UNDERGROUND CABLE SYSTEMS: PRINCIPLES AND PRACTICES

October 28–30 ($1595)
This 3-day course provides up-to-date information on important aspects of all types of underground transmission systems, including extruded-dielectric, pipe-type, SCFF, and GIL. The course covers topics from initial planning and coordination with OH lines through design optimization, civil construction and cable installation, and operation and maintenance including failure analysis and repair.

More than two hundred engineers have attended this popular course over the last 20 years. [2.1 CEUs]

PIPE-TYPE CABLE SYSTEM DESIGN, INSTALLATION, AND OPERATION

October 31–November 1 ($1295; $995 if taken with the Underground Principles and Practices course)
This 2-day course focuses on the design, ampacity, specification, installation, uprating, maintenance practices, dielectric fluid-handling systems, and life evaluation of both high-pressure gas-filled (HPGF) cables and high-pressure fluid-filled (HPFF) cables. There are extensive slide presentations on cable manufacturing and pipe and cable installation.

Topics include ampacity calculations, cathodic protection systems, pumping plant requirements, dissolved gas analysis (DGA), cable ampacity, uprating methods using fluid circulation and forced-cooling, relocation and extension of existing lines, and many other topics relevant to pipe-type cables including several presentations on state-of-the-art trenchless water crossings. [1.4 CEUs]

RECONDUCTING AND VOLTAGE UPGRADING OF TRANSMISSION LINES

November 18–20 ($1595)
The transmission uprating course discusses basic design issues relating to transmission line design and ratings and then focuses on techniques and technologies that may be applied to increase capacity of overhead transmission circuits, first considering approaches that minimize capital investment by line owners/operators.

The course addresses traditional and novel methods and materials for maximizing power flow on new and existing transmission lines. Both experienced designers and beginning engineers can profit from the presentations. [2.1 CEUs]

APPLICATION OF HIGH-TEMPERATURE LOW-SAG CONDUCTORS

November 21 ($950; $750 if taken with the Reconducting course)
The range of materials and commercially available high-temperature, low-sag (HTLS) conductors is studied in depth. Installation procedures and problems are discussed and field results examined. Deterioration of HTLS conductors at temperatures above their design limits is explained. The peculiar but important issues involving the use of annealed aluminum wires in combination with steel and carbon fiber composite cores are explored. Limitations of HTLS use in corrosive and extreme ice loading regions are explained. [0.7 CEUs]

EXTRUDED-DIELECTRIC POWER CABLE SYSTEMS – DESIGN AND INSTALLATION

October 24–25 ($1295; $995 if taken with the Underground Principles and Practices course)
Extruded-dielectric cables are now in service through 500 kV worldwide, and there are extensive installations in the United States at 345 kV. We will discuss design aspects, including analytical studies, installation considerations, factory and commissioning tests, general operation considerations, utility power system effects, and maintenance practices, focusing on XLPE-insulated cables as well as EPR-insulated cables. There will be special discussions of hybrid lines, where short sections of UG cables may be the only way a utility can permit a long OH line. [1.4 CEUs]

LIVE LINE MAINTENANCE: PRINCIPLES AND PRACTICES

October 21–23 ($1595)
NEW! Presented jointly by Tom Verdecchio and PDC
This course is for utilities or contractors considering live line maintenance practices on overhead transmission lines up to 765 kV. The history, tools, theory, industry best practices, and the economic value of live working will be covered, as well as the procedures for calculating minimum approach distances, designing structures to be live work friendly, and overvoltage controls, and an in-depth review of IEEE S16-2009 will be included. [2.1 CEUs]

POWER CABLE RATINGS AND SOIL CONSIDERATIONS

October 15–18 ($2100)
NOW 4 DAYS! Presented jointly by Geotherm, Inc., Dr. George Anders, and PDC
Underground cables generally have lower ratings than overhead lines, and the cost per ampere is much higher. Wind farms are using underground cables to collect power from distributed wind generation. From the standpoint of ratings, both over-designing and under-designing are very costly. So it is desirable to confidently rate the cables near their ultimate limit. Important issues include:

