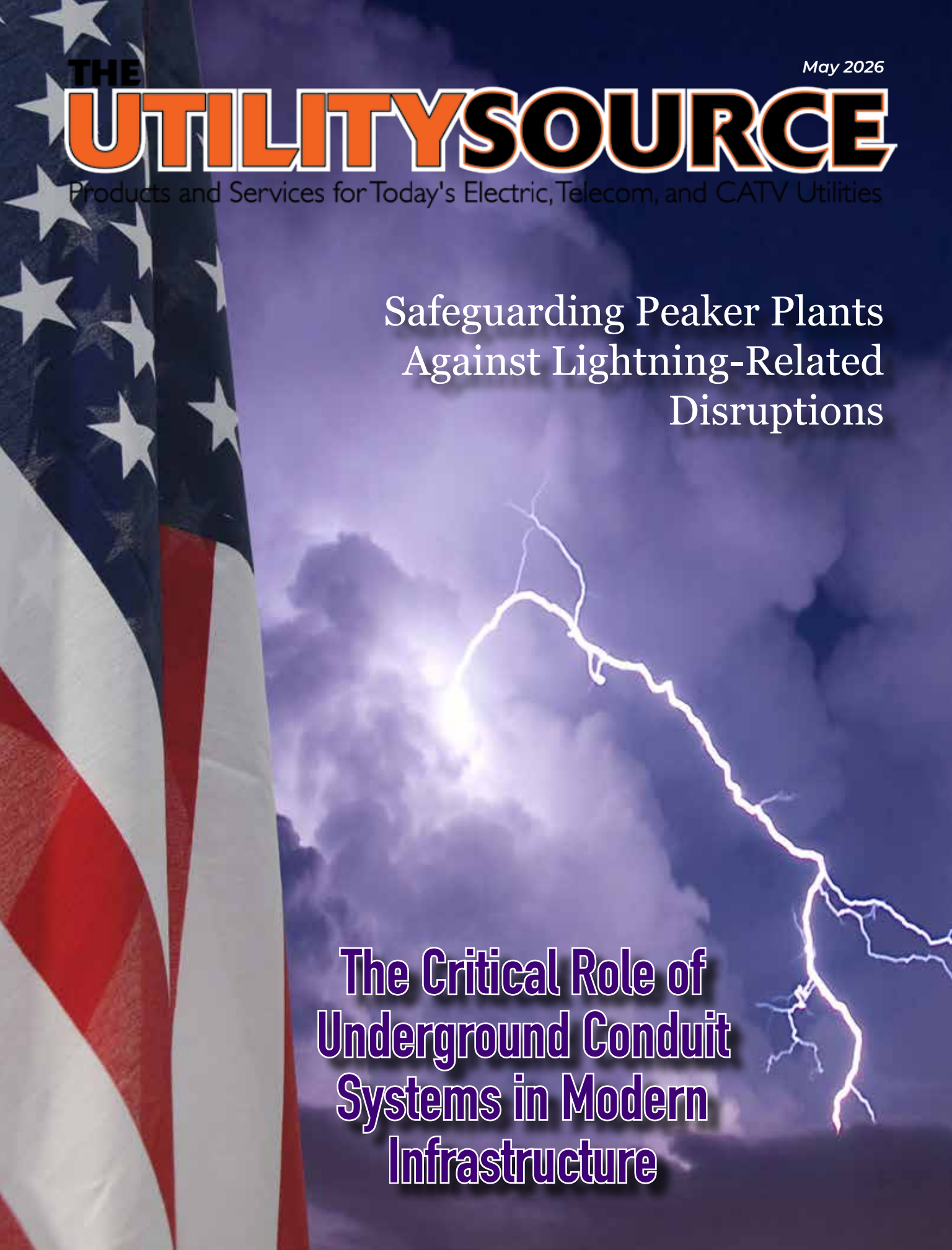


The background of the cover features a dramatic sky with dark, swirling clouds and a bright, jagged lightning bolt striking down from the upper right. On the left side, a portion of the American flag is visible, showing the stars and stripes. The magazine title 'THE UTILITY SOURCE' is prominently displayed at the top in a large, bold, orange and black font. Below the title, the subtitle 'Products and Services for Today's Electric, Telecom, and CATV Utilities' is written in a smaller, black font. The main headline, 'Safeguarding Peaker Plants Against Lightning-Related Disruptions', is centered in a white serif font. At the bottom, another headline, 'The Critical Role of Underground Conduit Systems in Modern Infrastructure', is written in a purple serif font.

