Vac Excavation

March 21st, 2019
Discussion Topics

• Best Practices
• Test program
• Keys to success in HDD applications
• Dielectric misconceptions
• Disposal
Best Practices

• GTI recommendations widely accepted/Ditch Witch.com- Dig Safe
• Maximum water pressure
• Technique when excavating
• Minimum distance between nozzle and utility
• Heated water limitations
Test Program

• Explore consequences of different variables
  • Nozzle selection
  • Materials (type of utility)
  • Distance
  • Water pressure
  • Exposure
  • Water temperature

• Intent was to define threshold of no damage
Test Parameters

- 0.5” to 8” distance
- Exposure: 5 sec, 10 sec and constant movement
- Up to 3,000 psi
- Nozzles
  - Fan (15º F angle)
  - Conical #1
  - Conical #2
  - Linear
- Ambient and 180º F
- Various products
Results
Types of Utilities Tested

Fiber optic

Old electric line

Gas

New electric
Fan
0.5” distance
1,500 psi
5 sec
Ambient temp

Conical #2
0.5” distance
3,000 psi
10 sec
Ambient temp
**Fan**
- 0.5” distance
- 2,000 psi
- 5 sec
- Ambient temp

**Conical #1**
- 0.5” distance
- 3,000 psi
- 10 sec
- Ambient temp
Linear  
0.5” distance  
2,000 psi  
10 sec  
Ambient temp

Linear  
0.5” distance  
2,000 psi  
5 sec  
Ambient temp
Linear 8” distance
2,000 psi
10 sec
Ambient temp

Linear 0.5” distance
2,000 psi
10 sec
Ambient temp
Linear
0.5" distance
2,500 psi
10 sec
Ambient temp
Conical #1

- **Fiber optic**
  - 0.5”
  - 3,000 psi
  - 5 sec
  - Ambient temp

- **Old electric line**
  - 0.5”
  - 2,500 psi
  - 5 sec
  - Ambient temp

- **Gas**
  - 0.5”
  - 3,000 psi
  - 10 sec
  - Ambient temp

- **New electric line**
  - 0.5”
  - 2,500 psi
  - 10 sec
  - Ambient temp
Conical #2

Fiber optic
0.5”
3,000 psi
10 sec
Ambient temp

Old electric line
0.5”
3,000 psi
10 sec
Ambient temp

Gas
0.5”
3,000 psi
10 sec
Ambient temp

New electric line
0.5”
3,000 psi
10 sec
Ambient temp
Conical #1
0.5” distance
2,500 psi
10 sec
180° F

Ambient Temp
Key Findings

• Nozzle selection is critical
• Exposure: Constant motion reduces damage
• Water temperature has noticeable impact
Nozzle Summary

• Four important considerations
  • Fan: Not recommended for exposing utilities
  • Linear: Not recommended for exposing utilities
  • Conical #1: Excellent performance at all distances
  • Conical #2: Excellent performance at all distances
Recommended Procedures

- Select proper nozzle
- Adjust pressure and/or temperature as needed
- Keep tip of nozzle in motion
- Don’t insert nozzle into soil
- Nozzle should never touch utility
- Keep loose spoils removed for visibility
HDD Applications
Success in HDD Application

• Many contractors are exposing utilities
• Increasing number leaving utility exposed while crossing and backreaming
• Alternative is measure depth and document with photos
Dielectric Misconceptions
Dielectric

• Increased discussion about dielectric tools
• All dielectric materials are insulators, not all insulators are dielectric
• Dielectric boot requirements are dictated by a standard (ASTM F1117)
  • “Dielectric boots,” therefore, has strict definition
• Vacuum tools are not dictated by a standard
  • Stating “dielectric” does not tell the entire story
Applications

HDD

Hydrovac
Before and After

MetaFLO Treated Directional Drilling Fluid

Before

After
In field bulk mixing of hydrovac mud
Case study - Hydrovac

Before

After
Large bore HDD site set-up example
Solidified HDD Fluid with LMS and MF002
Bulk mixing – hydrovac offload
Questions?