Fiber Deployment – a low impact approach

An introduction to microtrenching

JUNE
2020
Overview

This is about connectivity, connecting everyone;
This is about tele-health, tele-education, tele-firefighting;
This is about self-driving cars, real time and augmented data;
Connectivity for first responders, drivers, educators, nurses, doctors, sports fans, gamers, working from home and improving the home experience.

Today's presentation is about one tool that can expedite a means to connect, everyone.
Agenda

1. Panelists Introduction
2. About Crown Castle
3. Microtrenching Overview
4. Los Angeles Success Story
5. Q&A
Panelists Introduction

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Vice President – Network Design & Construction West Region
Crown Castle

Scott Longhurst
Government Affairs Manager
Crown Castle

Kevin James
President of Board of Public Works Commission
City of Los Angeles
Our role in your world.

We own and operate the nation’s most unique and comprehensive portfolio of communications infrastructure. It all works together to meet unprecedented demand—connecting people, businesses, and communities and erasing life’s conventional boundaries.

Our infrastructure transforms everything around us.

People
We connect people to the devices, apps, and data they rely on to communicate, stay informed, and live their lives to the fullest.

Businesses and organizations
We make sure businesses and other large organizations have secure access to the essential data and applications they need to embrace new technologies and stay ahead.

Communities
We provide connections that improve safety and efficiency and that make communities better places to live.

Schools and universities
Our fast, secure fiber networks support new learning technologies in the classroom and promote groundbreaking research in higher education.

First responders
We give police officers, firefighters, and EMTs secure access to the information they need to react quickly to emergencies.

Venues
We give stadiums, convention centers, amusement parks, and other venues the wireless coverage and capacity to accommodate large crowds.

Innovators
We help deploy exciting new technologies that build smarter communities and create new opportunities for cities and technology companies alike.

Cell towers
Towers receive and transmit cellular signals over a large geographic area—carrying the voice and data that people send and receive on their wireless devices.

Fiber
Using pulses of light, fiber optic cables are the fastest and most efficient way to transmit wired or wireless data through both the public internet or private intranets.

Small cells
Lower to the ground, and often attached to streetlights or utility poles, small cells add additional wireless coverage and capacity—or bring new coverage where towers aren’t feasible.

Neutral Host Infrastructure Provider

25 Years of Experience
Nearly 100 offices
5,000 Employees

75K+ route miles of fiber
65K+ small cells on air or under contract
40K+ towers on air or under contract
Crown Castle’s California Presence

- 460 Resident Full-Time Employees
- 7 Offices
- 4,415 Towers
- 14,980 Small Cells
- 10,565 Fiber Miles
- 170+ Government, School & Public Safety Customers
- 2,840 Buildings Connected by Fiber

Contract Vehicles
- CALNET CA Dept of Technology – DNCS (IFBC4DNCS19)
- General Services Administration IT MAS Schedule 70 Contract No. GS-35F-465DA, SIN 132-52
- Defensive Information Technology Contracting Organization Basic Agreement BA HC101320H0006
- Michigan Collegiate Telecommunications Association MSA-MICTA 2, MICTA 3, MICTA 4
New technologies are driving greater data demand and usage.

More devices, faster speeds, and more data-heavy traffic.

2x Expected growth in broadband speed from 2017 to 2022.

10B+ Expected growth in connected devices from 2017 to 2022.

82% Expected amount of all consumer internet traffic that will be video by 2022.

A Means to Build a Network

Microtrenching
How we define Microtrenching

- 12" to 16" Deep
- 2" Wide
- 2 Conduit Installation: 1 – traditional 1.25" dia; 1 – 7-way microduct
- Capable to Carry 2,880 Fiber Strands

- Minimal Traffic Disruption
- Same Day Restoration
- Minimal Existing Infrastructure Impact
- Compliant with CA Regs
Microtrenching - an innovated and improved way to install fiber
Faster, smaller, and less disruptive from installation to restoration

- 80% faster than traditional trenching
- Minimal disruption to traffic
- Less noise and equipment
- Fewer resident complaints
- Less waste and debris from microtrenching are vacuumed up during process
- Fewer new materials needed to reinstate roadway

Typical width of 2”
- Minimizes impact to your streets and municipal infrastructure

Typical depth of 12” – 16”
- Ability to avoid many underground obstructions and existing utilities
- Deep enough to not be in conflict with future road work
Microtrenching and Microfiber

**Microtrenching**

**Open cut trenching**

VS

- Polyethylene Jacket
- Core Binders
- Buffer Tubes
- Ripcords
- Optical Fiber
- Central Strength Member
- WB Binders
And we’re using it successfully in communities around the country.

Austin, TX
Boston, MA
Charlotte, NC
Chicago, IL
Dallas, TX
El Paso, TX
Lexington, KY
Los Angeles, CA

Louisville, KY
Manhattan Beach, CA
Miami-Dade County, FL
Mt. Vernon, NY
New York City, NY
San Diego, CA
Scottsdale, AZ
Reinstatement Materials

Corbel Trench Fill

Corbel Trench Fill
Micro Trench Reinstatement Material

DESCRIPTION
Corbel Trench Fill is a one-component, rapid setting, low shrinkage, extendable cement that is used for reinstatement of a micro trench. Corbel Trench Fill is mixed with aggregate and water on site for large scale micro trench and small street cut out applications. The mix is placed in the microtrench in one pass, rolled to smooth and create texture and ready for traffic in 2-3 hours.

