

كابات القدرة: إختبارها، إختبارها ومعرفة مواقع الخطأ

POWER CABLES: SELECTION, TESTING & FAULT LOCATION

INTRODUCTION

The electricity companies have to supply electricity to the consumers at the lowest possible cost commensurate with safety. Power cables represent a major capital asset for electricity suppliers. While in service power cables must be maintained and monitored in order to anticipate faults and possibly avert any failure.

While requirement for underground cables have been increasing, there has been a rapid development of new cable types and accessories including the use of polymeric cables (predominantly XLPE). Evaluating technical and economic aspects of new cable systems is not easy. Furthermore the installation of underground power requires unique skills and knowledge. Tasks involved cover many aspects: laying, jointing, testing and commissioning underground cables, to cable location and fault-finding. Changes in systems also bring additional costs in stores holdings, job instruction preparation and jointer training.

Faults in underground cables can occur at any time, and the causes are many and varied. When faults do occur they generally cause loss of supply to customers and loss of revenue for suppliers. So it is imperative that the fault location process is efficient and accurate to minimize excavation time, which results in reducing the inconvenience to all concerned. For fault locating to be efficient and accurate technical staff needs to have expert knowledge accompanied with experience in order to attained service reliability.

This course is designed to ensure that those responsible for the selection, laying, operation, maintenance and monitoring of power cables understand the characteristics, technical issues involved and comply with relevant specifications and requirements.

COURSE OBJECTIVES

At the completion of the course participants are expected to have gained knowledge and experience on how to apply concepts of EMS in a manner that follows international best practice and be aware of the kind of tools

appropriate for the task. Outputs of the courses are working knowledge by participants of the subject matter, and reference documentation.

Schedule

- Identify the various types of cables, connectors, materials and methods of connection.
- Describe the construction of cables, classification, conductors materials and configurations, the different applications and voltage of cables
- Apply the latest techniques in HV/MV cable splicing jointing, terminating and testing
- Apply the theory of joints and terminations
- Underground cable ampacity
- Cables installed in ducts
- Short circuit

- Practice cable jointing, splicing, testing and terminating
- Reasons for cable failures, analysis and predictive maintenance
- Method of repairing the damaged cable outer sheath for XLPE cables.
- Method of repairing the silicone oil leak of XLPE cable sealing ends
- Short circuit effect on cables
- Permitted voltage drop
- IEC tests of cables, joints and terminations, type tests, routine tests, commissioning tests and maintenance tests
- Visual inspection of the cable sealing ends, stop joints & transmission joints.
- High voltage cable inspection
- Joints.
- Open terminations
- Resistive stress control
- Cable termination design
- Enclosed terminations
- Crimp connection
- Pulling the cable
- Installing cable racks
- Cable jacket and sheath removal

- Cable metallic shielding removal
- Cable semi-conducting material removal
- Cable insulation removal
- Cable splice connector
- Installing taped cable insulation
- Identification of conductors
- Conduits
- Cable supports
- Cable tray
- Trenches
- Service entrance
- cable maintenance
- cable termination
- Steps for fault location
- Fault location methods
- A-frame
- Time domain reflectometry
- Wheatstone (resistance) bridge
- Able to read and understand description , legend and trace site routs, cable burying details

Course Instructor
PROF.DR.OSSAMA EL-SAYED GOUDA



Prof. Dr. Ossama El-Sayed Gouda is the professor of electrical Power engineering and high voltage in the Dept. of electrical power and machine ,Faculty of Engineering ,Cairo University since 1993.He teaches several courses in Power system, High voltage ,Electrical machine ,Electrical measurements , Protection of electrical power system &Electrical installation. He is a consultant of several Egyptian firms. He conducted more than 90 papers in the field of Electrical power system and High



voltage engineering. He supervised about 35 M.SC. & Ph.D. thesis . He conducted more than 150 short courses about the Electrical Power, Machine & High voltage subjects for the field of Electrical Engineers in Egypt & abroad