

# High-voltage cables and optical cables are stored in the same trench

## Article Overview

Optical fiber cables can be laid in the same trench as high-voltage power cables if proper spacing, insulation, and standards are followed to ensure safety, signal integrity, and thermal management.

## Technical Considerations

**Electromagnetic Interference (EMI) and Safety:** Optical fiber cables are generally immune to electromagnetic interference because they transmit light rather than electrical signals. However, high-voltage cables generate strong electric fields that can induce leakage currents or corona effects on nearby cables, especially if the optical cable is not all-dielectric or properly insulated. Special care is required to prevent tracking and degradation of the cable jacket due to high-voltage fields, dust, moisture, or contaminants in the trench environment (Corning, IEEE 1222 standard) . **Thermal Effects:** High-voltage cables generate heat during operation. When optical cables are laid in the same trench, thermal dissipation must be considered to avoid overheating. Controlled backfill materials like sand or lean concrete are often used to improve heat dissipation and maintain cable performance (Electrical Engineering Portal) . **Mechanical Protection:** Both cable types require proper bedding and protective layers. IEC standards recommend 75 mm of sand below and above the cable, with concrete tiles or warning tapes above for mechanical protection. Backfilling with selected soil free of stones and organic matter ensures long-term stability and prevents damage during maintenance or future excavation .

## Installation Practices

**Spacing and Trench Design:** Adequate separation between power and optical cables is critical. While exact distances depend on voltage levels and local regulations, trenches are typically designed to maintain safe electrical clearance and allow for thermal expansion. Ducts or conduits may be used to isolate optical cables from high-voltage cables, especially in urban or congested areas . **Trench Depth:** Higher voltage cables require greater burial depth for safety and mechanical protection. Optical cables can be laid in the same trench at a slightly higher or lower level, provided bedding and separation standards are maintained . **Standards Compliance:** Installation should follow IEEE, IEC, and local electrical safety codes. IEEE 525-2007 and IEC 60364 provide guidelines for trench design, cable spacing, earthing, and protection to minimize faults and ensure long-term reliability .

## Benefits and Challenges

**Benefits:** Sharing a trench reduces excavation costs, manpower, and road disruption. It also allows coordinated maintenance and reduces the overall footprint of underground infrastructure . **Challenges:** Coordination between utility providers is necessary. Differences in installation specifications, thermal ratings, and

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maintenance schedules can complicate joint trench projects. Proper planning and adherence to standards are essential to avoid cable damage or service interruptions .

## Conclusion

Laying optical fiber and high-voltage cables in the same trench is feasible and widely practiced when proper insulation, spacing, thermal management, and compliance with IEEE and IEC standards are ensured. Using protective bedding, controlled backfill, and possibly separate ducts for optical cables enhances safety, signal integrity, and operational reliability. Coordination between utility providers is critical to maximize cost savings while maintaining long-term performance.

**Thermal Design of Cables** Underground cables are installed in trenches of rectangular

We are laying MV cables (15 KV) (armored cu /xlpe) in an open trench. Adjacent (parallel) to it, we are laying fiber

The installation of optical fiber near high voltage circuits is a common occurrence. It is especially attractive for utilities

Fiber Optic Network Design Jump To: The Communications System Cabling Design Choosing Transmission Equipment Planning

For cables installed with less than 900 mm depth of cover, generally associated with short defined sections for crossing of

The optic-fiber transmission system can supply large-capacity and high-reliability channels for SCADA data, voice,

Cables that are installed in the vicinity of high-voltage power lines should be grounded, including all-dielectric cables. Maintain proper

When there are two different voltage ratings on cables, separation, either mechanical or by distance, is to avoid an

Abstract--The Objective of this paper is to workout and highlight the possibilities to operate an AC Power cable and Optical Fibre

OPGW is installed in the same manner as high voltage cable but ends are brought to the ground and

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an AC Power cable and Optical Fibre Cable (OFC) by laying both in one trench. This paper has studied the electrostatic, magnetic

Data cable in metal conduit requires no separation when both systems are in separate

This document establishes standards for cables and cable installations in substations to ensure safety and minimize failures. It

The last layer of backfill will be done with topsoil coming from the excavation and previously stored properly, in order

Where cables are installed in ducts in a shared trench arrangement and where ducts of other services are installed directly above the

Typically, higher voltage cables require greater burial depth, while protective ducts may

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