

# Testing Times

A newsletter for the electrical construction and maintenance industry

Volume 3 No. 4

## Maintenance Testing - How much is enough?

Preventive maintenance is important for many tangible reasons: increased equipment productivity and life expectancy, reduced unscheduled outages and downtimes, and in some cases, reduced insurance premiums. According to IEEE Design of Reliable Industrial and Commercial Power Systems (Std 493-1990),

Electrical equipment deterioration is normal. But, left unchecked, the deterioration can progress and cause a malfunction or electrical failure. Electrical equipment preventive maintenance procedures should be developed to accomplish four basic functions, that is, keep it clean, dry, sealed tight, and minimize the friction. Water, dust, high or low ambient temperature, high humidity, vibration, component quality, and countless other conditions can affect proper operation of electrical equipment. Without an effective electrical preventive maintenance program, the risk of serious electrical failures increases.

As soon as new equipment is installed, a process of normal deterioration begins. Deterioration can be accelerated by such factors as severe duty cycle, high ambient



*All facilities require maintenance: the type of operating environment can determine the frequency.*

temperature, a dirty or corrosive environment, and overload conditions. Other potential causes of equipment problems include load changes, circuit alterations, harmonics problems, and improperly set or selected components. An effective PM program will help identify and correct problems before a serious failure. "Dependability can be engineered and built into equipment, but effective maintenance is required to keep it that way" (NFPA 70B, Recommended Practice for Electrical Equipment Maintenance, 1994).

The extent of maintenance testing must be determined by the function and importance of the components. Ultimately, the frequency of testing should be determined by the operating environment. Following is a range of industry accepted

maintenance testing frequencies for a few electrical components. Please remember that these guidelines are general and will need to be tailored to site specific equipment based on criticality and environment.

See the back page for details on helping you customize your maintenance program. ❖

Equipment	Frequency
Protective Relays	2 - 3 years
MV Breakers	1 -3 years
Switchboards	6 months - 6 years
BP Switches	6 months - 3 years
480V Breakers	1 - 5 years
Ground Fault	1 - 5 years
Infrared Survey	1 - 2 years



### Cable testing for maintenance

We often get calls from customers asking us to test their cables, either medium voltage (above 600V) or

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low voltage (600V and below), for maintenance purposes. This request is often generated by their insurance company. We have seen facilities who have had their cables tested annually for years and have pretty color charts plotting the results. Of course, what we would all like to know as a result of this testing is the condition of the cables. Are they deteriorating? Do they need to be replaced? Are they as good as new?

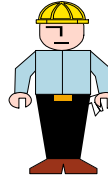
**The Bad News**

This type of testing will not give you an accurate picture of the status of your cables. Maintenance testing of cables is not destructive and, in most cases, will not cause any damage. The problem? Results are inconclusive. Unfortunately, the large number of variables limits the consistency, and therefore, the comparability of results. These variables include temperature, humidity, test voltage, stability of input voltage, and ohthers. If you have a reason to suspect cable

damage, i.e., a backhoe ran into your buried conduit, by all means, test your cables. However, for routine maintenance, save your testing dollars for more useful purposes. ❖

breakers, motor starters and switches should have a contact resistance test performed on them prior to acceptance and start up and during routine maintenance. This test should also be performed routinely across cell to cell connections of standby battery plants. ❖

**Testing Terms...**



**Contact Resistance**

The measurement of contact resistance between a set of current carrying contacts provides an indication of contact heating, alignment, wear and tear, and pitting. Circuit breaker contacts, motor starter contacts, and switch blades are designed to carry current when closed. If these contacts or blades are excessively worn or misaligned, they may not be able to carry current without overheating and subsequent failure. All significant circuit

**FaxBack**

H-P&D is pleased to offer help on customizing your **Electrical Maintenance Schedule**. If you would like assistance, please fax this page to:

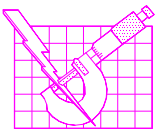
**404-299-3542**

Include your phone number:  
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Your name and address will appear on the label below. If you have any questions, please contact Ms. Lyn Cosby at 404-296-5990.

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