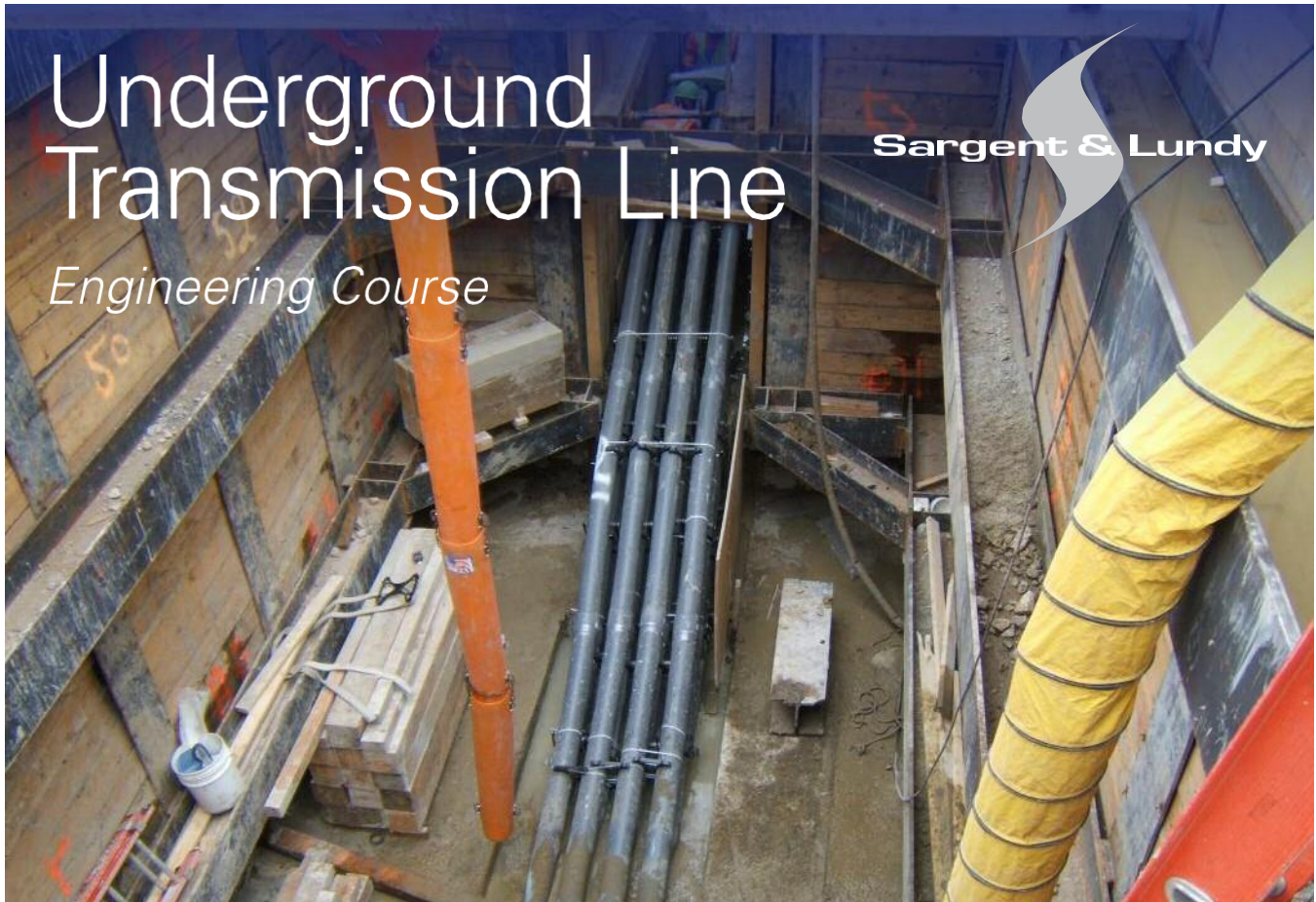


# Underground Transmission Line

## Engineering Course

Sargent & Lundy



Sargent & Lundy conducts two days of training in underground transmission line design for our clients in the utility industry. Training is offered to utility personnel as either an onsite presentation or remotely via an online presentation by Sargent & Lundy engineers engaged in utility transmission line design and engineering.

