

IEEE Guide for Working Procedures on Underground Transmission Circuits with Induced Voltage

IEEE Power and Energy Society

Sponsored by the
Insulated Conductors Committee

IEEE
3 Park Avenue
New York, NY 10016-5997
USA

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IEEE Guide for Working Procedures on Underground Transmission Circuits with Induced Voltage

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**Insulated Conductors Committee
of the
IEEE Power and Energy Society**

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Abstract: Induced voltage working procedures for underground transmission circuits are established in this guide. A transmission circuit when de-energized will have an induced voltage when in a common duct bank with an energized circuit. The induced voltage may be a possible safety hazard. The induced voltage may be determined by modeling the circuits and by measurement. This guide addresses the working procedures to follow when performing work where induced voltage is present.

Keywords: cable, duct bank, equipment, grounding, IEEE 1727™, induced voltage, jointing, underground transmission

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Introduction

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As the need for greater power capacity increased the locations where overhead transmission lines could be built to deliver this power to the users were restricted or eliminated by surrounding communities. This resulted in increasing numbers of underground transmission circuits. As the need for additional capacity continued, the instances of parallel transmission circuits also increased due to the limited locations available for construction of new underground transmission lines.

Typically while performing operations and maintenance tasks on an existing line, parallel lines would remain energized. Utilities became aware of the problem of induced voltages in the situation where the parallel lines were very close. Because there were no industry guidelines or standards for these situations a utility conducted surveys of their peers to determine what others were doing. These surveys resulted in the recognition of the need for a standardized approach to this problem. A working group was formed to address this need.

This guide addresses this lack of standards by detailing working procedures that when used, help to ensure a safer working environment for workers performing tasks where induced voltages are present from parallel underground transmission lines in a common duct bank.

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1. Overview

1.1 Scope

This guide establishes induced voltage working procedures for underground transmission circuits. A transmission circuit when de-energized will have an induced voltage when in a common duct bank with an energized circuit. The induced voltage may be a possible safety hazard. The induced voltage may be determined by modeling the circuits and by measurement. This guide addresses the working procedures to follow when performing work where induced voltage is present.

1.2 Purpose

The purpose of this guide is to establish working procedures for de-energized underground transmission circuits where induced voltage is present. The guide will describe working procedures to use under this condition.