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Corbel
MICROTRENCHING
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Thank You for Attending the First Microtrenching Summit

• Fellow Speakers
• Friends
• Sponsors and Partners
• Rick Dvorak
• Tanya, Kay, Molly, Jennifer, and Dura-Line Team
• Victor, Josh, Javier and Corbel Team
• Darnell Sutton and HWDC Team
• Angelo Pino and Stephen Javakian
• Mayor Richard Thomas
• Known for Innovation and Continuous Process Improvement
• Capable of Handling any Challenging Project
• Have Been Pioneers in Microtrenching with Great Partners in our Clients, Duraline, Ditch Witch, Backfill Manufacturers.
More than 5,000,000 LF of MT completed.
Our Promise

• Combining a wealth of experience, technology expertise, and a talented and certified staff, Corbel provides customers with the highest quality of survey, design and engineering, the safest construction, in addition to an unprecedented level of professionalism, and the most cost effective solutions available.
Overview > Services & Solutions

We are a full service turnkey contractor. A one stop shop that completes the entire cycle from survey and design through engineering and construction to installations and testing.
What Makes Corbel Unique?

- Have helped pioneer the microtrenching processes used today.
- The most experience in microtrenching in the United States.
- The latest technology and working with manufacturers on the next generation of equipment.
- Working with Cities to gain approval.
- Developed own unique backfill mix.
- Demonstrated national abilities and proven its model across the United States.
Microtrenching

“Unlike traditional trenching, which is primarily used in soil and may be cut to four feet deep and four to eight inches wide. Microtrenching, as its name implies is used cut a narrow, shallower trench. It ranges from ¾ in. to 2 in. Wide and a maximum depth of 26 in.”
Types of Installations

- Small Cell
- Smart Cities
- Fiber to the Premises
- Rural Broadband
- Enterprise Laterals
- Backbone
- Low Voltage Electric
Comparison of Installation Speed

- Central Business Districts
  - 17 nodes in Dallas would have taken 8 Weeks. We did it in 3 days!

- Fiber to Premises
  - Missile Bore – 1000 LF per day with a lot of manpower.
  - Directional Drill 500-700 per day in ideal conditions per machine.
  - Plowing and Missile Bore under driveway – 1000 LF per day.
  - Microtrenching 4,000LF per day!
Reduced Complaints
Utility Strikes
Countermeasures that can be Implemented

- Utility Locates
- Ground Penetrating Radar
- Test Pits

Shallower Depth Reduces Hits Dramatically
Savings Example

- 20,000 Nodes
- Half Can be MT = 10,000 Nodes
- Avg of 400 LF per Location
- Total of 4,000,000 LF
- Avg cost of conventional $200 per LF = $800,000,000.00 (80K per Node)
- IF MT = AVG $60 per LF = $240,000,000 (24K Node)
- Potential Savings $560 Million and Much Faster Deployment
- If invested savings into expansion could deploy approximately 23,000 additional sites
Successful Deployments

- Boston MA
- New York City
- Eagan MN
- Louisville KY
- Nashville TN
- Charlotte NC
- Atlanta GA
- Wintergreen VA
- Washington DC

- Austin TX
- San Antonio TX
- Gatlinburg TN
- Wintergreen VA
- Philadelphia PA
- Los Angeles CA
- Fullerton CA
- Chicago IL
Along Gutterline - Austin TX
Along Gutter - Dallas TX
Offset from Curb - San Antonio
Concrete Streets - Louisville KY
Traditional Streets
Behind Sidewalks, Under Pavers
Backfill Approach

• Reduce Cost of Thermoset Resins and Other Chemical Compounds
• Find something that has high adhesive capability
• Find a product that will set quickly and not be susceptible to Tire Tracks
• Find a Product that Won’t Flow out of trench when on inclines.
• Find a Product that has minimal shrinkage

Corbel Trench Fill
Corbel Trench Fill

Micro Trench Reinforcement Material

DESCRIPTION
Corbel Trench Fill is a one-component, rapid setting, low shrinkage, extruded cement that is used for reinforcement of a micro trench. Corbel Trench Fill is mixed with aggregate and water on site for large-scale micro trench and trenchless street cut-off applications. The mix is placed in the micro trench 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 shoulders/curb joints
- Concrete street and curb
- Street cuts on and under curb

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

YIELD
Approx. 3.5 pounds per cubic yard of dry mix, which is approximately 100% effective yield, depending upon aggregate proportion.

