Training Program:

Distribution Overhead Transmission Lines and Underground Cables: Operation and Maintenance

Introduction:

A major goal of overhead power line design is to maintain adequate clearance between energized conductors and the ground so as to prevent dangerous contact with the line, and to provide reliable support for the conductors, resilient to storms, ice load, earthquakes and other potential causes of damage. Structures for overhead lines take a variety of shapes depending on the type of line. Structures may be as simple as wood poles directly set in the earth, carrying one or more cross-arm beams to support conductors, or "armless" construction with conductors supported on insulators attached to the side of the pole. Tubular steel poles are typically used in urban areas. High-voltage lines are often carried on lattice-type steel towers or pylons. For remote areas, aluminum towers may be placed by helicopters. Concrete poles have also been used. Poles are made of reinforced plastics are also available, but their high cost restricts application. Underground cables are less susceptible for environmental and other hassles.

Target Audience:

Engineers and Technicians with Electrical Backgrounds from Electrical Power Utilities Companies, Engineering Professional, and Petrochemical Companies are recommended to attend this seminar.

Participants need specific requirements other than basic understanding of Electricity and Magnetism and knowledge of nature and operation of Power supply and distribution system.

Training Methodology:

The course is designed to maximize delegate benefit from the outset. The goals of each participant are discussed to ensure their needs are fulfilled as far as possible. Questions are encouraged throughout particularly at the daily wrap up sessions. This provides opportunities for participants to discuss specific issues and if possible find appropriate solutions. Case studies are employed to highlight particular points and appropriate video material used to illustrate particular conditions.

Objectives:

Upon the successful completion of the course, participants will be able to:

- Describe the traditional and current design practices in transmission line structures as well as the improves design approaches
- Know the various types of insulators &conductors and be familiar with their accessories and function. In addition to, the methods used for improving their performance s.
- List down the tools and equipment's used in transmission line construction and maintenance and explain its step-by-step procedure
- Describe the typical insulated power cables for high-voltage applications and be familiar with its testing, troubleshooting and fault location
- Understand the concept of transmission line parameters and identify the characteristics of overhead conductors, analytical performance
- Clarify the principle of mechanical design including Sag calculations, span, etc....

- Introduce corona and noise in overhead lines and recognize its main effects in the construction, maintenance and patrolling
- Learn overhead line troubleshooting and know how to narrow down the possible causes or locations of the problem
- Explain the purpose of patrolling, and identify problems to look for when patrolling.
- Be familiar with troubleshooting safety, obtaining clearance or work instructions
- Discuss safety precautions to observe when troubleshooting overhead distribution lines.
- Explain the purpose of troubleshooting, and describe the steps for troubleshooting an overhead distribution system.

Course Outline

- Refreshment of electrical basics and fundamentals
- Classifications of overhead lines
- Pole and tower types
- Pole and tower structures
- Cross-arm design parameters
- Comparisons between overhead lines and underground cables
- Surveying and profiling
- Parameters of transmission line and cables
- Overhead line fittings

- Power cable fittings
- Modelling of transmission lines (short/medium/long)
- Performance of transmission lines
- Mechanical design of overhead lines (sag, span, etc…)
- Corona discharge
- Pole mounting transformers
- Sectionalizes
- Autoreclosers
- Load break switches
- Fuses
- Conductors: types and sizing
- Mechanical properties of conductors
- Insulators and creep age distance
- Air gaps and surge arresters
- Grounding types and requirements
- Distribution voltage clearances
- Overhead line clearances
- Voltage regulators
- Inspection and maintenance of overhead and power cables
- Patrolling
- Failure modes in overhead lines

- Steps of troubleshooting and fault tracing
- Lightning and lightning protection
- Protection methods of overhead lines and underground cables
- Pre and Post Tests

Accreditation:

BTS attendance certificate will be issued to all attendees completing a minimum of 80% of the total course duration.