THE

May 2026

UTILITY SOURCE

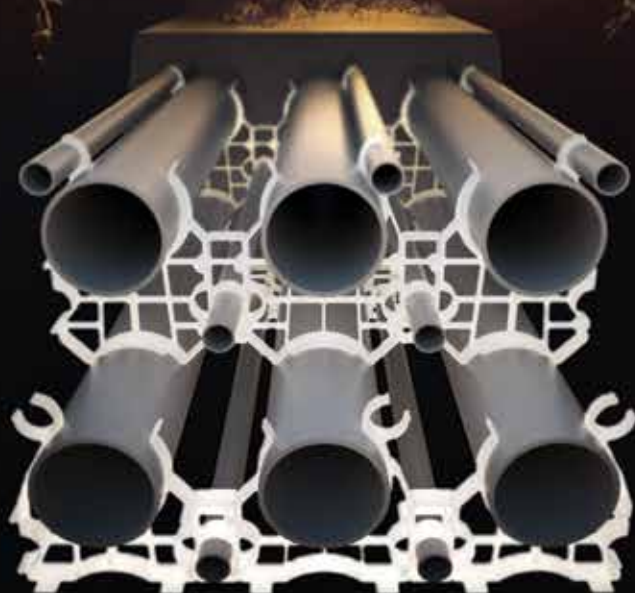
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PG 4	The Critical Role of Underground Conduit Systems in Modern Infrastructure
PG 16	OTR Expands Track Offering with E5 Tread Pattern for Smoother Rides, Surface-Friendly Performance
PG 20	Safeguarding Peaker Plants Against Lightning-Related Disruptions
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PG 26	Ad Index



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THE UTILITYSOURCE

Products and Services for Today's Electric, Telecom, and CATV Utilities

Vol. 26 Issue 5

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HFG Media

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The Critical Role of Underground Conduit Systems in Modern Infrastructure

Introduction

Underground conduit systems are among the most overlooked yet indispensable components of modern infrastructure. Hidden beneath streets, commercial buildings, industrial facilities, and residential developments, these systems form the backbone of electrical distribution, telecommunications, water management, transportation signaling, and utility protection. While the public often notices roads, bridges, and towering utility poles, underground conduits quietly perform the essential task of protecting and organizing the

networks that sustain contemporary society.

As urban populations continue to grow and cities become increasingly dependent on uninterrupted connectivity and reliable power distribution, the importance of underground conduit systems has never been greater. From safeguarding electrical cables against environmental damage to supporting the expansion of smart cities and renewable energy networks, underground conduits play a foundational role in ensuring safety, efficiency, and sustainability.

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Despite their significance, underground conduit systems rarely receive the level of attention they deserve in public policy discussions, infrastructure planning, or investment priorities. Many aging conduit networks across the world face deterioration due to decades of underinvestment, poor installation practices, inadequate maintenance, and increasing environmental stress. At the same time, rapid technological advancement is placing unprecedented demands on underground infrastructure.

This editorial explores the importance of underground conduit systems, the engineering principles behind their design, the challenges associated with installation and maintenance, the role they play in modern urban development, and the urgent need for long-term investment and innovation in underground infrastructure.

Understanding Underground Conduit Systems

An underground conduit is a protective tube or channel installed beneath the ground to house electrical wires, communication cables, fiber optic lines, or other utility systems. Conduits may be constructed from materials such as PVC, HDPE, fiberglass, galvanized steel, aluminum, or concrete, depending on the environmental conditions and the type of utility being protected.