- Ampacity audits and uprating
- Soil dry-out – is it really an issue?
- Shield/sheath bonding on XLPE cables
- Fluidized Thermal Backfill™, other fills
- Conductor size vs. additional special backfill
- Temperature monitoring, dynamic rating

NEW: We are pleased to have Dr. George Anders lecture on Day 4 of the course. Dr. Anders will speak on special topics including:

- Effects of cable crossings
- Deep cable ampacities
- Cables in tunnels
- Wind farms and Data Centers
- Other special topics selected by students

Cost to attend Day 4 only is $1000. [2.8 CEUs]
PDC courses are intended for engineers and field personnel concerned with the planning, design, installation, operation and maintenance of underground cables and overhead lines. Any of our courses can be presented on-site at utilities and elsewhere. Please give us a call to discuss your interests and so we can recommend the best courses for you to attend.

Continuing Education: PDC is a Continuing Education Provider in the State of Florida #CEP0003531. Learning outcomes for our courses are available on our web site or by request.

General Course Considerations: Each course includes a comprehensive course notebook, coffee breaks, and lunch. The courses are scheduled so that there is adequate time to ask questions during the formal presentation, during breaks, or after class. Students are responsible for travel and living expenses. Based on favorable comments from past students, all of our scheduled courses are held in the St. Pete/Tampa, FL area where we have arranged reduced rate hotel room blocks at The Alden, 5900 Gulf Blvd, St. Pete Beach, FL, 727-360-7081.

Underground Cable Systems: Principles and Practices  
(Oct 28-30) J.A. Williams, R.I. Mosier
Pipe-Type Cable System Design, Installation, and Operation  
(Oct 31-Nov 1) R.D. Wilkinson (Consultant); J.A. Williams
Reconductoring & Voltage Upgrading of Transmission Lines  
(Nov 18-20) J.R. Stewart (Consultant); D.A. Douglass
Application of High-Temperature, Low-sag Conductors  
(Nov 21) D.A. Douglass
Transmission Line Monitoring & Rating (Oct 22)  
D.A. Douglass
Extruded Dielectric Power Cable Systems –  
Design & Installation (Oct 24-25)  
J.H. Cooper, R.I. Mosier
Live Line Maintenance: Principles and Practices  
(Oct 21-23) T. Verdeccio (Consultant); E. Surmanis
Power Cable Ratings & Soil Considerations (Oct 15-18)  
D. Parmar (Geotherm), Dr. George Anders (Consultant), J.A. Williams

T&D ENGINEERING SERVICES
PDC’s experienced engineering staff offers services in a variety of areas including:
- Rating/uprating of overhead and underground lines and power transformers
- Initial planning studies to compare the suitability – both technical and economic – of various cable & conductor options
- Environmental impact reviews, including support in permit applications and hearings
- Purchase and installation specifications
- Factory audits, witness testing
- Bid preparation and proposal evaluation
- Review of vendor’s drawings and calculations
- Client representative for factory inspection and acceptance tests
- Preparation of Operation & Maintenance (O&M) manuals, and on-site training
- Evaluating novel materials and installation techniques
- Equipment life evaluation and extension
- Assessment and replacement of aging conductors

We will issue course completion certificates indicating the number of Professional Development Hours (PDHS) and Continuing Education Units (CEUs) earned based on national guidelines and the number of classroom hours that are satisfactorily completed.

Power Delivery Consultants, Inc.
28 Lundy Lane, Suite 102, Ballston Lake, NY 12019
Telephone: 518-384-1300  Fax: 866 667,1725
Engineering T&D Excellence*

Find more details and registration information at our web site:
http://www.pdc-engineering.com

Our courses are presented by practicing engineers with more than 40 years analytical and field experience.

Power Delivery Consultants, Inc.
Engineering T&D Excellence since 1992