### What You'll Learn

This two-day course provides a comprehensive treatment of underground transmission line engineering. Specific tasks and activities pertaining to line design will be presented, as well as the fundamentals of system needs, design requirements, route selection, cable selection, detailed design, and installation. In-class exercises include evaluation of alternate routes and cable types.

Course instructors include Dennis O'Reilly, PE; Mark Rankin, PMP; and Tom Thorsell, PE.

### Who Should Attend?

Utility engineers, project managers, and other professionals involved with transmission line projects, as well as entry level engineers or experienced professionals who are new to this area of the electric utility business.

### Course Fees

The two-day course is offered at a price of \$1,000 per person. The price is reduced to \$900 if payment is received by Sargent & Lundy one week prior to the course start date. Credit card payment is accepted through our website.

The course is available to utilities looking to provide an onsite or online presentation exclusively for their employees. Please call for information and pricing.

### 16 Professional Development Hours

Upon completion of the course participants receive a certificate of completion and one professional development hour (PDH) for every hour of classroom instruction. Refer to specific state requirements for applicable PDH credits.

Online participants must sign in/out each day and be in attendance for the entirety of the course to be eligible for PDH credits.

FOR INFORMATION CONTACT: MARY JO MCNAMARA  
[mary.j.mcnamara@sargentlundy.com](mailto:mary.j.mcnamara@sargentlundy.com)  
312-269-2117

# Underground Transmission Line Course Details

## Day 1

Session 1 provides an overview of underground transmission. Session 2 is an introduction to power system analysis and factors influencing transmission line design. Sessions 3, 4, and 5 cover the engineering aspects of underground line design, including route selection, preliminary design, and factors affecting ampacity. Attendees will gain an understanding of applications and limitations of underground transmission and parameters affecting design, as well as relative costs of underground transmission.

### Session 1 – Overview

- Why go underground
- Relative cost of going underground
- Underground cable types
- Options

### Session 2 – System Needs

- Power system analysis
- Continuous steady-state, short-circuit, and emergency ratings
- Cable capacitance
- Electromagnetic fields
- Communications cable

### Session 3 – Design Requirements

- Factors affecting cable ampacity
- XLPE cable

### Session 4 – Route Selection

- Routing objectives
- Identifying information sources
- Compiling/interpreting information
- Evaluating alternatives

### Session 5 – Preliminary Design

- Preliminary cable sizing
- Manhole locations
- Duct bank routing
- Cable expansion allowance

## Day 2

Sessions 6 and 7 present detailed design and explore obstructions encountered in the design process. The detailed design section includes duct banks, manholes, cable bonding, cable support, grounding, and terminations. Sessions 8 and 9 address installation and cable system testing. While the course is focused on solid dielectric cable, Session 10 covers pipe-type cable as well.

### Session 6 – Obstructions

- Typical existing underground installations
- Typical clearance required from obstructions
- Relocation of obstructions

### Session 7 – Detailed Design

- Duct banks
- Manholes
- Cable, cable bonding, cable supports
- Grounding
- Cathodic protection
- Termination structures

### Session 8 – Installation

- Duct bank and manhole installation
- Clean and mandrel conduit
- Cable pulling lubricants, calcs, operation, splicing/terminations

### Session 9 – Cable System Testing

- Cable manufacturing tests
- Post installation testing

### Session 10 – Pipe-Type Cable

- Cable types
- Cathodic protection
- Replacing pipe-type cables

FOR INFORMATION CONTACT:

MARY JO MCNAMARA  
[mary.j.mcnamara@sargentlundy.com](mailto:mary.j.mcnamara@sargentlundy.com)  
312-269-2117