The primary purpose of underground conduit systems is to provide physical protection to cables and utility lines while also allowing easier maintenance, replacement, and expansion. Without conduits, buried cables would be highly vulnerable to moisture intrusion, soil movement, corrosion, accidental excavation damage, and other environmental hazards.

Underground conduit systems are commonly used in:

- Electrical power distribution
- Telecommunications and fiber optics
- Transportation signaling systems
- Industrial automation
- Renewable energy projects
- Municipal utility networks
- Commercial construction
- Data centers
- Airports and rail systems

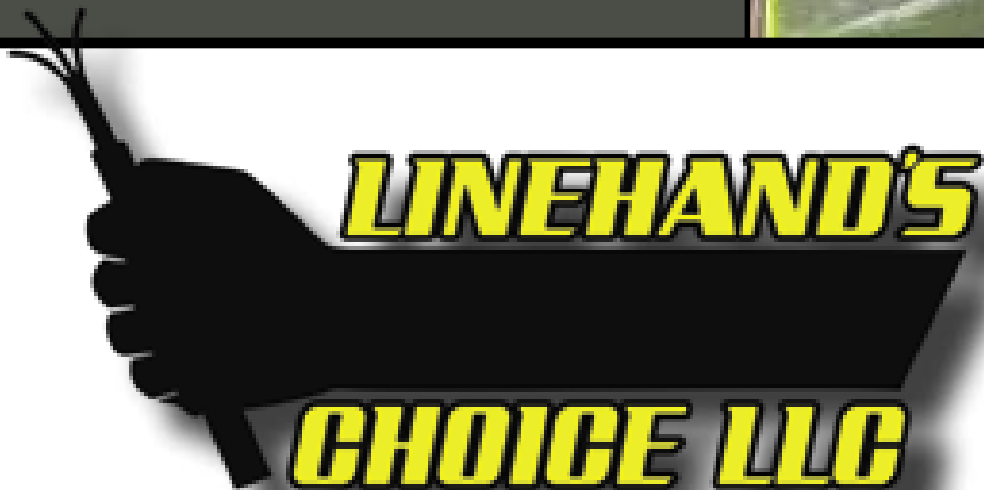
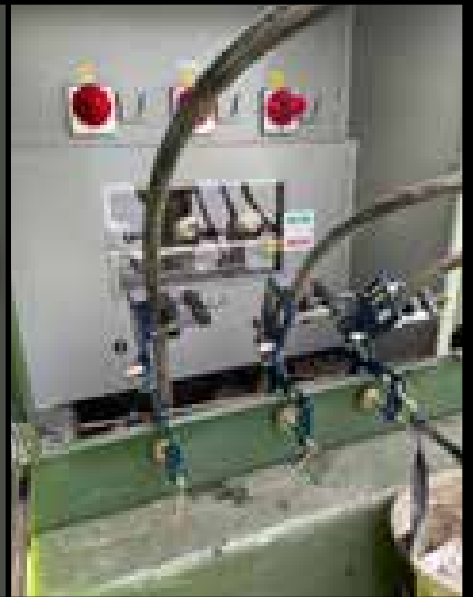
Modern infrastructure projects rely heavily on underground conduits because they provide a safer and more aesthetically pleasing alternative to overhead utility systems. In densely populated urban environments, underground utility corridors reduce visual clutter, minimize exposure to weather-related disruptions, and improve overall reliability.

The Evolution of Underground Conduit Infrastructure

The concept of underground utility protection is not new. Ancient civilizations used primitive underground channels for water transport and drainage systems. However, the widespread use of underground conduits for electrical and communication systems began during the industrial revolution and expanded significantly during the twentieth century.

As electrical grids expanded and cities became more densely populated, utility providers recognized the limitations and vulnerabilities of overhead wiring. Severe weather events, fires, falling trees, and urban congestion frequently disrupted service. Underground conduits emerged as a more secure and durable solution.

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In the early days, many conduit systems were constructed using clay tiles, cast iron pipes, or concrete ducts. Over time, advances in materials science led to the development of lightweight and corrosion-resistant materials such as PVC and HDPE, which revolutionized underground conduit installation.

