep You Safe and Warm

By Stuart Smith

With much of the nation buried under mountains of snow or enduring freezing temperatures, now is the time to make sure that your industrial facilities have been inspected for potential electrical problems. Without proper preventive maintenance on your electrical systems, disaster can happen before you have time to thaw.

Why Perform Preventive Maintenance on Electrical Systems

During the winter months, power requirements are higher for many industries as facilities struggle to keep buildings warm and their assets in operation. In addition, in today's economic environment, facility and plant managers also struggle with efforts to lower power consumption in order to reduce expenses.

Training and specialized equipment such as programmable logic controllers (PLC) can only help so much. All of the above goals contribute to a variety of issues that includes but is not limited to:

Ten Reasons to Perform Electrical Preventive Maintenance

- Avoid electrical shorts that cause fires: Electrical short circuits can occur when wires are overloaded with current, wires are exposed and load imbalances. This can cause excessive heat buildup, arcing or explosions.
- Identify loose connections: Loose connections can cause power fluctuations to devices, devices to operate erratically and uneven load distribution between wires.
- Identify components running hot or not according to specifications: Transformers, motors, bearings and wires almost always run hot before they fail. Predictive maintenance technologies such as infrared thermography, vibration analysis and laser alignment tools as well as general maintenance such as regularly scheduled lubrication can avoid asset failure.
- Identify unusual smells, noises, dust build up, or discoloration: Melting insulation, stressed motors, corrosion through dust and so on make a physical inspection a requirement for electrical components. Electrical troubleshooting should be performed using a systematic approach.
- Check all emergency lighting, signage and power indicator displays: Many electrical disasters occur when the safety monitoring equipment itself is faulty leading to a false belief that all is ok.
- Extend the useful lifecycle of assets: Poorly maintained assets require more energy to do the same amount of work. This leads to excessive wear and tear and a shortening of the assets useful lifecycle.
- Avoid unplanned downtime: Unplanned downtime can shut down production, result in emergency labor costs and unnecessary capital asset replacement. Without proper electrical training, all of these significantly impact the profitability of the organization.
- Less equipment loss: Consistent electrical preventive maintenance will reduce the amount of equipment that needs to be replaced early as a result of electrical problems.
- Energy savings: Optimal energy efficiency will occur when equipment is functioning within design parameters and is well maintained.
- Safety and Liability: The most important reason of all is safety. Avoiding serious injuries or death is worth every penny spent on prevention. Liability lawyers have a field day when facilities have a poor maintenance record.

How Often Should Electrical PM be done?

Electrical systems should have a thorough inspection by a licensed electrician every 3 to 5 years. Individual assets should be inspected according to manufacturer directions or based upon experience and industrial training in a particular environment. For example, some motors may need to be inspected quarterly, air handlers annually and so on. Preventive maintenance, inspections and work orders are best handled using CMMS software for the scheduling and recording of activity, results and notes.

Preventive maintenance of electrical systems goes beyond the visual or scheduled predictive maintenance work. A full electrical PM is a complete look at the electrical system including;

Sample Electrical PM Items

- Re-torque connections
- Checking panel boards
- Inspecting PLCs for effectiveness
- Examining work orders as well as new installs for compliance and uniformity
- Making sure lock-out tags are in place
- Inspection of heating and cooling units
- Lighting
- GFCIs
- Shutdown mechanisms
- NEC code compliance

Electrical PM Tools

Performing electrical preventive maintenance can be done with the help of a number of technology tools. Which tool or combination of that works best for your facility depends on the type, location and accessibility of assets. The most important part about performing preventive maintenance is that is must be planned and be consistent. Regardless of the type of tool used to identify problems all electrical repair/install work should be done by a licensed electrician.

The goals of reliability, condition based, predictive and preventive maintenance are all the same which is to keep assets working in optimal condition for the longest period of time at the lowest overall cost to an organization. Some of the tools available are:

- CMMS/EAM software for asset and maintenance management. These are good for scheduling all forms of preventive and predictive maintenance including work orders and inspections as well as tracking vendor documents/contracts for outsourcing of work.
- PLC and training: PLCs are used for the control of machinery from assembly lines to lighting fixtures. PLCs are designed for multiple inputs and output arrangements, extended temperature ranges, immunity to electrical noise, and resistance to vibration and impact.
- CBM and reliability based maintenance methodologies.
- Infrared Thermography: Common predictive technology tool that is great for identifying changes in heat or moisture. As previously stated almost all devices run hot before failure. Moisture causes corrosion.
- Vibration analysis: Most vibrations in electrical motors are unwanted and indicate a loss of energy occurring.
- Ultrasonic analysis: Not all sounds are audible to the human ear. Ultrasound analysis can detect tightness
- Laser alignment: Laser shaft alignment can increase the efficiency and lifecycle of motors.
- Using the senses: Visual, smell and noise changes are important signals of impending problems and they can be used for often than any other form of problem identification.

Electrical inspection checklists and resources

Every organization has a unique set of assets. Therefore, it is unlikely that the same electrical inspection checklist will be the same. The following links are examples of electrical preventive maintenance checklist or good resources to develop your own checklists:

- Also see **Electrical Preventive Maintenance Training course**
- NFPA. Order the complete NEC code book.
- Comprehensive Electrical System Maintenance Checklists Sample Electrical Inspection Checklist.
- Ensuring long life for electrical equipment. Solid information about Electrical equipment.
- Standard for Infrared Inspection of Electrical Systems & Rotating Equipment Infraspection Institute Guide

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About the Author:

Stuart Smith, MBA, MS is an avid writer about CMMS and EAM software solutions for Mintek Mobile Data Solutions. Stuart specializes in Start-Ups, Turnarounds, BioTech and New Technologies, Company Analysis, Micro-enterprise Development areas to name a few. He has over 25 years experience running operations in multiple industries.