

Testing Times

A newsletter for the electrical construction and maintenance industry

Volume 5 No. 1

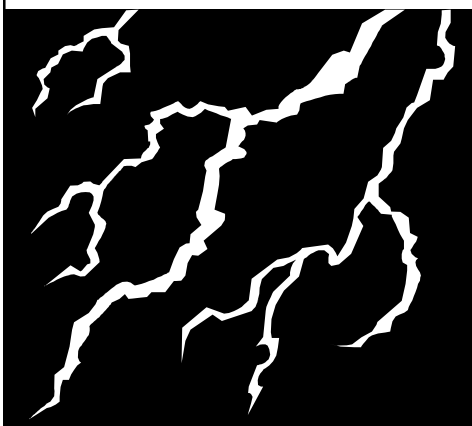
Insulation Coordination

Insulation coordination is the comparison of the protection of surge arresters in an electric system and the surge withstand capability of the insulation of the electric system's equipment. This is commonly done on the electrical design for new systems where the BIL (basic insulation level) of electrical equipment is specified by the designer or by manufacturing standards and appropriate surge arresters are specified. For many systems, special attention to the BIL and surge ratings is not required because there is very little chance that transient overvoltages can be introduced onto the system. Transient overvoltages arise on electrical systems as a result of lightning, switching surges, and faults.

However, on more systems than is often recognized, insulation coordination needs to be reviewed, particularly on those systems where capacitors are switched, where outdoor substations are in service, and where large motors are involved. On new systems, this review should be done as part of the design and review process, much the same as short circuit and coordination studies. Even on old, existing systems, insulation coordination needs to be

reviewed every 5 to 7 years.

- ◆ Has the facility experienced a large number of motor



Transient overvoltages arise on electrical systems as a result of lightning, switching surges, and faults.

failures?

- ◆ Has the facility experienced the failure or misoperation of sensitive electronic control equipment?
- ◆ Do unexpected equipment failures occur when storms are in the area but the electrical service is not interrupted?

If the answer to any of these questions is yes, then the insulation coordination of the

(continued on page 2)



Cable Testing Update

Testing medium voltage cables (over 600V) after energization, i.e., maintenance testing, has always been something of a controversial topic. This practice is common in the utility business and in some industrial environments. The question is, does DC high potential testing of these cables damage them in any

DC high potential testing of medium voltage cables can be destructive in some cases.

way? After years of field and laboratory research, the verdict is in. The answer is yes in the case of cross-linked polyethylene insulated cables (XLPE). XLPE cable appears to be more susceptible to problems associated with aging. DC high potential testing after cables have been in service can further the effects of aging.

The other most common type of medium voltage cable, ethylene-propylene rubber (EPR), does not seem to be affected by DC high potential testing. Thus,

(continued on page 2)

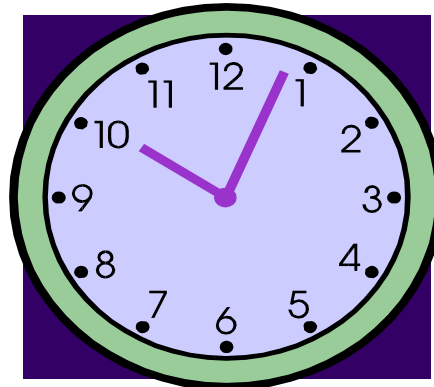


HOOD - PATTERSON & DEWAR INCORPORATED
 ELECTRICAL ENGINEERING AND TESTING
 POST OFFICE BOX 1048 • DECATUR, GA 30031
 TELEPHONE (404)296-5990 • FAX (404) 299-3542

Insulation (continued from page 1)
facility needs to be reviewed. With the improvement in arrester technology in recent years, much better protection can be offered by modern products. On the other hand, the power electronic equipment is more susceptible to transient overvoltage failure. In addition, power electronic equipment, with its fast switching capabilities, can increase the incidence of switching surges arising on low voltage systems that would never have been possible in the past. ❖

Cables (continued from page 1)
maintenance testing of this type of cable does not pose any problems. The other significant change in field testing recommendations is the length of time that the test voltages are applied. For **new** cables, the previous recommendation was to hold the test voltage for fifteen minutes. Based on cable testing studies, the revised test length is five minutes. This five minute maximum test applies to XLPE and EPR for both new and old cable (i.e., acceptance testing and maintenance testing).

Based on these revised industry recommendations, Hood-



In a major revision, the new test length has been revised to five minutes maximum for all MV cables.

Patterson & Dewar has revised its cable testing specifications. We no longer recommend maintenance testing for XLPE cables. As a consulting engineer or owner responsible for specifications, please make a note to review and update your cable testing specifications accordingly. ❖

FaxBack

Hood-Patterson & Dewar offers our Electrical Testing Specifications free of charge as a reference:

- _____ Electrical Testing Specifications (1997 Revision 2.1)
- _____ MV Cable Testing Specifications (revised 1997)
- _____ Company Information

Fax this page to: **404-299-3542.**

Your name and address will appear on the label below.

Do you have a colleague who would like to receive a copy of the **Testing Times**? Please forward us their name and mailing address.

HOOD - PATTERSON & DEWAR INCORPORATED

ELECTRICAL ENGINEERING AND TESTING
POST OFFICE BOX 1048 • DECATUR, GEORGIA 30031



inside:

**Insulation coordination
Cable testing update**