Today's conduit systems are far more sophisticated than their predecessors. Advanced conduit technologies now include:

- Directional boring installation methods
- Flexible high-density polyethylene conduits
- Multi-duct bank systems
- Smart monitoring sensors
- Fire-resistant conduit materials
- Corrosion-resistant coatings
- High-capacity fiber optic pathways

These innovations have enabled infrastructure developers to install utility systems more efficiently while improving reliability and reducing maintenance costs.

Why Underground Conduits Matter

Protection of Critical Infrastructure

One of the most important functions of underground conduit systems is protecting critical infrastructure. Electrical cables and communication lines are vulnerable to numerous environmental hazards, including water, chemicals, extreme temperatures, physical impact, and soil pressure.

Conduits act as a protective barrier that shields utility lines from these threats. In industrial environments where corrosive chemicals or heavy machinery may be present, conduit systems provide essential protection that extends the operational life of electrical systems.

Underground conduit systems also reduce the likelihood of service interruptions caused by storms, hurricanes, ice accumulation, and falling trees. As climate change increases the frequency and severity of extreme weather events, underground infrastructure becomes increasingly important for maintaining resilient utility networks.

Public Safety

Safety is another major reason for the widespread adoption of underground conduit systems. Exposed electrical wiring presents serious hazards, including electrocution risks, fire hazards, and accidental damage.

By enclosing utility lines within protective conduits beneath the ground, communities can significantly reduce public exposure to dangerous electrical systems. Underground conduit systems also lower the risk of electrical fires caused by damaged overhead power lines.

In addition, underground utility placement helps prevent vehicle collisions with utility poles, which can result in severe injuries, fatalities, and prolonged power outages.

Urban Aesthetics and Space Efficiency

Overhead utility lines often create visual clutter that detracts from the appearance of cities and neighborhoods. Underground conduit systems provide a cleaner and more organized urban environment.

As cities seek to modernize and attract economic investment, aesthetic improvements become increasingly valuable. Underground utilities contribute to:

- Improved streetscapes

WHEN ONE LINE FAILS, EVERYTHING IS AT RISK.

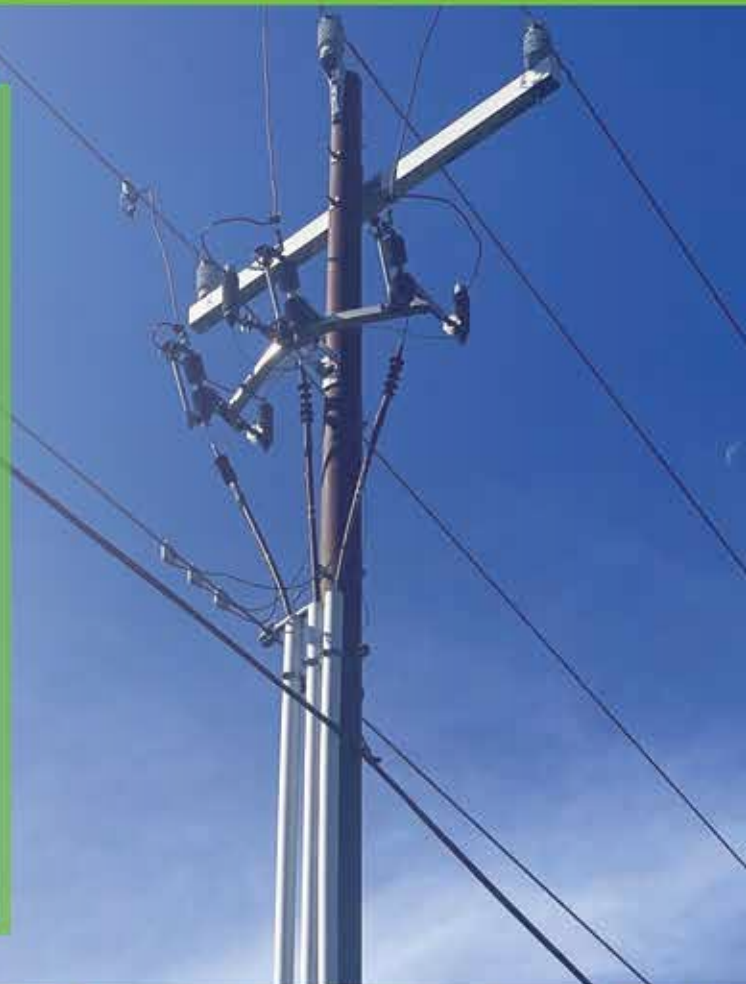
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In crowded metropolitan areas where space is limited, underground conduit systems allow municipalities to maximize land use efficiency while maintaining essential utility services.