WHERE TO USE
- Airport runways
- Asphalt streets
- Asphalt street/curb joint
- Concrete street and curb
- Street cut out where digging under curb

FEATURES/BENEFITS
- Rapid Setting: Structures can be opened in 2-3 hours
- Shrinkage compensation minimizes cracking from drying Shrinkage
- Excellent resistance to freeze/thaw
- Excellent workability
- Can be dyed to match surface
- Low permeability

YIELD
Approx. 3 yards per bulk-bag/super sack but largely dependent upon aggregate proportion

PACKAGING
- 50 lb bag
- 80 lb extended with sand
- 2,000 lb bulk bag
- Bulk

STORAGE
Store and transport in clean, dry conditions

APPLICATION TEMPERATURE RANGE
40°F to 90°F (Hot weather placement procedures recommended above 90°F; Cold weather placement procedures recommended below 50°F)

Safetrack MTI

Safetrack MTI
Micro-Trench Infill System

Product Description
SAFETRACK™ MTI is a cold, liquid applied, self-compacting, flexible roadway reinstatement system based on Sterling Lloyd’s (now part of GCP Applied Technologies) unique Essella™ resin technology. Its fast cure and overall versatility make this product ideal for underground small cell and optical fiber installations.

Product Advantages
- Rapid cure - fast return to service within short drive-on times
- Cold applied, no hot tools
- Free flowing - no compaction required
- Insolvent mechanical interlock
- Does not deform under traffic load
- Custom re-size coloring - One can be added for creating an orange dig-safe indicating layer as well as the ability to match the color of the substrate
- Minimal adhesive sensitivity to moisture

SAFETRACK™ MTI Application

<table>
<thead>
<tr>
<th>Temperature/F Substrate</th>
<th>Typical Working Life</th>
<th>Typical Cure Time(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>45°F</td>
<td>15 minutes</td>
<td>60 minutes</td>
</tr>
<tr>
<td>65°F</td>
<td>10 minutes</td>
<td>35 minutes</td>
</tr>
<tr>
<td>77°F</td>
<td>13 minutes</td>
<td>25 minutes</td>
</tr>
<tr>
<td>88°F</td>
<td>15 minutes</td>
<td>50 minutes</td>
</tr>
<tr>
<td>98°F</td>
<td>12 minutes</td>
<td>40 minutes</td>
</tr>
</tbody>
</table>

* See safety data sheet for more information.
** Local GCP representative for advice.
* Based on field performance and comparable systems.
** Tested at 30°F and 75°F, similar results at 40°F and 60°F.
Corbel Trench Fill

- Western Materials & Design FasTrac 400 Cement
- Other uses include dowel bar retrofits, concrete slab replacements, and highway & runway repairs
- Rapid setting concrete cement slurry mixed on site and applied in one pass
- Free flowing and self-consolidating so no compaction is required
- Designed for use with both asphalt and concrete
- Can fill to grade, or fill most of the way and then apply Safetrack MTI as the top layer
Safetrack MTI

- GCP Applied Technologies (previously Stirling Lloyd) Safetrack RMP 100
- Has been used for years throughout Europe and other parts of the world
- Cold applied liquid is free flowing and self-consolidating, so no compaction is required
- Fast curing and bonds to existing roadway, flexible and does not deform under traffic load
- Designed for use with both asphalt and concrete
- Overband provides clean application and prevents ingress of water
Example 5 year old Microtrench - Austin, Texas
Originally installed in 2015
Photos taken February 2020
Los Angeles Success Story
Los Angeles Success Story

Summary of approval process

- Met with City Council and Bureau of Engineering to introduce idea and benefits
- Completed Parking Lot Demonstration and follow up testing of core samples
- City created Ordinance No. 186444 to incorporate microtrenching into Municipal Code
- City Council voted and approved Ordinance
- Bureau of Engineering created City of LA Microtrenching Standard Plan S-474-0

ORDINANCE NO. 186444

An ordinance amending Section 62.00 and 62.03 of the Los Angeles Municipal Code to decrease the minimum installation depth requirements and to adjust the Street Damage Restoration Fee for substructure utilities placed via micro-trench and similar installation methods.

THE PEOPLE OF THE CITY OF LOS ANGELES DO ORDAIN AS FOLLOWS:

Section 1. Section 62.00 of the Los Angeles Municipal Code is amended to add the following definition in alphabetical order:

"Micro-trenching" shall mean a narrow open excavation trench for the purpose of installing a subsurface pipe or conduit. The trench shall be less than or equal to 8 inches in width and less than or equal to 26 inches in depth, or as otherwise defined by the City Engineer in an adopted Standard Plan.
Los Angeles Parking Lot Demonstration
Los Angeles Example Project
Microtrenching Fiber: A Hosted Walkthrough

https://www.youtube.com/watch?v=rIoGDUXYw&feature=youtu.be
Questions?
Thank you

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