

A competency-based program that will enhance the engineer's ability to interpret various substation designs: scheme criteria, interpret protocols, and industry standards to be able to design a highly efficient, reliable and safety complying substation scheme.

At the end of the session, the participants will be able to:

- Enumerate the basic principles and methodologies of Substation Engineering
- Identify advance applications in utility, industrial and commercial industry
- Generation / Transmission Maintenance Engineers/ Technicians
- Describe the importance and applicability of Substation design and construction

At the end of the session, the participants will receive:

- Certificate of Completion, TESDA Accredited
- Continuing Professional Education points (as required by PRC and IIEE)
- Recommendation of Competency (upon completion of Supervisor evaluation)



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SUBSTATION DESIGN and CONSTRUCTION

- Design fundamentals of the Design and Construction processes of electrical substation from start-up and commissioning
- Installation / erection of utility electrical substation
- Objective of substation Design
- Construction and Project Management of Substation
- ANSI, IEC and PEC Standards in Substation Design and Construction Accepted Tests
- Substation Operation and Maintenance
- Assessment by Evaluation

July 7 to 9, 2010
October 6 to 8, 2010

COURSE BACKGROUND:

The EPIRA law mandates reliability, efficiency and practically zero downtime in substation apparatus operation. Technical services group, power system maintenance team and facilities maintenance engineers are the front liners in ensuring the asset longevity operation and recovery of investments.

The unpredictability of operation lies in the way substation assets are maintained and this technical training will guide experienced power transformer maintenance engineer improve his knowledge based on international standards.

COURSE HIGHLIGHTS:

- Step by Step Study of the substation design and construction process
- Consider all Phases from initial site review and selection
- Substation start-up and commissioning
- Major components of electrical substation equipment and apparatus
- Methods of layout, purpose and its application in the systems

WHO SHOULD ATTEND?

- Substation design engineer
- Consulting Engineers
- Industrial, Utility and Plant Engineers
- Transmission and Distribution Line Design Engineers and Technicians
- Project Managers/Engineers
- Construction Supervisors
- Engineering Technicians
- Managers of Design Engineering Department

- Electric Utility Engineers Involved in Distribution Engineering, Operation and Planning
- Engineers involved in Construction and operation of Medium or H.V. S/S

COURSE FEE:

PhP 12,800.00 inclusive of snacks, lunch, Certificate of Completion

A processing fee of PhP 500.00 will be charged CPE points accreditation

COURSE OUTLINE

DAY 1

1. Substation Types and Purpose
 - Fundamentals of power system operation
 - Primary unit substations
 - Secondary unit substations
 - Objective of substation design
2. Overview of S/S Design and Construction Process
 - Establishing the needs for substation facilities
 - Project scope document description and content
 - Site Selection and Environmental issues
 - Project management
 - Engineering Design-Equipment specs and drawings
 - Specifying and procuring materials and equipment
 - Construction
 - Testing, Start-up, commissioning
 - Ordering Materials / Delivery dates issues
3. Initial Steps in the design process: Setting the bounds for the overall project
 - Understanding and review of project scope document
 - Data and information gathering during site visit
 - Determining site adequacy for initial and future requirements

SUBSTATION DESIGN and CONSTRUCTION

- Environmental Zoning and Public perception issues
 - Construction and construction outage requirements- Access for construction and O/M Equipment
4. Site Selection and Design
- General Requirements
 - Environmental and Permitting issues
 - Site preparation
 - Drainage and erosion protection
 - Surface materials
 - Roads and access
 - Understanding soil test reports
 - Slab on grade design example
 - Acquiring permits
 - Zoning and Ordinance destruction

DAY 2

1. Substation layout: converting single line diagram to physical layout
 - Substation components and required code clearances
 - BIL, Insulation coordination and Surge arrestors
2. Grounding and ground design
 - Purposes of grounding
 - Field testing ground grid resistance and soil resistivity
 - Materials and installation
3. Substation structures
 - Choice of structure for substation designs
 - Specifying a structure
4. Power Transformer and Controls
 - Major Components
 - Construction and operation
 - Fixed TAPS and OLTC
5. Introduction to schematics and wiring diagrams
 - Control logic
 - Converting control schematics to wiring diagrams
 - Sample of transformers control and wiring diagrams
 - Pressure – vaccum gage
 - Voltage regulators
 - Construction and operation
 - Ratings