Supporting Technological Advancement

Modern society depends heavily on digital connectivity. Fiber optic networks, data centers, 5G infrastructure, and smart city technologies all require reliable underground conduit systems. Without sufficient conduit capacity, cities may struggle to support future technological expansion. Installing conduits during infrastructure development allows for easier upgrades and expansion of communication networks.

The rapid growth of electric vehicles, renewable energy systems, and distributed power generation also increases demand for underground electrical infrastructure. Conduit systems provide the flexibility necessary to adapt to evolving technological needs.

Engineering Considerations in Underground Conduit Design

Designing underground conduit systems requires careful planning and engineering expertise. Several factors must be considered to ensure long-term reliability and performance.

Material Selection

Choosing the appropriate conduit material is critical. Different environments and applications require different material properties.

PVC conduits are widely used because they are lightweight, affordable, corrosion-resistant, and easy to install. However, they may not provide sufficient mechanical strength in certain industrial applications.

Steel conduits offer superior strength and durability but are more expensive and susceptible to corrosion if not properly protected.

HDPE conduits are increasingly popular for telecommunications and fiber optic installations because of their flexibility and resistance to moisture.

Engineers must evaluate factors such as:

- Soil conditions
- Moisture levels
- Chemical exposure
- Temperature extremes
- Mechanical loads
- Electrical requirements
- Installation depth

Load and Stress Analysis

Underground conduits are subjected to significant external forces from soil pressure, traffic loads, and ground movement. Proper load analysis is essential to prevent conduit deformation or collapse.

Engineers must calculate:

- Soil compaction forces
- Hydrostatic pressure
- Thermal expansion
- Surface traffic loads
- Seismic activity impacts
- Frost heave effects

Failure to account for these factors can lead to conduit damage, cable failure, and costly repairs.

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Drainage and Moisture Control

Water intrusion is one of the greatest threats to underground infrastructure. Poor drainage can accelerate corrosion, damage cables, and compromise system reliability.

Effective conduit design includes:

- Proper slope and grading
- Drainage channels
- Waterproof seals
- Corrosion-resistant materials
- Moisture barriers

In flood-prone regions, additional protective measures may be required to ensure long-term system integrity.

Accessibility and Maintenance

One of the key advantages of conduit systems is the ability to access and replace cables without

extensive excavation. Engineers typically incorporate pull boxes, manholes, and access points into conduit designs.

Well-designed access systems simplify maintenance operations and reduce long-term operational costs.

Installation Challenges

Installing underground conduit systems can be highly complex and expensive, particularly in urban environments.

Excavation Difficulties

Excavation work often encounters unexpected obstacles such as:

- Existing utilities
- Rocky soil conditions •

The advertisement features a dark blue background with a silhouette of a power transmission tower and a large, white, cylindrical electrical regulator on the right side. The regulator has various components, including a pressure gauge, a control panel with a red 'DANGER' label, and electrical connections at the top. The Sunbelt Solomon logo, a white circle with a stylized lightning bolt, is in the top left. The text 'SUNBELT SOLOMON' is in large, white, sans-serif capital letters. Below it, 'REGULATORS' is in a larger, bold, white, sans-serif font. A list of services is provided in white text: '24/7 customer support', '5 dedicated regulator shops across the US, with factory-trained technicians', 'Retrofitting to your preferred control panels', and 'Comprehensive field service offerings'. At the bottom left, 'GET A QUOTE TODAY' is in bold white text, followed by 'Evaluations and estimations provided on all units prior to repair' in smaller white text. On the bottom right, contact information is listed in white: '800.830.0251', 'info@sunbeltsolomon.com', and 'sunbeltsolomon.com'.

