dura-line

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MicroTrenching Enables Better Travel and Middle-Mile Expansion

along the Pennsylvania Turnpike

The Pennsylvania Turnpike has been an integral part of life for communities and travelers across the Northeastern United States since 1940.

For the Turnpike's planners and managers, ensuring safe and efficient travel is a constant priority. And as holders of enormous potential in rights of way, they also have an opportunity to provide middle-mile connectivity to underserved and rural communities across Pennsylvania.

PENNSYLVANIA TURNPIKE FIBER OPTIC NETWORK AT A GLANCE

Exisiting Turnpike
Turnpike Expansion

Over 500 miles MicroTrenched

288-count fiber optic cable

DURA-LINE PRODUCTS USED:

FuturePath 8-way 16/12

FuturePath 8-way 12.7/10

16-inch MicroTrench cut along the shoulder, five feet from white line

What is an Integrated Transport System (ITS)?

An ITS is a comprehensive transportation model that relies on advanced technologies and massive streams of data to make transportation networks more efficient, safer, and more sustainable using technologies like sensors, communication systems, data analytics, and real-time monitoring to optimize transportation systems and improve travel. ITSs offer regions and cities:

Real-Time Information on traffic conditions, public transport schedules, and travel times which informs commuters' decisions.

Interconnectivity, linking different modes of transport, such as buses, trains, bicycles, and cars, to ensure seamless transitions.

Traffic Management through smart traffic lights, dynamic signage, and congestion monitoring to manage road networks effectively.

Increased Safety through collision avoidance, automated braking, and emergency response mechanisms.

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Sustainability by reducing emissions through efficient route planning and vehicle usage.

Payment Integration, by enabling unified payment systems, like smart cards or mobile apps, for multiple modes of transport.

Why use fiber for your ITS?

Fiber is a natural fit for ITS because it easily supports:

High Data-Transfer Speeds, essential for transmitting large volumes of real-time data from sensors, cameras, and control centers.

Reliability—fiber is less prone to interference and can operate over long distances without significant signal loss.

Scalability, which supports future upgrades and expansions.

Low Latency, critical for applications like traffic signal control, emergency vehicle prioritization, and collision-avoidance systems.

CHALLENGE:

Building Safer, More Connected Roadways and Bridging the Digital Divide

Since 2003, the **Pennsylvania Turnpike Commission (PTC)** has been working to transform the Turnpike into a fully connected ITS in response to the rapidly increasing need for greater connectivity among their communications. Where in the past, leased lines and microwave towers were adequate, now a 14% average annual bandwidth growth, 24% average annual increase in connected devices, and 212% average annual increase in storage demands meant that the PTC would need its own fiber optic network—both to meet this growing demand and to adopt advancements in transport technology, like all-electric tolling and autonomous vehicles.

A roadside fiber network also presented opportunities for a much-needed middle-mile connection and its ensuing benefits to rural communities between Pennsylvania's major cities. Along the Turnpike, the broadband revolution has passed by many rural Pennsylvania communities, with the high cost of extending fiber coverage leaving low-density areas severely underserved. The PTC — like many other transportation authorities— were in a position to provide this connectivity through their right of way.

When contractors **Thoroughbred Construction** and **Kokosing Construction** were tasked with building out part of this network, the primary challenges of the installation were clear.

"We're out there every night taking right-lane closures, working next to live traffic, which poses a lot of challenges getting people out on the roadway, and then everything we do has to finish that night and get off the roadway," Kokosing Project Manager Mitchell Radigan shares.

While some of the network deployed fiber aerially, over 500 miles will be placed inside FuturePath 8-way from Dura-Line, all in a 16-inch deep MicroTrench with 13 inches of reinstatement. Once complete, the entire network will cover 563 miles, with over 3 million feet (625 miles) of Dura-Line conduit installed.

Getting an efficient and low-impact installation method was crucial for a compact space—a shoulder of just 12 feet in width—across a long and large-scale project, all of which would require working at night along a busy roadside. In addition to assembling and training the right team, the choice of installation method could impact the amount of time, money, and safety of all the crews involved.

SOLUTION:

A Fast, Efficient Installation Method That Allows For Greater Coverage

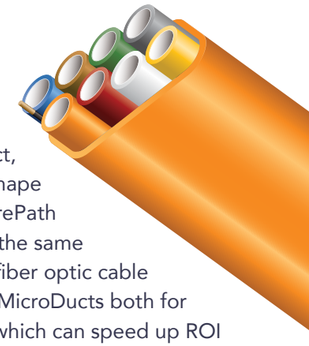
PTC chose MicroTrenching and MicroDucts to expand connectivity along the Pennsylvania Turnpike. Unlike traditional trenching methods that often require wide and deep excavations, MicroTrenching involves using a rotary blade to make a narrow cut, which results in less damage to roads, sidewalks, and landscaping, and can provide yields of several hundred meters of fiber laid per day.

While a key challenge for a project of this scale was logistics, Radigan notes that the biggest advantage that MicroTrenching brought to the process remains its efficiency as an installation method:

"With the restoration happening in the same night, there's not a lot of open holes behind you, so it becomes a very efficient way to progress. In city streets where you want the lowest impact possible, it's a very quick installation method."

RESULTS:

More Ground Covered in Less Time, with Lower Impact, at a Lower Cost



MicroTrenching allowed installers to cover more length of this 563-mile fiber build in less time than traditional trenching methods.

FuturePath 8-way, used in two sizes for the majority of this project, provides a convenient, compact shape for MicroTrenching. Because FuturePath also provides several pathways in the same solution, PTC was able to deploy fiber optic cable and reserve the remaining empty MicroDucts both for their own future use and leasing, which can speed up ROI for the PTC and eliminate a significant barrier to entry for operators to serve the underserved along the Turnpike.

And while adoption continues to grow across the industry, the advantages of MicroTrenching have been proven, not the least of which is cost savings.

Compared to traditional open trenching, MicroTrenching can generate on average between 50% to 75% reduction in costs.

MICROTRENCHING KEY STEPS

1. Sawcutting a narrow, shallow trench in roadways or sidewalks, usually 1-2 inches wide at depths of 20 inches or less
2. Laying conduit, backfilling, jetting cable into the conduit inside the trench
3. Backfilling the trench with a protective reinstatement material and sealing it
4. Achievable daily yields of up to 2,000 ft. in ideal conditions

Paving the Way for Other Innovative Roadside Networks

Transportation agencies and authorities around the globe are in a unique position as the holders of rights of way. By capitalizing on rights of way through long stretches of landscape and through communities, agencies and authorities can unlock enormous potential to improve and streamline their own communications, as well as deliver connectivity where it can make the biggest positive impact to quality of life.

Installing fiber along planned upgrades or expansions—especially if housed in FuturePath and installed with innovative and low-impact methods like MicroTrenching—enables transportation agencies like PTC to accomplish their short- and medium-term goals while creating space for exciting future possibilities:

Enable healthier competition and lower costs for customers, because the new middle-mile fiber removes a key barrier to entry for competitive internet service providers (ISPs) to serve the underserved in rural and/or remote communities.

Collaboratively implement Dig Once, as emphasized by federal broadband infrastructure policies, which lead to greater broadband coverage in underserved areas.

Deploy fiber in innovative ways to streamline and expand current capabilities through emerging technologies —like fiber optic sensing and autonomous vehicle readiness— to make traveling even more efficient and safer.

Interested in how MicroTrenching with FuturePath can make your installation faster, less costly, and with lower impact? Check out footage of the installation to learn more.

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