DAY 3

- Schematics and wiring
1. Disconnect switches
 - Types and Applications
 - Manuals and Motor operated Switches and Control schematics
 2. Power Circuit breakers
 - Purposes and types
 - Construction and operations
 - Schematics and wiring
 3. Circuits Switchers
 - Purposes and types
 - Construction and operation
 - Schematics and wiring
 4. Reclosers
 - Purposes and application
 - Construction and operation
 - Schematics and wiring diagrams sample
 5. Power Fuses
 - Types and applications
 - Operations
 6. Instruments Transformers
 - Potentials and current transformers
 - Principles of operation
 - Burden Saturation and Accuracy
 - Ratings and Connections
 7. Protective relay systems
 - System protection objectives and philosophies
 - Typical relay types and applications
 - DC Trip and Close schematics
 - Voltages and Current schematics
 - Wiring Diagrams

YOUR INSTRUCTORS:

Engr. Rodolfo R. Peñalosa, PEE, PECE, Apec Engr.

Engr. Penalosa is the Chairman and President of . He is also the President of WESTCO is a sister company of PAMAV specializing in providing electrical testing services and equipment. Engr. Penalosa is a visionary and leader of testing equipment and tools for the development and advancement of the Electrical Engineering Profession. He is a keynote speaker on Electrical Engineering Law, Substation testing and key areas in the Electrical Engineering field and has addressed various audiences both locally and the international scene. He led the Continuing Professional Education Council of the Professional Regulation Commission (PRC) as a Chairman for nine years. Currently, Engr. Penalosa is the Chairman of the Technical Panel for Engineering, Technology (TPET) of the Commission on Higher Education (CHED) and a member of the Construction Arbitration by The CIAC. His expertise contributed to being a Philippine Representative of CHED in Japan, Brunei and Pennsylvania covering the aspects of Electrical Professional Practice and Standards and APEC Competency Standards Development for Engineer Registry. Engr. Penalosa also holds Past President of Society of Philippine Electrical Contractors & Suppliers (SPECS, 1992), the Institute of Integrated Electrical Engineers of the Phils (IIEE, 1995), Past Chairman of Construction Manpower-Development Foundation, National Construction Productivity Development Plan, Department of Trade and Industry (DTI/JICA, 1994 to 1996), the President of Society of Philippine Accredited Consultants (SPAC, 2007-08) and a Past President of the Philippine Association of Board Examiners (PABE, 2001 & 2002). Engr. Penalosa has attended extensive trainings in Power System Maintenance by DOBLE in Finland, Boston and Singapore and holds a degree in Bachelor of Science in Electrical Engineering from FEATI Universtiy.

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Engr. Ulysses B. Paguio, PEE

Engr. Paguio is a Training Consultant of PAMAVTech. Engr. Paguio's expertise comes from years of experience as a Power Systems and Testing Engineer in the Middle East and the Philippines servicing companies such as: Siemens, ABB Industry, Inc., and Manila Electric Company to name a few. He is also a Professor of the Electrical Engineering department at the Mapua Institute of Technology in the Philippines teaching. Engr. Paguio's expertise is on the aspects of Power System Engineering and Testing. He graduated Bachelor of Science in Electrical Engineering and is currently continuing his Master of Science in Technological University of the Philippines.

REGISTRATION

SUBSTATION DESIGN AND CONSTRUCTION

Please check the date:

- Date:** July 7 to 9, 2010
 October 6 to 8, 2010

Venue: PAMAVTECH, 7F Integrated Professional Office Building
 14 Quezon Avenue Quezon City

Time: 8:00 a.m. to 5:00 p.m. on each day

Please fill up and return to fax 740-7602 or admin@pamavtech.com. Provide one form for each participant.

NAME <small>(as you want to appear on certificate. Title, first name, middle initial, last name, suffix)</small>	
DESIGNATION	
COMPANY NAME	
TELEPHONE	LOCAL NUMBER
CELLPHONE	
EMAIL ADDRESS	

Payment:

Reservations without payment do not confirm your slot. To confirm your reservation, please pay the course fee of Php 12,800.00 per person thru China Bank (Quezon Avenue branch) Account name PAMAV Training Institute & Technology Center, C/A#: 107-119555-8. Please attach the deposit slip with this form.