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OTR Expands Track Offering with E5 Tread Pattern for Smoother Rides, Surface-Friendly Performance

OTR Engineered Solutions (OTR) offers customers greater rubber track selection with its TrackBoss® E5 tread. The new track is an ideal solution for minimizing damage to sensitive surfaces without sacrificing performance.

“Operators shouldn’t have to choose between protecting the jobsite and getting work done. The E5 tread is designed to deliver on both, combining surface-friendly performance with the durability and traction customers expect from OTR track solutions,” said Michael Dembe, Vice President of Construction.

Featuring a distinct multi-bar pattern, the E5 tread combines the





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smooth ride of traditional straight-bar treads with the higher traction of those with multiple connecting points. Like all other tracks in the TrackBoss line, the E5 is made from exclusive rubber compounds that are formulated for enhanced tread durability and resistance to cutting and chunking. It's engineered for longer service life with no degradation in performance. The new tread is currently available in the most commonly used sizes and widths for compact track loaders.

"Innovations like the E5 tread reflect OTR's continued investment in expanding our track solutions and delivering greater value to customers worldwide," said Oscar Torres, President & CEO. "As we grow our presence across both aftermarket and OEM channels, we remain focused on providing high-performance solutions that meet the evolving needs of equipment operators and manufacturers."

Customers can easily find the best size and tread style for their equipment and application by using OTR's online Track Finder tool, which makes it easier than ever to identify proper track solutions. Many options are available for a wide range of equipment, such as carriers, compact track loaders, cranes, drills, and mini excavators.

OTR Engineered Solutions is a market-leading global enterprise specializing in off-the-road tire, wheel, and track solutions for original equipment manufacturers (OEMs) and aftermarkets. Known for being an innovator in multiple off-the-road applications, OTR differentiates itself by providing value-added services such as warehousing, tire mounting, and sequencing, among other things. The firm has long established strategic partnerships with OEMs covering Construction, Lawn & Garden, Powersports, Agriculture, Forestry, Mining, Material Handling, and Specialty Vehicle markets. OTR's infrastructure comprises 30+ facilities and warehouse locations throughout the U.S., Canada, Europe, and Asia, serving customers globally.