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

STORAGE
Store and transport in dry, cool, and dry conditions.

APPLICATION TEMPERATURE RANGE
40°F to 100°F (the weather placement procedures recommended above 90°F. Cold weather placement procedures recommended below 90°F).

HOW TO APPLY
Surface Preparation (See ICRI guidelines):
1. Concrete must be sound and fully cured (28 days).
2. Saw out the perimeter of the area being patched to a square with a minimum depth of 1/2" (13 mm).
3. Remove all paint, oil, grease, curing compounds, and other contaminants that could prevent adequate bond.
4. The concrete substrate should be saturated with water. (SSD) substrate has been used.
5. Mix with aggregate and apply the mixed material onto the prepared saturated surface-dry (SSD) substrate. Best practices to ensure there are no air pockets. Ensure proper compaction of the mortar and compaction around reinforcing steel. Minimum application thickness is 1". Finish the compaction repair, as required, taking care not to overwork the surface.

Reinforced Steel
Removes all oxidation and scale from the exposed reinforcing steel in accordance with ICRI Technical Guideline No. 03730. "Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion."

Mixing
- Approximately 0.38-0.42 parts of cement to 1 part of water. Conduct field trials to verify proper slump (4-inch to 8-inch) consistency.

Set time
- Min. 72°F (22°C) ASTM C 191
- Mid: 20-30 minutes
- Final: 30-40 minutes
- Long: 40-50 minutes

Chloride Penetration - Time of wetting: 360 min (ASTM C 1202)
- Time: 12 hours
- 7 days: 95%
- 28 days: 97%

Compressive Strength - 2" dia. cylinder, ASTM C 39
- 24 hours: 3,000 psi (20.6 MPa)
- 3 days: 4,300 psi (29.4 MPa)
- 7 days: 5,740 psi (40.1 MPa)
- 28 days: 6,600 psi (45.2 MPa)

Shear Bond Strength - ASTM C 892
- 24 hour: 2,700 psi (18.9 MPa)
- 7 day: 2,400 psi (16.5 MPa)
- 28 day: 2,900 psi (20.0 MPa)

Shrinkage - ASTM C 197, Air Cure
- 28 day: 0.095% (0.009%)

Curing
Cure immediately after finishing. Use a curing compound that complies with ASTM C 309. For curing dry product, use a wetting agent and keep the area covered with wet material. The product is typically furnished in a plastic bag. Follow the manufacturer's instructions for curing and storing the product. Curing is typically recommended for up to two years between applications.

Clean Up
Clean tools and equipment with clean water immediately after use. Cured material must be removed mechanically.

Health and Safety
Make certain the most current versions of product data sheet and SDS are being used.

Risks
Product contains water-reducing agent and sand (crystalline silica). It can cause skin and eye irritation. Inhalation or ingestion of dust may cause respiratory irritation. This contains free respirable quartz, which has been linked to suspected human carcinogens by NTP and IARC. Repeated or prolonged overexposure to free respirable quartz may cause silicosis or other serious and delayed lung injury.

Precautions
KEEP OUT OF THE REACH OF CHILDREN. Prevent contact with skin and eyes. Prevent inhalation of dust. DO NOT inhale. Use only with adequate ventilation. Use protective glasses, eye protection and if the TLV is exceeded or is used in a poorly ventilated area, use NIOSH/MSHA approved respiratory protection in accordance with applicable federal, state, and local regulations.

First Aid
In case of eye contact, wash thoroughly with water for at least 15 minutes, and seek medical attention. In case of skin contact, wash affected areas with soap and water. If the irritation persists, seek medical attention. Remove and wash contaminated clothing. If irritation causes physical discomfort, remove to flush off. If the discomfort persists, resulting difficulty occurs, or if swallowed seek medical attention. Refer to Safety Data Sheet (SDS) for further information.

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State of the Art QA/QC
Where is the Future heading in MT?

- Better Partnerships with City’s and Right of Way Providers
  - Select Location together.
    - Gutterline
    - In Roadway
    - Behind Curb
    - In Sidewalk
    - In Marking Stripes
  - Reduce Costs of Entry for Carriers will help residents and businesses.
- Recycling Spoils from Trenching
- Faster Speeds
- Less Impacts
- Deeper Depths
Microtrenching

- Safer
- Faster
- Cheaper
- Less Invasive
- Less Disruptive
- The Path Forward to winning the 5G and technology race.
Q&A