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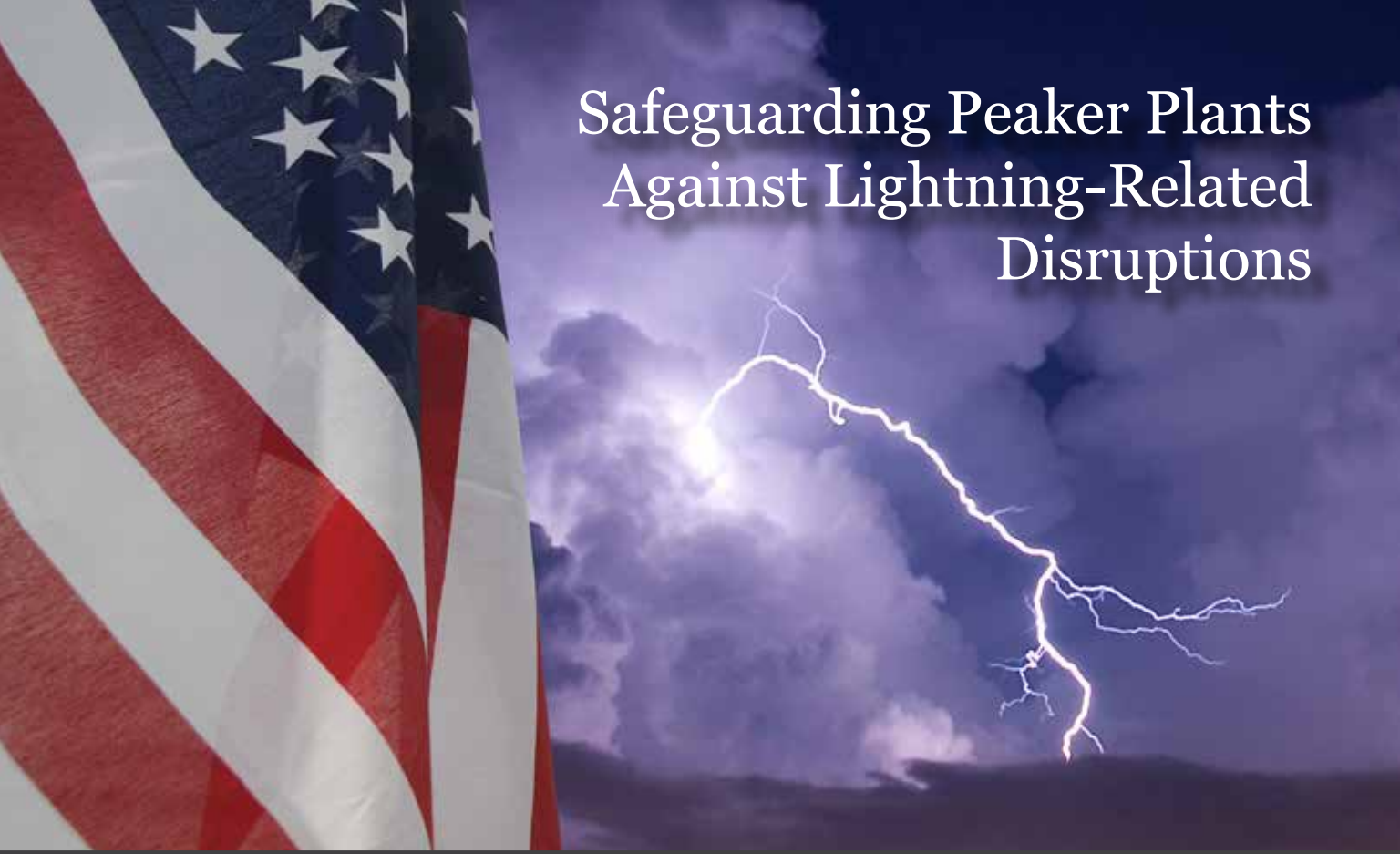
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Safeguarding Peaker Plants Against Lightning-Related Disruptions

Comprehensive lightning protection measures help keep peaker plants in a constant state of readiness, enabling them to deliver supplemental power at a moment's notice when electrical grids become overloaded

According to the latest federal data, the United States currently has just over one thousand peaking power plants in active service. Also known as peaker plants, these electric power generation facilities are designed to operate only during periods of high electricity demand. Their function is to supply additional grid support, activating when baseline utility power generators such as nuclear, coal, hydro-electric, or large combined cycle plants cannot meet short-term spikes in load.

Although simpler in infrastructure and more compact than traditional power generation facilities, peaker plants are among the most vulnerable to operational disruptions caused by direct lightning strikes and their secondary effects.

Peaker plants are particularly susceptible to lightning effects for several reasons. They often include prominent structures such as exhaust stacks, transmission towers, and open-air substations, all of which act as likely lightning strike collection points. Within the facility, large amounts of electrically conductive equipment are directly tied into the grid. Generating units, power transformers, switchgear lineups, control platforms, and communications networks operate under high electrical stress and are susceptible to transient overvoltage.

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Even in areas with infrequent thunderstorms, severe lightning events can still occur, leading to catastrophic damage, injury, downtime, fines, and negative impact to corporate reputation. When this occurs, the financial consequences can be devastating. A single strike can ignite fires, destroy valuable assets, and lead to costly downtime and environmental damage.

The secondary effects of lightning are also significant. Ground potential rise and electromagnetic energy coupling into control and instrumentation cabling can disrupt plant functions or damage sensitive hardware where grounding, bonding, surge protection, and shielding are not in place.

The operating profile of a peaking facility adds another layer of exposure. These units run only when supplemental capacity is needed and are designed for rapid startup, which often means long periods offline. Insulation systems, grounding networks, and related protective features must therefore remain dependable despite long periods of inactivity and cold equipment conditions.

Lightning-induced surges can introduce hidden degradation that may not appear during routine maintenance and inspections but later interferes with startup when the unit is urgently required for peak demand or grid support. The impact is considerable because these plants are called upon during periods of system grid stress.

For these reasons, peaker plants typically incorporate comprehensive lightning protection measures, including air terminals, which are designed to attract lightning and will only protect structures. Low-impedance grounding grids and transient voltage surge protection devices are also

included in the lightning protection measures. Lightning avoidance technologies may also be utilized, such as Charge Transfer technologies. A Charge Transfer System not only protects structures but allows reliable operation of the control and monitoring automation through the storm.

“Rather than offering a one-size-fits-all solution, lightning protection and mitigation recommendations should be tailored to a facility’s unique vulnerabilities, whether that involves direct strike avoidance, secondary damage caused by a nearby strike, or grounding improvements,” says Peter Carpenter, Director of Applied Engineering at Lightning Eliminators & Consultants, Inc. (LEC), a pioneer in the field of lightning protection since 1971.

LEC’s solutions protect critical operations and structures for some of the world’s most recognized companies, including Tennessee Valley Authority (TVA) nuclear facilities, Exelon, Constellation Energy, Duke Energy, and Consumers Energy, Federal Express, UPS, Marathon Petroleum, Chevron, ExxonMobil, and thousands of others.

Prevention is the Best Defense

According to Carpenter, the most effective defense is to prevent a lightning strike from occurring.

“This is a far superior solution than a lightning rod-based system that attracts lightning to the protected site and then attempts to manage the strike,” explains Carpenter.

Lightning occurs when the difference in potential between storm clouds and the earth reaches a critical level, triggering an electrical discharge. For lightning to strike, it requires a connection be-

tween a downward leader from the cloud and an upward streamer from the ground.

The Dissipation Array System (DAS®) from LEC is designed to prevent direct lightning strikes within its designated protection area by lowering the electric field to levels below those required for lightning to form.

“DAS prevents these connections by using point discharge technology, which neutralizes the charge differential before a strike can occur. Through a system of well-grounded points, DAS facilitates the exchange of ions between the air and the ground, disrupting the conditions necessary for a lightning strike,” says Carpenter.

DAS can be integrated with a wide range of structures, including buildings, towers, tanks, and stacks. Since its inception, over 4,500 DAS installations have been deployed worldwide, accumulating more than 100,000 system-years of effective performance. Testimonials from industry leaders confirm its effectiveness, with companies reporting significant reductions in downtime, maintenance costs and improved reliability.

LEC even offers a “No-Strike” warranty for all supervised installations, ensuring complete protection when the system is properly maintained and inspected.

The effectiveness of DAS is enhanced when combined with a comprehensive lightning protection system that includes a low-impedance grounding system, transient voltage surge suppression, and modular strike prevention devices. Together, these components ensure optimal protection against both direct strikes and secondary electrical surges.

Lightning Risk Assessments

Due to the wide range of available technologies, mounting an effective defense against lightning-related threats typically requires a tailored strategy that integrates multiple solutions, each having its own specific purpose for minimizing damage or avoiding it altogether. The optimal combination depends on the specific site conditions and the nature of the operation.

Carpenter says the appropriate combination of solutions can only be determined through a comprehensive evaluation of each facility's current protection measures, grounding systems, and overall risk exposure.

“Understanding a peaker plant's past issues, vulnerabilities, and protection goals helps determine whether the solution should focus on grounding enhancements, surge protection, direct strike avoidance, secondary damage from a nearby strike, or a combination of all three,” says Carpenter.

By conducting a thorough site assessment, LEC helps facilities identify vulnerabilities and implement customized mitigation strategies, whether that means improving grounding, adding targeted surge protection, or implementing direct strike mitigation solutions.

This proactive step not only safeguards critical infrastructure and personnel but also helps prevent costly disruptions and reinforces a facility's long-term resilience against lightning-related threats.

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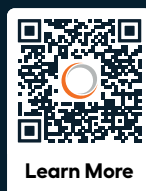
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